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THE  
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Contract Reporter.

A WEEKLY

ILLUSTRATED JOURNAL

OF

ART,

CIVIL ENGINEERING,

AND

BUILDING.

*"Architecture!—the most suitable field in which the genius of a people arrived at superiority may range."*—HORACE WALPOLE.

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# THE ARCHITECT AND CONTRACT REPORTER. A JOURNAL OF ART, CIVIL ENGINEERING & BUILDING.

## THE WEEK.

ONE advantage of Free Trade is that all the materials used in their offices by English architects can be obtained at moderate prices, although they may be manufactured abroad. In Canada, where duties have to be paid on imported articles, it is necessary for an architect to imitate POPE, the poet, and become "paper-sparing." On drawing-paper the duty is 25 per cent. of value; one kind of tracing-paper also pays 25 per cent., while on another kind the duty rises to 35 per cent. On tracing linen, black print paper and blue print paper the duty is 35 per cent. Inks, colours, drawing and surveying instruments are mulcted with 25 per cent. It was probably expected that by taxing materials an impetus would be given to Canadian manufactures. But there are so few architects in any part of Canada, it would not be worth while to set up paper-mills in the expectation of their patronage. The tax, therefore, is levied on the incomes of architects, who cannot, in consequence, charge any higher commission to their clients.

A BILL has been drafted which, if it should become law, will enable local authorities to grant superannuation to officers and servants similar to what is allowed under the Poor Law Officers' Superannuation Act. It is assumed that a percentage varying from two to three per cent. of the salaries and emoluments will be subscribed by those who are to benefit by the arrangement. The proposed scale of superannuation is as follows:—An officer or servant who has served for ten years but less than eleven years shall be entitled to an annual allowance equal to ten-sixtieths of the average amount of his salary or wages and emoluments during the five years ending on the quarter day which immediately precedes the day on which he ceases to hold his office or employment, with an addition of one-sixtieth of such average amount for every additional completed year of service until the completion of a period of service of forty years, when a maximum allowance of forty-sixtieths shall be granted. It is provided that an officer who loses his appointment through fraud or grave misconduct forfeits all claim to superannuation, but he may be paid a sum which will correspond with his contribution to the fund. There can be no doubt that at present municipal officers have to suffer through the non-existence of an Act of the kind proposed. Engineers and surveyors give the best years of their lives to the public at salaries which are often inadequate, and when they are worn out by service it is with difficulty an arrangement can be made to create an office for them which will preserve them from want. The promoters of the scheme (the Municipal Officers' Association) are, therefore, entitled to general support.

LONDON can claim to be at the head of all cities in the world if valuation for taxation can be taken as a test. Its pre-eminence in that respect is not likely to be envied. It is now known that the valuation list prepared under the Valuation of the Metropolis Act, 1869, which will come in force on April 6, shows a decided advance on that at present in use. The gross value of London has now reached the enormous total of 43,461,733 $\frac{1}{2}$ l., the net value being 36,115,407 $\frac{1}{2}$ l. The previous one was gross 41,239,847 $\frac{1}{2}$ l., net being 34,230,334 $\frac{1}{2}$ l. Government property at last seems to be going to bear its fair share of the rates. An example of this is shown in

the parish of Islington, where the figures in April 1895 were 4,189 $\frac{1}{2}$ l., and are now shown as 10,391 $\frac{1}{2}$ l. In St. George's, Hanover Square, there is an increase under this one head of 4,292 $\frac{1}{2}$ l. In the parish of St. Margaret and St. John, Westminster, the figures show a still greater disparity, as in 1895 Government property was valued at 52,828 $\frac{1}{2}$ l., while this time it is shown at 89,159 $\frac{1}{2}$ l.

THE Urban District Council of Morecambe have at length realised that there can be no financial success without the aid of advertising. The same rule applies to picturesque districts as to individuals. The Council have lodged a Bill for next Session to empower them to expend a sum, equal to a rate of 2d. in the pound on the assessable value of the district, for the purpose of "advertising, pictorially or otherwise, the town of Morecambe, showing the advantages and attractions of its district." The preamble of the Bill states that advertising the district would conduce to its advantage, as its "prosperity is dependent on the visitors that resort thereto for health and recreation." Morecambe is a healthy place; but it is practically unknown beyond the surrounding district. Towns to which nature has been less bountiful are crowded with visitors because the authorities have understood the peculiarities of human nature, and know that the world will not believe in qualities which remain unadvertised. The Corporation of Bournemouth have also decided to be liberal in expenditure on a similar object.

FOR a time, at least, there is likely to be a cessation of the newspaper correspondence about the Peterborough Cathedral. On Wednesday the Dean and Chapter finally resolved to act upon the resolution of the restoration committee passed on November 25, 1896, and to carry out the work upon the north gable of the west front of the cathedral as advised by Mr. J. L. PEARSON, R.A., and Sir ARTHUR BLOMFIELD, A.R.A. The cost of this and of the further work of necessary repair recommended by the architect to be done at the west front and other parts of the cathedral is estimated at 11,000 $\frac{1}{2}$ l., of which sum rather more than 9,000 $\frac{1}{2}$ l. remains to be raised. If the suggestion about obtaining the opinion of the specialists had been adopted by the Dean and Chapter there would be less difficulty in obtaining the 9,000 $\frac{1}{2}$ l. required. But it is not likely that with so many censors who will watch the operations there will be any destruction of ancient work, unless such a course becomes unavoidable. It remains to be seen how far the public can take an interest in the project, and the subscription list will be evidence on that subject.

THE arrangements for holding the Salon of 1897 in a temporary building erected on the Place du Carrousel were no sooner completed than they were set aside. After all, the exhibition will be opened in a fragment of the Palais de l'Industrie which will be preserved from demolition for that purpose. But the term of the exhibition is to be brief, viz. from April 20 until June 8. The paintings will be received from March 5 to 10, sculpture from March 23 to 27, architectural drawings, engravings and lithographs on March 28 and 29. There will consequently be only three weeks allowed for judging and hanging works. If the purchasers are equally expeditious, some consolation will be afforded.



## THE LEICESTER HOSPITAL, WARWICK.



HERE are few more interesting relics of the past history of this country than the hospitals and almshouses which were founded in the Middle Ages as refuges for aged and indigent persons of both sexes. These institutions exist in various parts of the kingdom, and many of them are well worth a visit.

The Hospital of St. Cross, near Winchester, founded in 1136 by HENRY DE BLOIS,

Bishop of Winchester, with its handsome entrance tower, its picturesque dining-hall, cloister and brethren's dwellings,

and above all its magnificent church, is perhaps the most ancient of these institutions, but there are many of a later period which deserve notice, and we have chosen for our present illustrations the Leicester Hospital at Warwick.

Situated at the western end of the High Street, it commands a view of the distant country towards Stratford-on-Avon, and at once attracts the eye as a singularly picturesque group of buildings, the most striking feature being the chapel, which is built upon the ancient entrance-gate to that part of the town. The hospital is approached by a gentle ascent, which passes under an archway and leads to the chapel on the left and to a quadrangle on the right, around which are situated the master's lodgings and some of the pensioners' rooms, which latter are reached by a quaint staircase of massive timber-work: here, as well as in other parts of the building, numerous coats of arms, crests and badges of the



GENERAL VIEW AS ONE APPROACHES FROM THE TOWN.



VIEW FROM THE ROAD TO STRATFORD-ON-AVON LOOKING TOWARDS WARWICK.



Leicester family—prominently the bear and ragged staff—may be observed.

According to SMITH'S "History of the County of Warwick," the buildings appear to have been the halls of two guilds—one in honour of the Holy Trinity and the Blessed Virgin MARY, the other in honour of St. GEORGE the Martyr, both of which were founded in the time of RICHARD II., and were afterwards united. At the dissolution of the fraternity during the reign of HENRY VIII. the

master (according to a special clause in the deed of endowment) receiving only 50*l.* In 1813 considerable changes were made; the number of brethren was increased to twenty-two, each fresh pensioner, and ultimately the whole brotherhood, receiving an allowance of 80*l.*, and the master's salary being gradually raised to 400*l.* Vacancies as they occur are filled up by persons who have lived for not less than five years in the counties of Warwickshire or Gloucestershire—the preference in all cases is given to soldiers who



APPROACH TO BUILDINGS THROUGH THE ARCHWAY.

buildings became the property of ROBERT DUDLEY, Earl of Leicester, who, in the twenty-eighth year of the reign of ELIZABETH, converted them into a hospital for twelve impotent men, none of whom should possess as much as 5*l.* a year, and one master—a professor of divinity. The land with which the hospital was endowed produced at that time an annual income of 200*l.*, but in 1811 its value had so much increased that the annual income amounted to nearly 2,000*l.*, when each brother received 130*l.* per annum, the

have become "disabled or decayed in the service of their country." There was a regulation requiring the brethren to wear a blue gown with the Leicester badge—the bear and ragged staff—on the left sleeve, without which they were not allowed to appear in public. This rule, however, seems to be no longer in force, for the blue gown is seldom seen at the present time. The hall in which the meetings of the Guild are supposed to have been held is now converted into rooms for ten additional brethren. The chapel was





QUADRANGLE WITH STAIRCASE TO PENSIONERS' ROOMS.

given by ROGER DE NEWBURY in the reign of HENRY I. to St. Mary's Church when it was made collegiate.

The illustrations show (1) a general view of the buildings as one approaches them from the town, with the old entrance gate and the chapel surmounting it. (2) A view from the road to Stratford-on-Avon, looking towards Warwick. (3) The approach to the buildings through the archway mentioned above as leading to the chapel and quadrangle. (4) The quadrangle itself with the staircase leading to the pensioners' rooms.

### CHARACTERISTICS OF SOME GREAT LONDON THOROUGHFARES.—I.

[BY A CORRESPONDENT.]

IT is a common remark that Londoners know a good deal less of the "sights" of the great City than their country cousins, and there can be no doubt that to a considerable extent this is true as regards, say, St. Paul's, Westminster Abbey, the Tower, the Houses of Parliament, the National Gallery, &c. But, on the other hand, many of those who, by the force of various circumstances, have found it more expedient, or, it may be, really necessary, to live amongst that huge conglomeration of towns around a small nucleus, the City proper, have perhaps obtained a larger appreciation of the beauties of London (the writer uses this word advisedly) than those who on a cursory visit have passed through its main streets and duly admired what they saw, in a general way, but have naturally failed to observe and to grasp the possibilities of "what might be." Neither can they have realised "what is" in the same way that an observant inhabitant has had the opportunity of doing on many occasions. The writer purposely uses the last expression, because it is a matter of experience how those who daily traverse a particular route are too apt to take everything as a matter of course, and fail to notice objects that would strike a stranger. The homely proverb,

"Familiarity breeds contempt," in this instance can be accurately brought to bear without being misapplied, as unfortunately is sometimes the case with proverbs.

Now what it is proposed to enlarge upon in these brief articles is the aspect of some of our great London roads and streets as viewed in a catholic manner (to use the adjective in a general, not ecclesiastical sense, and so with a small c). It would, therefore, not be amiss to start at the threshold of one of the main arteries of London, the southernmost of the great thoroughfares on the Middlesex bank of the Thames. Let us make a beginning at Abingdon Street, Westminster, to the south of the majestic Victoria Tower, the base of which is so well set off by the pretty public pleasure-ground between the street and the river. The irregular character of the roadway to the west of this great tower, in the manner of its varying widths (it is not a "Place" and cannot be called a street), with the grouping of the Abbey and St. Margaret's, has a pleasing effect owing to the absence of any cold formality, quite suited to the Mediæval surroundings.

Leaving Palace Yard and stopping opposite the Foreign Office and facing south, one has to consider what the effect will be when the long threatened and closely approaching demolition of the west side of Parliament Street has been accomplished. No doubt a splendid improvement will result in thus making a stately approach to the seat of the Legislature as also a great boon to the increasing traffic, for the police complain now about the congestion in this part. But the writer desires rather to look at the question from an entirely different standpoint. There are still a great many persons who do not care about everything being laid bare and open, as if Röntgen rays were circulating everywhere. "There is the rub." It is not only that Westminster Abbey and St. Margaret's reveal their outline gradually from a distance viewed from the north, but it is to some extent much the same with the Houses of Parliament, excepting, of course, the Clock Tower, for otherwise the latter would lose its *raison d'être*. However stately may be the new Public Offices erected between Parliament Street and St. James's Park, we shall lose that feeling of



(which often happens when the comparatively narrow defile of Parliament Street is being passed) at the beauty of the group of buildings around "the Square," almost suddenly revealed to view. Of course the writer is rather alluding to the impressions of the stranger to London, or it may be foreigner. On the other hand, the clearing away of modern accretions which have been injudiciously permitted to occupy spaces once open—as, for example, those houses near Poets' Corner, which almost entirely blocked up and concealed the approach to the Westminster Chapter-house—has been a distinct gain in every way. The same remark, but in the present tense, applies to the bookseller's shop built up against the north side of the tower of St. Stephen's Church, Walbrook, which entirely hides its lower stages, and is altogether incongruous. Many years since, in the time of the predecessor of Dr. FARRAR in the Rectory of St. Margaret, Westminster, there was a considerable talk about pulling down this church so as to show more of the Abbey, and there was a powerful party in strong favour of this vandalistic project; which, happily, was dropped. Any student of history is aware that it was not at all uncommon for a parish church to be in close proximity to a cathedral, and in the case of St. Gregory's Church, hard by Old St. Paul's, the attachment was very near indeed. But this building was much smaller than St. Margaret's and of earlier date. These churches, looked at from an architect's point of view, helped to give scale to the cathedrals they adjoined. However, that near Old St. Paul's never rose again from its ashes after the Great Fire; and even if it had, would have been most unlikely to have survived the urgent calls for more space in the crowded City with its yearly increase of traffic.

After this slight digression into the City, which will be treated of in due course, the writer would emphasise the peculiar beauty of the great thoroughfare called "Whitehall" in its brief course from Parliament Street till it merges into that mysterious irregularly-shaped locality now termed Charing Cross, the puzzle to strangers and cabmen who want to find a particular number. Now one cause of this unique London thoroughfare's picturesqueness, notwithstanding many elements wanting to qualify it for the last-named title, is the varying width, ending with the "bottle-neck end" about opposite Drummond's Bank, just before the great expansion into Trafalgar Square. Then there is the slight bend in the road and gentle incline up towards Charing Cross, and the two historic buildings on either side, *i.e.* INIGO JONES'S fine fragment of that royal palace never carried out, and the Horse Guards. One might fairly add the Admiralty, plain and unpretentious as it is. But beyond these advantages which this noble street possesses, there is to be noticed the gardens with their trees, on the east side, which are the more to be valued because a goodly portion of them is Government property that has been threatened to be used for new Public Offices, badly wanted as additions to the present overcrowded buildings. It is most sincerely to be hoped that no diminution will be attempted of this effective open space, such a help towards good impressions of the approach to the seat of the Legislature.\* The writer has purposely not alluded to other and less ancient public offices between Bridge Street and Charing Cross than those previously mentioned, as they do not, in his opinion, assist much towards that effect he has been endeavouring to describe, though that palatial structure, Whitehall Court, notwithstanding being set back some way from the great thoroughfare now commented on, tends to dignify this part of London by its picturesque Château-like outline. It is, however, certainly a blemish to look at the unsightly mass of the back of the Hôtel Victoria (in Northumberland Avenue), marring the formerly fine view of St. Martin-in-the-Fields tower. The only antidote to this would be some new building on the east side of Charing Cross which would block it out. But the remedy would be almost as bad as the disease.

Trafalgar Square has been so often described that it would be difficult to remark anything fresh about it. But as the writer was very familiar with the locality before Northumberland House was pulled down, he considers that the general effect of this great open area has in more than

one way been damaged by the removal of this historic mansion. The huge Grand Hotel and other buildings at the commencement of Northumberland Avenue have dwarfed the Square, and though a direct way to the river has been thrown open which has been a great boon to the public, yet instead of a pleasing outlook in that direction, the principal object is the Charing Cross railway bridge and the perspective of a row of stately modern buildings leading up to it. Though the old mansion was not earlier than the Jacobean era, it had at least some savour of antiquity about it which London could ill afford to lose, considering the rarity of such at the present day.

There can be no question but that the Strand is about the most interesting and important thoroughfare in the Metropolis, owing to its unique position, skirting the banks of the Thames on a high level above it, and therefore the southernmost great street on the Middlesex side of London. Whilst not a striking thoroughfare architecturally (though it possesses several buildings of merit) the slight bends in it are of value, and prevent it having that monotonous appearance which some other great London roads have. There is another characteristic feature in the Strand—the sharp incline of the streets out of it to the north, and the steeper descents towards the river. How well the writer remembers, as a boy, the awe with which he witnessed the disappearance of some waggons down that gloomy cavernous arched opening just west of the Tivoli, which had the appearance of going into the darkness of the bowels of the earth, instead of into the vaults, or Adelphi arches. The widening of the Strand on the south side, opposite the Hotel Cecil, independent of the partial relief to the traffic it will afford, will also give that kind of refreshing feeling of repose induced in any busy important street by a little square or enclosure opening out of it, something to make a break of a quiet sort, quite different from that of an intersecting busy street.

But something better than this is wanted on the south side of the Strand, between the Adelphi Theatre and St. Clement Danes; only commercially it perhaps would not exactly pay, because what the writer wants to see is some fair-sized open "square" or oblong, as that to the Hôtel Cecil, with a garden in the centre and buildings on either side, with the exception of that towards the river, on the Strand level of course. It should be like a terrace with a balustrade to give a view of the river, and so let in some fresh air to the Strand. This is no new idea of the writer, nor does he believe it to be an Utopian dream; but it has occurred to him again and again, when travelling outside an omnibus, how charming are the momentary peeps of the running stream, with sailing barges, or maybe steamboats, that can be seen on a fine clear day when passing Savoy Street, Norfolk, or Arundel Streets, with the wooded Surrey hills in the horizon, and the Crystal Palace on its high perch. The rise on the way from Westminster Bridge up to the Charing Cross South-Eastern terminus is so gradual that it is only when nearing Trafalgar Square that there is any noticeable incline. Therefore many people fail to realise what a great advantage it is for many reasons to get up on this higher level. Why not make better use of it? Even from a purely commercial motive only it is worth while rendering London more attractive to foreigners, who come over here in much larger numbers than was formerly the case (notably from the other side of the "herring pond"), and our great city has a much finer river, with higher banks—on one side, at any rate—than the Parisians have in the Seine. But the inhabitants of the Metropolis would very soon avail themselves of such a boon as has been pictured, even though it were destitute of a band, refreshment pavilion, or any other like special attraction. Look at Leicester Square and other small open spaces where the public have free access, but no distant view or any other special advantages beyond the many comfortable garden seats, which in fine summer weather are always fully occupied with contented people. Of course, the only obstacle to the writer's proposal is the great cost. But Leicester Square was "lifted out of the mire" and brought into its present condition by the action of one man, and at his sole expense. So there is no reason to despair about a greater undertaking of this kind being accomplished under the auspices of some wealthy philanthropists.

(To be continued.)



## CELTIC INTERLACED ORNAMENT.

BY THE AUTHOR OF "CHARLES LOWDER."

IT is well known that the intricate and beautiful designs generally called "Celtic interlacing work" are used with endless variety on all remains of ancient Irish art, whether in stone, metal-work, or illuminated manuscripts. A remarkable discovery of the principle underlying all such designs—the foundation on which the ancient artists invariably worked—has recently been made in Ireland.

Let me begin by saying that the greatest living authority concerning Celtic art and history, Miss MARGARET STOKES, has proved that the notion which so long prevailed, that the interlaced work which marks early Christian art in Ireland originated there, "must be for ever abandoned." "Certain varieties of such designs," she adds, "were developed in Ireland, and if they were to appear in any part of the Continent . . . it would be on the tombs of the founders of Irish monasteries on the Continent. . . . But these Irish varieties *do not appear* on the tombs of COLUMBAN\* and his followers at Bobio. The interlacings on the marbles are in no way different from those which overspread Italy in the period of Lombardic-Romanesque architecture, before the sixth and seventh centuries. It would be difficult to prove that any such designs prevailed in Ireland before the seventh century. They are not found on pre-Christian remains in that country, although they are in Italy. They appear to have been gradually introduced into Ireland along

Of some of these, in the "Book of Kells," one of the greatest treasures in Trinity College, Dublin, Mr. J. O. WESTWOOD says:—

I have counted in a space scarce  $\frac{3}{4}$  of an inch in length by less than  $\frac{1}{2}$  an inch wide, no fewer than 158 interlacements of a slender ribbon pattern, formed of white lines edged with black ones. The invention and skill far surpasses all found in ancient manuscripts by continental artists.

WYATT says that he attempted to copy some of these ornaments, but broke down in despair.

A glance at the magnificent reproduction of the lovely gold chalice discovered in Ireland about twenty-five years ago would do more than pages of writing to convey some notion of the exquisite use of this art, and also of enamel, in gold work. This replica of the ancient chalice is always on view, under a glass case, at the entrance to Mr. JOHNSON'S shop, Grafton Street, Dublin, and ought not to be overlooked by visitors to Ireland.

Everything is pressed into the service of this decorative work, even eight human figures, of which the thirty-two limbs form the interlaced work filling the panel to be decorated; but there was evidently some underlying and never-failing principle forming the basis of every pattern, however intricate, which had not been grasped even by those most devoted to Celtic art.

At a meeting of the County Kildare Archæological Society, the late Father DENIS MURPHY, S.J., in giving a description of a beautiful pastoral staff which was exhibited graphically interlaced his fingers and said that when such

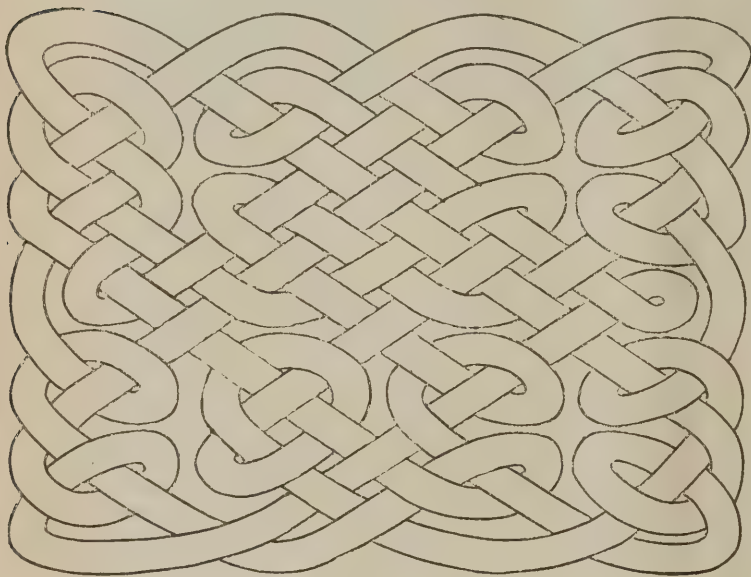


FIG. 1.

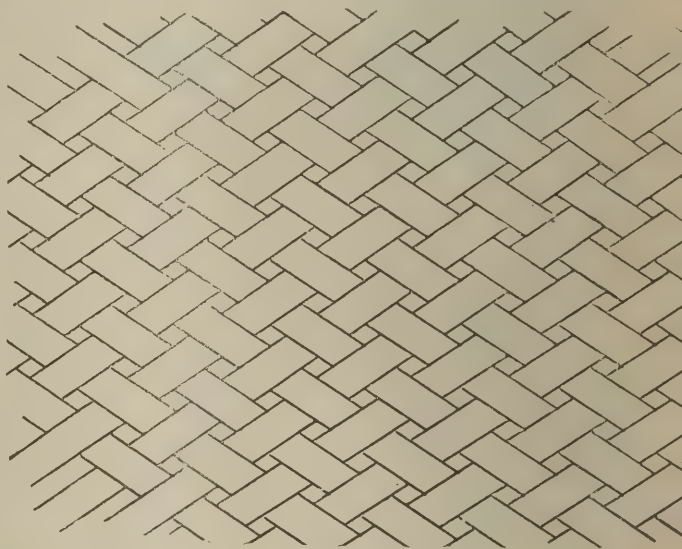


FIG. 2.

with Christianity at a time when this style still lingered in the south of Europe."†

This ornamentation may therefore be called Italo-Bizantino, or Lombardic-Romanesque, since, in the periods so termed by authorities on the history of Italian architecture, "interlaced bands, knots and other designs which we are accustomed to call Irish and Celtic are of frequent occurrence, and in places whose history is not connected with that of any Irish missionary we know of."‡ It is found, in precisely similar designs to those abounding in Ireland, on a door of San Clemente, at Rome, A.D. 650; on a balustrade of the ninth century of Sta Maria in Trastevere, and on many fragments preserved in the Lateran and other museums.

There is no doubt, however, that when introduced (probably in the seventh century, and by pilgrims returning from Rome) into Ireland, this special character of decoration was there developed in an extraordinary manner, with the utmost ingenuity, and by artists whose subtle sense of beauty brought the art to wonderful excellence, especially in golden chalices and ornaments, and in illuminations.

\* The famous Irish missionary Bishop in Gaul and Italy. He died A.D. 615, and lies entombed in the church of St. Columban, Bobio (near Piacenza), in a richly-carved marble sarcophagus.

† *Six Months in the Apennines*, pp. 11, 12. George Bell & Co., 1892.

‡ *Ibid.* p. 5.

like was found in ornamental work it might be taken as Irish; and Italo-Bizantino decoration, to which, as we have seen, the Irish belongs, has been described as "interlacings which have all the character of basket-work:"\* but in examining numberless varieties of these interlacings, the law governing designs, at first sight apparently irregular, eluded the students.

To take as an example one of the most beautiful specimens extant of the "endless-ribbon pattern" in a panel on the Cross of Tuam (fig. 1).

This is composed of one or more ribbons without ends, interlaced so as always to cross under and over alternately. If, beginning in any corner or any spot, the pattern is traced with a pencil, it will arrive back at the starting-point, the whole of the ribbon having been marked; and it will be found that, while the latter seemed during the tracing to wander in apparently the most reckless and aimless way about the surface, it had really arranged itself into an intelligible and orderly pattern devoid of repetition, but containing a general harmony throughout—one knot or twist balanced by a corresponding though totally different one; while all through the bands cross one another alternately under and over, without a single break. What was the key to this symmetrical variety? I must give in his own words the account of the remarkable discovery made by Mr. COOKE TRENCH,

\* *Six Months in the Apennines*, p. 6.



while building on his demesne in the county Kildare a church which he had determined should be Irish from foundation to roof. He sought everywhere for examples of interlaced work to use in decoration, but finding only a small number available for the spaces into which they were to be introduced, he was led to consider whether it was not possible to produce new patterns of the same character which could be exactly adapted to any given surface. He says, in a paper read before the County Kildare Archaeological Society in 1894:—

What I thought beautiful patterns grew up under my hand, but always, just as I was bringing one to a finish, some fatal crossing appeared, and the whole was a wreck. It was plain that there was some fundamental principle which, if one could only grasp it, would leave the rest easy. I consulted every authority that I could get hold of, living and dead. Even Miss Stokes could throw no light upon it. The librarian of the Royal Irish Academy produced volumes which touched upon the question, but without solving it. If an elucidation of this mystery is to be found anywhere, I thought, it will surely be in O'Neill's "Irish Crosses." But there I only found what I have quoted, that the art had declined and perished. I was driven to the conclusion that it was a lost art. Suddenly, one day, it flashed upon me what the underlying principle must be. I tested it, and found it work.

To explain the process in a few words. The artist first covers the space to be decorated with lines crossing one another, and woven in and out like basket-work. Fig. 2 gives the plain basket-work that formed the foundation of the pattern on the Tuam Cross (see fig. 1). He then proceeds to join all the ends two and two together.

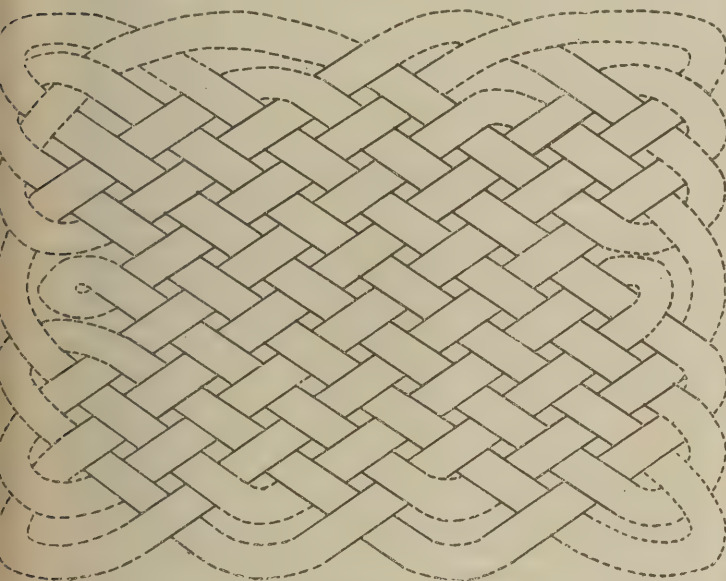


FIG. 3.

In fig. 3 is shown by dotted lines the manner in which this is done. Finally, the artist obliterates crossings here and there, joining the ends thereby set free in a manner differing from that which they originally followed. A glance at fig. 4 will make this process clear. It will be seen that it is a tracing from fig. 3, except that the crossings



FIG. 5.

obliterated in the completed design are shown by faint lines, while the subsequent joinings are shown by dotted lines. If this be now compared with fig. 1, it will be seen that the design is the same, and that we have easily and exactly followed the method by which the artist, between

one and two thousand years ago, turned the simple basket-work of fig. 2 into the elaborate and beautiful decoration on the Tuam Cross. Every knot, every winding is there, and it is all one ribbon. We are thus brought back to Miss Stokes's description of the architectural decoration



FIG. 6.

which overspread Italy in the Italo-Bizantino and Lombardic-Romanesque period as "interlacings which have all the character of basket-work."

The Tuam Cross pattern was intended to fill a square or oblong, and the foundation of it was, as we have seen (fig. 2), composed entirely of straight lines. But this

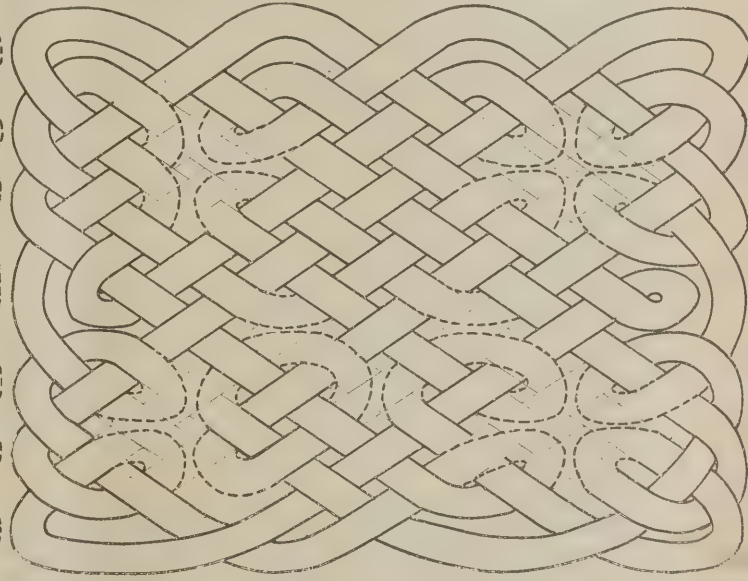


FIG. 4.

special kind of decoration is also well adapted for circular spaces. We give a specimen of the work, drawn by Mr. TRENCH to illustrate the paper read by him on the subject (fig. 5).



FIG. 7.

In the foundation for this pattern there is not a single straight line. It consists of two concentric circles and four ovals (fig. 6).

It is notable that while in the completed oblong pattern (fig. 1) the greater part of the original foundation remains, it is so much obliterated in the circular pattern that it is not



easy to perceive the process by which fig. 5 has grown out of fig. 6. It will, however, be seen at once by a glance at fig. 7, where, as before in fig. 4, the portions of the foundation obliterated are shown by faint lines, and the subsequent joinings by dotted lines.

If the faint lines be entirely erased the exact pattern of fig. 5 remains.

Yet, as Mr. TRENCH remarks, "anyone can join the ends, anyone can obliterate crossings, but the excellence of the patterns consists in the skill with which these processes are carried out, and herein lies the art." The excellence attained in the incomparable ancient specimens remaining of this art do indeed show skill, but also something far higher—that delicate sense of beauty, that indescribable touch of the true artist's hand in expressing it which satisfies us perfectly with his work.

It is possible that some possessing this rare gift may use the discovery which has been made to produce decoration as lovely and as varied as that of old; but for this a master's hand is needed, and the instinct of poetic genius. No knowledge of the rules of metre in poetry, or skill in using them, would have given "Rose Aylmer" or "Auld Robin Gray" to the world.

### ARCHITECTS AS AGENTS.

BY A BARRISTER.

THE architect or engineer is the general agent of the building owner for all purposes necessary for designing, obtaining tenders for, and superintending the buildings or works upon which he is employed. This authority is implied from the mere fact of his appointment, and from common knowledge as to the nature of an architect's business. No particular form of appointment is necessary, and the retainer may, with two exceptions, be either verbal or implied, from the acts of the parties or the circumstances of the case. If the agreement is one which is not to be performed within the space of one year from the making thereof, that is, is incapable of being completely performed within a year, it must be in writing. And if the architect is retained by a corporation, the agreement must be under seal. Where the work is to be performed under the direction of an architect to be appointed by the employer, the appointment of such architect is a condition precedent to the liability of the builder to commence his work; and if the architect is not appointed within a reasonable time, the builder may be released from his engagement to do the work.

The architect or engineer is the general agent of the building owner in making drawings, but he has no authority to warrant to the builder that they are correct, or that the work can be executed according to them, nor when there are omissions from them to order those omissions as extras under a power to order extras, if they are works indispensably necessary to complete the contract. Nor where the drawings are impracticable has he any authority to order as an extra, work necessary to make them practicable.

Where an architect is engaged to superintend the erection of works he becomes the agent of the employer generally for all purposes within the contract connected with the erection of the buildings, and the ordinary rules as to the rights and duties of agents of a general character, and having a recognised apparent authority incident to their character, will be applicable. His authority may be either expressly given or inferred from the acts of his supposed employer. But where the limits of the architect's authority are clearly set out by express terms in the agreement between the employer and the builder, the authority must be strictly followed, as an employer will not be liable for the acts of the architect unless the authority be duly pursued by him. At the same time, the Courts are so far liberal in construing authorities given to agents that they will hold them to include permission to use all necessary, or even usual, means of carrying the main intention of the principal into effect in the best manner. In an agreement by an architect on behalf of his principal for building a house, &c., the principal will be bound, although no specific contract be proved, so that the general authority be sufficient to comprehend the terms of the agreement.

Mere instructions to prepare plans do not give the engineer or architect any implicit authority either to

negotiate for advances with a view to building, or to get tenders or estimates. In such a case the architect or engineer is not an agent at all, but a skilled draughtsman instructed to do a specific work. Even when he is given authority to get tenders this does not extend beyond a power to invite tenders and to charge the employer with any expenses necessarily or reasonably incurred for that purpose. Sometimes the architect will, more or less distinctly and expressly, mention to the employer the necessity of a quantity surveyor, and then the employer may be liable by an express or tacit assent or ratification. But sometimes the architect, without saying anything about it, or receiving any authority from the employer, engages a quantity surveyor. The authority of the architect for so engaging a quantity surveyor must, therefore, be an implied one—implied either by custom, necessity, or the circumstances of the case. This authority has more than once been implied when the employer authorised the architect to obtain tenders. The authority of the architect to employ a quantity surveyor to supply quantities may also be implied from the knowledge of the employer that they will be supplied, and by the employer standing by and saying and doing nothing, or by ratification. Sometimes the architect himself takes out the quantities, being a quantity surveyor as well as an architect. It is doubtful whether an architect has an implied authority either from custom or agency to take out the quantities himself for the purpose of obtaining tenders, instead of employing a quantity surveyor. If he has implied authority it could only be to take out the quantities and charge his employer. The authority of the architect to employ a quantity surveyor to measure up, whether by custom or the necessities of the case, so as to render the building owner liable to pay the quantity surveyor's charges, may be negatived by the terms of the employment of the architect. These terms may be defined by a special contract between him and the building owner. And if the architect's duties are to measure up, it seems clear that he has no authority to employ a quantity surveyor to perform his duties, except at his own expense. A usage that the building owner should pay the quantity surveyor, contrary to the terms or construction of the contract of employment of the architect, would not be valid, for extrinsic evidence of custom and usage is only admissible to annex incidents to written contracts in matters in respect to which they are silent. The authority of the architect to measure up is implied, in almost every building contract, from the fact of his having to certify for payment, which he could not do without measurement; but whether the architect has a right to charge for this measuring up must depend upon the terms of his employment with the building owner.

Authority on the part of the engineer or architect to dismiss the contractor cannot be implied, and must depend on the special terms of the building or engineering contract. An architect or engineer has no power to render the employer liable to sub-contractors by ordering sub-contractors to do work not included in the general contract, nor by entering into subsidiary contracts with them, either for the original work or for deviations. An architect has no general authority to dispense with, waive, vary or alter the conditions of a building contract. His duty is to see that it is faithfully fulfilled according to its terms; but it may be varied by the parties themselves, who are entitled to strict compliance therewith, or by the architect under special authority given him on that behalf. He has no power to bind his principal by representations varying the contract, and where a contract has been reduced into writing, a party thereto is not authorised to rely upon the statements of the agents of the other party to the contract varying or modifying its terms. It is, therefore, useless for a builder to attempt to contradict or vary the contract by proof of statements or representations made by the architect that certain of the written terms would be varied or waived. The builder's only remedy in such cases is against the architect. And this is especially so when the employer is a municipal corporation. An architect cannot order or certify for extras without special authority. No authority to increase the cost of a building can be implied from the submission to the employer of a design, unless the employer knows, either necessarily from the character of the design or by being so informed, that it is a departure from



the original plan or contract, and will increase the cost to him.

Where an architect, according to the terms of the contract, has authority to certify for payment during the progress of the works, either in certain sums or to a certain proportionate value of the work done and no more, if he exceeds that authority, (1) the certificate will be bad, (2) the employer will not be compelled to pay, and (3) the architect will render himself liable to an action by the employer for negligence if the employer acted on faith of the valuation and did not use his own judgment. A final certificate of an architect or engineer is binding between the employer and the contractor, but the architect as a professional man will be liable to his employer for negligence in making the certificate, and may be sued for any amount which he has over-certified.

Architects entrusted with authority involving a trust or discretion cannot delegate it to another without a special authority to do so, as expressed by the maxim, "Delegata potestas non potest delegari." But this rule must be distinguished from cases where he does not so much delegate his agency as exercise a power impliedly contained in his appointment, in doing which he must act with precaution, and not exceed what is proper under the circumstances of the case and warranted by usage. An architect might be justified in retaining a surveyor to take out quantities, but he could not delegate the whole of his duties.

#### INSTITUTE OF ARCHITECTS OF IRELAND.

THE annual general meeting of the Royal Institute of Architects of Ireland was held on Christmas Eve at 37 Dawson Street, the president, Mr. Thomas Drew, R.H.A., in the chair. Mr. Albert E. Murray, hon. sec. A.R.H.A., Fellow of the Institute, presented the annual report.

Mr. Geoghegan moved the adoption of the report, which was seconded by Mr. Millar.

Mr. Parry spoke of the injustice under which architects suffered by the employment of unqualified persons. It was desirable that the Local Government Board should see that plans for any of the buildings promoted by them were signed by properly qualified architects, especially on sanitary matters.

Mr. Murray endorsed all that Mr. Parry had said.

Mr. Ashlin also spoke, and the report was then adopted.

The auditor's report, which was adopted, showed that there was a balance of 85*l.* 14*s.* in hand.

The President said that the strike in the building trade in Dublin had probably postponed or diverted away for ever building investments to the value of not less than 100,000*l.* in the Dublin district, and the loss of wages payable for skilled labour throughout the long wasted summer had not represented less than 50,000*l.*

The balloting for Council and officers for 1897 resulted in the re-election of the President, hon. secretary and treasurer. The Council is as follows:—Messrs. Callaghan, M'Carthy, Mitchell, Ashlin, Carroll, Geoghegan, Parry, Pentland and Fennell.

#### SCOTTISH SCULPTURED STONES.

AT the last meeting of the Scottish Society of Antiquaries, Dr. Joseph Anderson communicated notices of some recently-discovered inscribed and sculptured stones. The first was a cross bearing a runic inscription, discovered near the east end of the old church of St. Peter's in Thurso, which was sent for exhibition by the directors of the Thurso Museum. It is interesting as being the only runic inscription hitherto discovered on the northern mainland within the old Norse Earldom of Caithness. The inscription is defective at the commencement, part of the base of the shaft of the cross being wanting. It bears some one (name wanting) made this overlay, after (or in memory of) Ikuib, his father. The cross was found lying on the top of a stone-lined grave, and this circumstance may explain the unusual formula of the inscription, calling it an "overlay." The second was an incised slab, with symbols and an ogham inscription, found on the links of the Bay of Keiss, Caithness, and preserved at Keiss Castle by Mr. Barry, M.P. It bears on the upper part the symbol of the fish, beneath it an ornamented symbol like a book-cover, and at one side an ogham inscription consisting of a few letters only, which Lord Southesk and Rev. Dr. Joass agree reading as probably a proper name, but the concluding part of the inscription is wanting. This is the second symbol stone found on the links of Keiss Bay, Mr. Barry having given the one first found to the National Museum of Antiquities. The third was a portion of a sculptured slab with part of an ornamented

cross-shaft found in digging a grave in the churchyard of Murroes, Forfarshire, and preserved by the Rev. James Nicol. It bears an elaborately executed panel of interlaced work of serpents in relief and a figure of an animal such as usually appears on the sculptured stones of Scotland. The fourth was an incised symbol stone at Pabbay, in Barra island, discovered some years ago by Father Allan Macdonald, and of which a photograph and rubbings were now exhibited, which had been taken last autumn by Mr. Erskine Beveridge, F.S.A. Scot. The stone shows the lily-like symbol and the symbol of the crescent crossed by the double sceptre, and over them a cross-potent, an unusual association. The fifth was a very interesting portion of an erect slab or cross-shaft found in the island of Canna, near the well-known cross there by Mr. Thom, son of the proprietor of the island. Of this stone photographs and rubbings obtained by Mr. Erskine Beveridge were also exhibited. It bears on one side the lower part of the figure of a man with a serpent entwined round his legs, and on the other sides panels of elaborate interlaced and serpentine ornament. The sixth was a cup-marked stone at Drumfours, Leochel Cushnie, Aberdeenshire, of which a photograph was sent by Rev. G. Williams Thornhill, F.S.A. Scot. Some markings on one side of the stone thought to be oghams are considered doubtful.

#### GLASGOW ECCLESIOLOGICAL SOCIETY.

THE Glasgow Ecclesiological Society met on the 22nd ult. in the studios of Messrs. Stephen Adam & Son, Bath Street, to hear a paper by Mr. Adam, sen., on "The Methods of Mediæval Glass-Staining." There was a large attendance. Mr. John Honeyman presided, and among others present were Bishop Harrison, Rev. Dr. Marshall Lang, Rev. Dean Reid, Rev. Dr. King, Mr. Campbell Douglas, Mr. M'Gregor Chalmers, Rev. Mr. Miller (Bluevale) and Rev. David Watson. Mr. Adam referred at the outset to a paper which he had read in Park Church some time ago, in which he described some Mediæval work, and gave his views on the motives of its producers, and proceeded to criticise some modern church work. Time would not change his opinion of what he then described as the pure devotional feeling of earlier aspirations in art-work as compared with our too often sophisticated imitations of it in modern times. The causes of the decadence were not far to seek. We wanted a living faith and earnestness in all that we attempted towards the beautifying of the house of God. He somehow thought we had too many facilities with present surroundings and up-to-date inventions that tend to the producing of immature and unthoughtful work in church-decorating in window and wall. We were too comfortable in all about us, too luxuriant in exuberance of material. We were puzzled and bewildered by the plethora of art literature and lectures. Within the past fortnight he had listened to lectures by friends of the Philosophical Society. Their remarks gave him pleasure, though they did suggest that his art, to put it mildly, should take a back seat. There was much truth in what he heard. He would maintain, however, that but for the mellowed and enriched light which stained-glass was so capable of giving—how without it would the modern over-stencilled kirk interior look? The mural decorator had much to thank the glass-stainer for. So had the architect. Many criminalities in colour, form and cheap chiselling acquired borrowed plumes, subdued richness, by the glorified light of the glass-staining art. Mr. Adam afterwards described the methods of glass-staining, and gave a brief history of the art. In conclusion, he said that one hope he entertained for the improvement of the still undesirable state of things in connection with the embellishment of our modern churches lay in some endeavour being made by that and kindred societies to resuscitate, to restore, those ancient trade guilds of art-craftsmen under the banners which master and apprentice ever strove to honour by honest work. The craftsman then did much for the Church and church art. But for the noble efforts and the inherent love evinced by the trade guilds of Glasgow towards the defence of the cathedral it would, in the troublous time of long ago, have been effaced. The Church had ever its glorious function and pre-eminent duty towards its omnipotent Head and to suffering humanity, and yet without lowering of its blessed aims, and seeing that merely literary societies had been successfully established in ecclesiastical centres, why, under its patronage, should we not have a guild for the training of our youth in the "beauty of form and colour?" Was it so remote from the beauty of holiness? Let our youth be taught to detest ugliness in material as well as moral form. There would be something ennobling indeed in a pastor and his people taking a keen, intelligent interest in the adorning of a sacred building which, by association and many sweet communions, had become precious to them. Among the examples of church work shown by Mr. Adam, and in which the members were much interested, was the Lady Boswell memorial window now being executed in the studio, and which is to be erected in Auchinleck parish church.



## NOTES AND COMMENTS.

It is remarkable that the first substantial memorial of the late WILLIAM MORRIS should be a small labour church in Leek. He was not a church-goer and probably he would not be satisfied with the title selected. Indeed, it has been found strange by others "that Pagan MORRIS should give the name to a church." The labour church is an old building surrounded by tall trees; it has high back pews and can accommodate from 200 to 300 people if so many admirers of the many-sided man and his doctrines can be found in the district. Mr. LARNER SUGDEN, architect, is the treasurer, and he offered to pay for decorating the building if it were allowed to bear WILLIAM MORRIS'S name. As a result, the walls are being lacquered a rich red with stencil ornaments in colours to designs contributed by Mr. WALTER CRANE. The ceiling and overhead beams, as also the barred sash windows, are finished in pure white and the woodwork painted a translucent green. The west and south upper windows are draped with Morris blue velvet fabric. Gifts of embroidery, &c., have been received, and Mr. STEPHEN WEBB is emblazoning a pair of silk banners with quotations from MORRIS'S works.

THE Architectural Association of Ireland is now constituted, and the president, Mr. R. CAULFIELD ORPEN, has delivered his address. He was not able to hold out many hopes to the members. In Dublin, as elsewhere in Ireland, the people are indifferent to art in all forms, and so long as there is such general apathy architecture cannot flourish. Mr. ORPEN said there were many disciples of the beautiful in the arts, but he contended that in the mass they gave little encouragement to truly artistic work, which could only be brought into existence and nurtured to a vigorous reality by the patronage of an artistically-minded and discriminating public. The President hoped something might be done by the new Association to overcome the evil, but the prospect is not encouraging when the chief anxiety of clients is to have contract plans prepared in a week or two. Yet large sums are expended in Ireland on building. It is uphill work to persuade clients that the showiest structure is not the most architectural; but happily there is the consolation that Ireland is not enclosed by the brazen wall which Bishop BERKELEY suggested, and England and America offer opportunities enough to able architects. Dublin has, too, the advantage of models which are well worthy of study. The late Sir SAMUEL FERGUSON did not exaggerate when he said:—"We live in Dublin in the midst of great but unnoticed beauties; if our Custom House stood on the Grand Canal at Venice we should soon see something in the windows of our photographers that would strike every eye as a novelty. All our works of that period are those of an intellectually advanced and intellectually consistent people, and no better answer could be given to those who make the charge of tameness and monotony against Regular art than the variety, the freedom and yet the fitness, strength and dignity of the public buildings of Dublin of the last century." The members of the Irish Association should often think of what they possess.

ONE of the first buildings in Rome which the lover of paintings was expected to visit was the Palazzo Sciarra. The collection was not confined to Italian masters. Of late years the princely owner has found himself in a position which made a sacrifice of his pictures a necessity. Hence it was that RAPHAEL'S *Violinist*, which is by some believed to be a portrait of TEBALDEO, was secured by Baron ALPHONSE DE ROTHSCHILD for 30,000*l.*, with the *Bella of TITIAN* for 24,000*l.* and the *Modesty and Vanity* by LEONARDO DA VINCI, or his pupil LUINI, for a similar sum. PERUGINO'S *St. Sebastian* was also sold to the Louvre for 6,000*l.* CARAVAGGIO'S *Gamblers*, which is probably his masterpiece, was parted with for 2,400*l.* The Italian Government could not be indifferent to transactions which were contrary to law, and proceedings against the Prince were commenced. But a compromise is arranged. Prince SCIARRA has agreed to make over to the Government the following works:—GIOTTO'S *Life of Christ*, a small work, one of GUIDO'S *Magdalens*, SCHEDONE'S *Arcadian Shepherds*, ANDREA DEL SARTO'S *Blessed Virgin*, *St. Joseph and St. Peter*, DA CARPI'S *Pico transformed* and *Vestal carrying a Statue*,

GAGLIARDI'S *Church of the Gesù*, Rome, JOHN BELLINI'S *Virgin and Child*, a *Vision* by an unknown master, BRONZINO'S *Etienne Colonna*, besides some examples of ancient sculpture. In return the Prince can dispose of the remaining works, which include some paintings of the Flemish and French schools and by Italians of the Decadence.

THE late EDWARD HARGITT, R.I., the landscape-painter, was one of the most enthusiastic of English ornithologists. His paintings represented scenes in all parts of England, Ireland and Scotland, and there is little doubt that if he differed from most landscapists in not restricting himself to one region, it was partly owing to the desire to obtain new specimens of birds or eggs. It is satisfactory to learn that the Trustees of the British Museum have secured Mr. HARGITT'S collection of birds, which contains the finest series of woodpeckers in private hands, and in certain respects surpassing the national collection. The number of specimens of this family alone is close on 3,600, including all the valuable types described by Mr. HARGITT in his "Catalogue of the Woodpeckers"; and there are also 2,000 miscellaneous birds, a large proportion of which will be most useful for the exhibition gallery. It is a pity there is not a British Topographical Gallery in existence, for a large number of Mr. HARGITT'S landscapes in oils and water-colours would be available for it, and would be no less attractive than his birds will be in the Natural History Museum.

THE most precious collections of French amateurs sooner or later find their way to the Hôtel Drouot. Those formed by the Brothers DE GONCOURT are no exception. For many a year JULES and EDMOND spent their happiest hours in amassing drawings by French masters, memorials of French actresses, rare etchings and Japanese productions, all of which it was expected would one day belong to the French people and help to keep the memory green of two men who were covetous of fame. But next month all the objects which became as it were parts of the beings of the DE GONCOURTS will be dispersed. Owing to the character of the "lots" it has been decided to sell those constituting a variety of art by themselves. In consequence, no less than seven catalogues have had to be prepared, which seem like handbooks to special departments of a museum. Some of the friends of the brothers have undertaken the duty of writing introductions to the series, but they may not be able to persuade bidders to become liberal. The GONCOURT dramas were always failures, and the same fate may await their treasures. The drawings by masters of the eighteenth century are, however, likely to find many wealthy amateurs ready to take part in the contests for their possession.

NEW YEARS parties in jerry-built houses involve many risks. Sometimes ceilings fall and contusions occur to lightly dressed ladies, or a board gives way and sprains follow. Accidents of the kind during the festive season, with bursting pipes and stopped-up gutters, help to keep busy those suburban builders who profess to execute repairs with despatch. The judgment which was given by the Master of the Rolls and Lords Justices LOPES and RIGBY in *LANE v. COX* minimises the responsibility of owners in such cases. The plaintiff was engaged in August last to remove furniture from a cottage, and the stairs gave way under him and his load. He was injured, and brought an action against the owner of the cottage, but was nonsuited. Their lordships on the appeal held there was no contractual relation between the parties. The defendant had not entered into any contract with the plaintiff. There was no duty upon a person not to let an unfurnished house in a rotten condition. Any such obligation must depend upon express contract. It was but a short step from that to say that if the landlord owed nothing to the tenant he owed no duty to strangers. There was, therefore, no duty on the part of this defendant towards this plaintiff, and there could be no negligence, and the nonsuit was right. It follows from the judgment that guests who may be injured in a private house cannot expect to receive a financial remedy from the owner of the mansion. Whether in such a case they can look to the tenant, their host, need not be considered.









THE EXCOMMUNICAT

FROM THE PAINTING IN

BY M. JEAN



Jan. 1<sup>st</sup> 1897



E. LAURENS 1875

INK- PHOTO. SPRAQUE & CO. 54-5 EAST HARDING STREET FETTER LANE E.C.

ON OF KING ROBERT.

THE LUXEMBOURG GALLERY

PAUL LAURENS.













PHOTOGRAPHED BY S. B. BOLAS & CO



Jan 1<sup>st</sup> 1897.



INK- PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

N HALL.  
KE OF WESTMINSTER, K.G.  
OUSE, R.A., Architect.

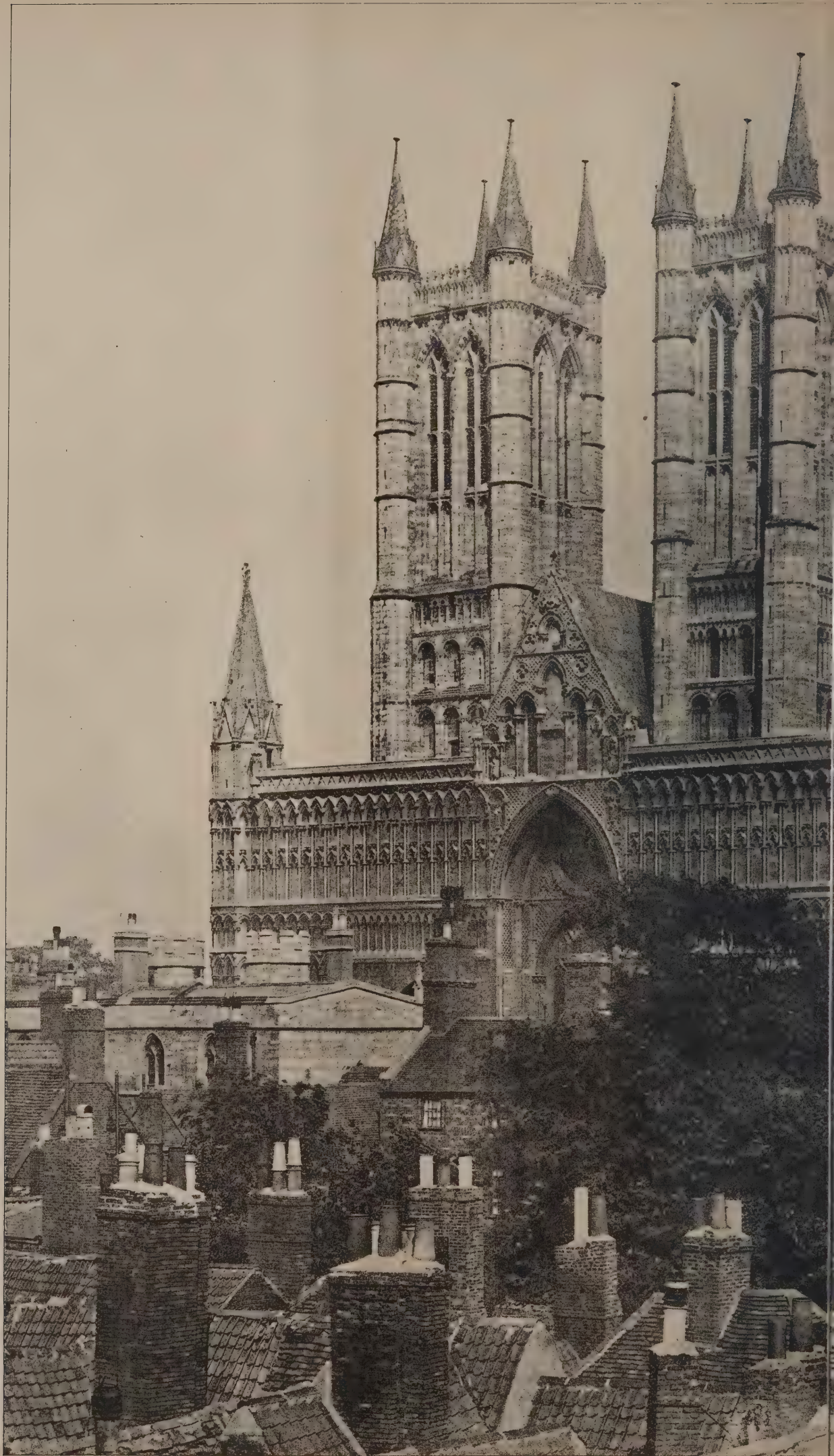












PHOTOGRAPHED BY S. B. BOLAS & CO



Jan. 1<sup>st</sup> 1897.



104 PHOTO SPRAGUE & CO. 205 EAST HARDING STREET FETTER AND I























## ILLUSTRATIONS.

## THE EXCOMMUNICATION OF KING ROBERT.

THE event which M. JEAN PAUL LAURENS has depicted exemplifies the power of the French clergy in the beginning of the eleventh century. ROBERT II., who was known as the Pious, the Wise, the Honest, was the son of HUGUES CAPET, who was the first of the third race of French kings, a race that was afterwards divided into three branches, viz. the Capetians, the Valois and the Bourbons. ROBERT II. was associated with his father in ruling about the year 988. In 996 he ascended the throne and held possession of it until his death in 1031. As a king he was disposed to be peaceful, and he patronised art, science and literature. His fondness for religious exercises gained for him the title of "le Pieux," and he could be considered as a faithful son of the Church. Some of the Latin hymns still in use were composed by him. Unfortunately, ROBERT married his cousin, the Burgundian princess BERTHA, without a dispensation, and by so doing had offended against the laws of the Church. Efforts were made to induce King ROBERT to abandon the princess, but as he declined he was excommunicated by Pope GREGORY V. In those days a formal act of that kind was a terrible calamity. As the painter has suggested, it signified the desertion of courtiers and other attendants from a king; their apprehension of a similar fate overcame their loyalty. For it was prohibited to have any relation with an excommunicated man or woman, to salute them, work with them, pray with them, dwell with them, or eat with them:—

Si pro delictis anathema quis efficiatur,  
Os, orare, vale, communio, mensa negatur.

A few exceptions were tolerated—servants could show fidelity to a master, a vassal to a lord and a subject to a king, but apparently King ROBERT was not fortunate in his retainers, or he was not among the favoured to whom lenience was allowed. It was with difficulty he was able to obtain food in his palace. With the country in a disturbed state government was difficult, but it could not be carried on while the king was treated as if he were more to be abhorred than a leper. Necessity compelled him to submission and he abandoned his wife.

BERTHA was replaced by CONSTANCE OF PROVENCE AND ARLES, a beautiful but despotic princess. The new queen was no helpmate for ROBERT. There was no sympathy between them. Her whole life appeared to be occupied with an endeavour to ruin him, and it is said she incited her sons, while they were still young, to conspire and head a civil war with that object. ROBERT found it so difficult to control his own household, we need not wonder if he refused to give way to ambitious projects and declined the emperorship as well as the sovereignty of Italy. Knowing how precarious was the tenure of his kingship, he arranged for the crowning of his second son HENRI I. against the wishes of CONSTANCE, who preferred to see her youngest and favourite son, ROBERT OF BURGUNDY, ruling France. The joint sovereignty lasted until 1031, when ROBERT the Pious died in his sixtieth year. King ROBERT deserves remembrance as a great church-builder. If we believe LE VIEIL, the author of "L'Art de la Peinture sur le Verre," it was during ROBERT's reign that the art of glass-painting was first exercised in France. All that was attempted is likely to have been the production of a transparent mosaic or a sort of marquetry in glass. From what is known of him, ROBERT, if he lived in a peaceful time, might have gained renown as an agent in the civilisation of Europe, for, in spite of civil wars, his subjects had reason to regret his death.

M. JEAN PAUL LAURENS is esteemed by his countrymen as their foremost historical painter. He confines himself to subjects derived from French history. The long period from the Merovingian kings to the Revolution is almost as familiar to him as the present century, for he has studied not only the histories and memoirs but the archaeology of each of the centuries. He prefers the tragic scenes, and leaves to others the task of painting life as if it were a series of comedies. In all his works the artist's conscientiousness is apparent, but what is seen does not reveal the immense labour which M. JEAN PAUL LAURENS imposes on himself before he attempts to place his visions of the past on canvas.

## EATON HALL, CHESHIRE.

IF any residence in England deserves to be called a palace of art, it is Eaton Hall, near Chester, which is occupied by the Duke of WESTMINSTER. His Grace is not content with having about him evidence of the antiquity of the GROSVENORS. He appears to be more anxious to make it apparent that he is a representative of the nineteenth century, and is as much moved by modern influences as any private gentleman among us. In many of the honest endeavours to make the world better, the Duke of WESTMINSTER takes a prominent and efficient share. As art has become a force it is represented in and around Eaton Hall in the worthiest way. Not only painters and sculptors have contributed to the adornment of the place, but we can there see examples which show those variations of architecture which are the tokens of the changes which English thought and taste have undergone, since the Duke of WESTMINSTER inherited the responsibilities which are attached to a position which can help to mould the future by the influence exerted in the present time, and which draws inspiration from the past.

## LINCOLN CATHEDRAL—VIEW FROM THE SOUTH-WEST.

THE view of Lincoln, in which the cathedral appears to domineer the city, is not to be effaced from the memory. Many artists have endeavoured to represent it. Even the late JAMES FERGUSSON, who was not much impressed by the sites of English buildings, was forced to acknowledge that "Nothing can exceed the beauty of the outline of Lincoln, as it stands on its cliff looking over the Fens." Illustrations of the interior of the cathedral are given elsewhere and they will be followed by others in succeeding numbers. Lincoln Cathedral is only the first of a series which we trust will enable people who have not studied ecclesiastical architecture to realise the present state of all parts of the treasures which are national property. The controversy about Peterborough Cathedral suggests that much ignorance on the subject prevails, and there is no more efficient way of removing it than by revealing the countless details of the buildings on a scale which will enable their beauty to be appreciated.

## SKETCHES AT HOME AND ABROAD.

THE views we now publish are derived from pages taken from a pocket sketch-book by Mr. HERBERT RAILTON, an artist whose development can be followed in *The Architect*, and, we may add, with advantage to every young architect who will make the attempt. The principal difference between the early and the more skilled work of Mr. RAILTON is that in the latter mass receives attention primarily rather than detail. The sketches, in fact, express the impressions which one of the busiest artists of our time has educated himself to receive. In them there is no working-up; what is felt at the most receptive moment is honestly and promptly recorded, and becomes the basis for later treatment. Mr. RAILTON does not enter into competition with photography, which can give detail with a fidelity it would be waste of time for the hand to compete with. What he supplies is something beyond the power of any scientific process to render, and that is the effect which can be produced by a building on a very susceptible and original mind, which has been strengthened by the severest training. The sketches may be only hurrygraphs, a sort of artistic stenography or confidential memoranda, but they are original in their aims, and as revelations of individuality they have the same character as the studies of great masters in painting and sculpture. They are invaluable as indicating one of the stages in the process of representing a building as a work of art by means of another work of art.

**The "Architect's" Cathedral Series.**—As many of our subscribers who have seen proofs of the plates of the series of English cathedrals, which are about to be published, have expressed a wish to keep them separately, arrangements have been made to issue special portfolios for that purpose. If the plates appear crushed from passing through the post office, it is easy to restore them by damping them on the back and passing a hot iron over the surface.



## LINCOLN CATHEDRAL.

WHEN VIOLLET-LE-DUC, as a representative of his countrymen, renounced all claim to a share in the design or execution of Lincoln Cathedral he must have suffered for the loss. "Thou, Lincoln, on thy sovereign hill," as WORDSWORTH apostrophises it, would be an honour to any race of builders. But the French architect acknowledged that he had failed to discern any trace of the French school either in the general design or in the details. The construction, he said, is English, the profiles of the mouldings are English, the ornaments are English, the execution is to be credited to English workmen of the beginning of the thirteenth century. The indebtedness of England to

France for all the best ecclesiastical buildings of the Mediæval period is firmly believed by French architects and archæologists. To conclude that one of the noblest examples was constructed without any direct intervention of French artists was, therefore, a sort of sacrifice to truth which needed resolution as well as honesty in whoever offered it.

VIOLLET-LE-DUC depended for evidence upon the character of the work in the building, and he might also have considered that the selection of so excellent a site, which makes the Minster appear to dominate the city and the Fens, was also a sign of that love of the picturesque which was more common in England than in France. But if he had considered the history of the cathedral he would have



Photographed by S. B. Bolas & Co.

CHAPTER-HOUSE, LINCOLN CATHEDRAL



found that Lincoln in its administration was as closely connected with France as any of the other English bishoprics. It was easy for VIOLLET-LE-DUC and foreign archaeologists to imagine that the district of Lincoln would be one of the last refuges of the Saxon, where the Normans were long in gaining a footing, and therefore primitive customs long prevailed in it; but the creation of Lincoln as a see was the work of the Conqueror.

There is no doubt an ecclesiastical district existed of which the Roman Lindum Colonia formed a part; but it seems to have been ruled from Stow, where is still a very interesting church. Owing to the invasions of the Northern rovers the bishops were driven inwards, and at the time of the Norman invasion Dorchester in Oxfordshire, instead of

Stow, was the residence of a prelate whose see extended beyond Lincoln. When he died, soon after WILLIAM'S coming, his office was bestowed on a little almoner from Fécamp, one of the speculators who had helped to subsidise the invaders, and who was known as REMY or REMIGIUS. He had his chair carried to Lincoln, and on the highest spot, near where a castle was being erected, he commenced the erection of a cathedral. Whether he endeavoured to make it correspond with the eminence of a priest who, as the ruler of the largest diocese in England, had become one of the foremost dignitaries in Europe, is not known. The size of the building can only be conjectured. Whether the cathedral was large or small, REMIGIUS was able to impart some of his own energy to the builders. In



*Photographed by S. B. Belas & Co.*

ANGEL CHOIR (PRESBYTERY, OR LADY CHAPEL), LINCOLN CATHEDRAL.

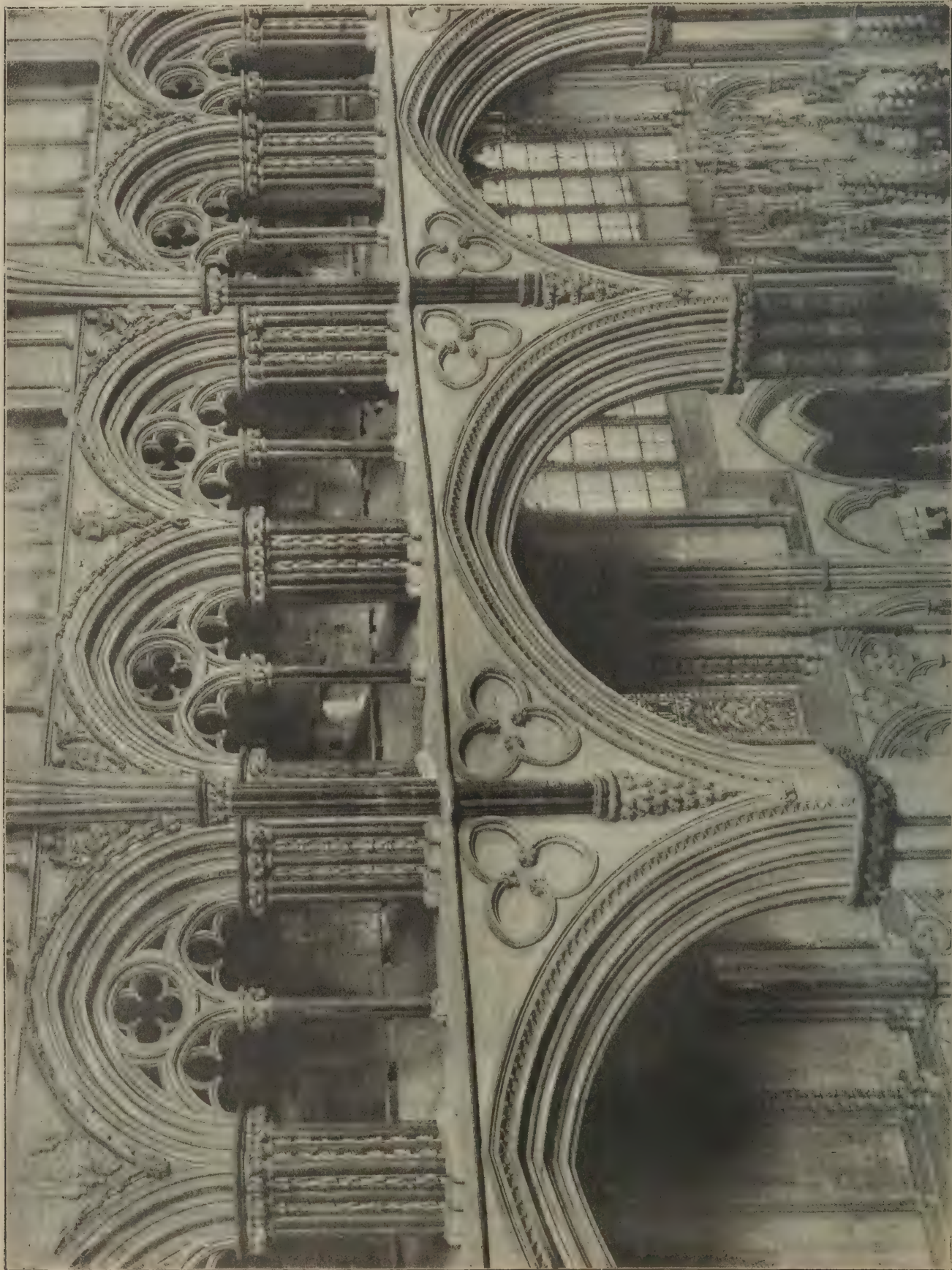


seven years it was ready for consecration. The date was fixed for the ceremony and clergy and laymen arrived to witness it—for it was the first which took place under the new rulers. But the Spirit who says "Come!" and who is no respecter of persons or events, had called REMIGIUS. The crowds found they were to be present at a funeral instead of a consecration. The parts of the first cathedral which have remained reveal that it was of the severest and plainest Norman. There was apparently no time to cut mouldings or chamferings, and in fact the mere shell of the building was all that REMIGIUS's expedition could raise. If, as some archæologists believe, the west front, or it may

be the veiled part, dates from his time, it affords by itself an idea of the aims of Lincoln's first bishop.

His successor, Bishop BLOET, apparently was not zealous about the building, but ALEXANDER, the third Bishop of Lincoln, was one of those men who are sure to find in the newest building opportunities for alterations. A fire which occurred in 1141 and destroyed the whole of the roof enabled him to introduce stone vaulting throughout the building. He also constructed the three doorways in the west front and the lower parts of the towers, his masonry being more finely jointed than that of REMIGIUS.

In 1186 another Norman, called HUGH OF AVALON, a



TRIFORIUM, ANGEL CHOIR, LINCOLN CATHEDRAL.



Carthusian, afterwards known as St. HUGH, was consecrated bishop. In the year preceding an earthquake had destroyed a large part of the cathedral, and left the remainder in an unsafe condition. HUGH appears to have bravely encountered the difficulties which awaited him. He spent some years in making arrangements and providing materials. A change had taken place in architecture, and the style adopted by Bishop ALEXANDER was as much out of date as that of Bishop REMIGIUS. HUGH OF AVALON was enabled to obtain the aid of GEOFFREY OF NOYERS as "constructor ecclesie" to prepare plans in the new style, the beautiful Early English, which must have seemed at the time to have been an inspiration from heaven.

It is rarely the name of a Mediæval architect has come down

to us, and GEOFFREY or GODFREY deserves to be honoured. But it is commonly assumed he was one of the Normans who made of architecture a close profession for their own benefit. There is, however, reason to believe he belonged to a family that was over a century settled in Lincolnshire. Although of foreign origin he has as much right as his building to be considered English. Unfortunately for his reputation hereafter, the architect, although nearly eight centuries have elapsed since he worked at Lincoln, by his masonry excited the anger of Professor WILLIS, who can only regard him as "a crazy Frenchman!" He is therefore severe on GEOFFREY's shortcomings and grudging of praise to his skill. "I can trace," said the Professor, "his eccentricities through every part of the building which he erected, from



*Photographed by S. B. Belas & Co.*

LESSER TRANSEPT (SHOWING CLUSTERED AND CROCKETED COLUMNS), LINCOLN CATHEDRAL.



the floor to the vaulting. His double arcades were a great conceit, and his octagon shafts, with their detached shafts around them, introduced one of the most serious difficulties which the Dean and Chapter had to contend with in the repair of the cathedral. Yet, with all his oddities, GODFREY hit on occasional beauties; and the noble pier column, with the crockets between the detached shafts and the main pier, is one of the best of its kind in England." One consequence of Professor WILLIS's judgment is that it inspired the late Sir GILBERT SCOTT to take a similar view. In one of his Academy lectures he said:—"The subject of puzzles in vaulting suggests a notice of that of the choir at Lincoln, where the architect seems to have put himself out of the way to make an easy matter difficult; for instead of groining his oblong bays in the usual way, he has made each cell strike obliquely to points dividing the central ridge of the bay into three equal parts; so that neither the cells nor the diagonal ribs from either side ever meet one another, but each cell is met by an intermediate or an oblique transverse rib from the opposite side." SCOTT was, however, compelled to acknowledge the beauty of the architect's work and to express a wish that similar craziness and eccentricity were more prevalent in England. There is apparently no example of Gothic emancipated from Romanesque or other detail to be found at so early a date as we can see it in the choir at Lincoln. If more height had been given to the vaulting the work would be still more effective.

Bishop HUGH set an example to the amateurs and craftsmen of his diocese. He aided in the work by acting as a humble labourer, and was proud to carry stones and mix mortar for the masons. The character of his work in the choir suggests the enthusiasm he inspired, and is thus described by JOHN HENRY PARKER:—

Nothing can well exceed the freedom, delicacy and beauty of this work; indeed, there is an exuberance of fancy which leads us almost to think that the workmen ran wild with delight, and it became necessary to sober them down and chasten the character of the work afterwards; for instance, in the double arcade which covers the lower part of the walls there is a waste of labour, which is avoided in the subsequent work of the nave without material injury to the effect. In the early work there is not only a double arcade, one in front of the other, but in some parts there are actually three shafts in a line, one in front of the other, so as only to be seen sideways and with difficulty; this arises from the vaulting-shafts being brought in front of the double arcade. The foliage of the capitals is exquisitely beautiful, and though distinguished technically by the name of "stiff-leaf foliage," because there are stiff stalks to the leaves rising from the ring of the capital, the leaves themselves curl over in the most graceful manner, with a freedom and elegance not exceeded at any subsequent period. The mouldings are also as bold and as deep as possible, and there is scarcely a vestige of Norman character remaining in any part of the work. The crockets arranged vertically one over the other behind the detached marble shafts of the pillars are a remarkable and an uncommon feature, which seems to have been in use for a very few years.

St. HUGH was not destined to see the completion of the work which he had commenced with fervour. He died in London on November 17, 1200, when only the choir with the chapels on its eastern side and a part of the great transept were ready for use. His body was brought back to Lincoln, and buried in the east part of the church above the high altar. King JOHN helped to carry the coffin. Mr. FERGUSSON considers that we owe to Bishop HUGH the first perfect vault in England, which was constructed by the masons of Lincoln not necessarily in the Burgundian manner; "but in that form with which they were conversant from their practice in erecting smaller side vaults."

Another HUGH (DE WELLES), who occupied the chair for a quarter of a century, dying in 1235, is supposed to have had much of the nave constructed, with the chapels on the north and south sides, besides the chapter-house and the Galilee porch attached to the western transept. At his death he left to the cathedral one hundred marks, besides all the timber he possessed throughout the diocese.

Bishop GROTESTE followed. He belonged to the humblest class of the people, but, as often has happened in the Roman Church, his origin helped him to advance. He was no respecter of persons when duty was to be supreme. LINGARD says that "Neither pope nor legate could prevail on him to give institution to foreign clergymen presented to benefices in his diocese. When the nuncio sent him a provision by which FRÉDÉRIC of Louvain, the nephew of

INNOCENT IV., was promoted to a prebend in the church of Lincoln, GROTESTE replied, in language singularly energetic, that the provision was contrary to the good of the Church and the welfare of souls; that he would not consider it as emanating from the pontiff, and that he should never deem it his duty to carry it into execution." He had used similar language before the Pope at one of the councils, and he appears to have succeeded in establishing reforms. He held the see of Lincoln for eighteen years. It is as an intrepid reformer and writer he is known, rather than as a builder. All the work that can be assigned to his episcopate is the rebuilding of the central tower, which had fallen during one of the canon's sermons.

The crowning work of the interior, the beautiful "Angel Choir," which the late Professor PALEY described as "the most perfect structure, both within and without, in England," was commenced in 1255. In order to erect it a part of the city wall was allowed to be removed. It was not completed until 1281, when the body of St. HUGH was deposited in it, King EDWARD I. and his Queen, the princes and all that was greatest in England taking part in the ceremony. As a work of a later time it necessarily differed from the style introduced by GODFREY OF NOYERS; indeed, RICKMAN includes it among examples of the Decorated period, but remarkable skill is seen in the avoiding of contrasts that would be too pronounced. It is not everywhere the transition is so finely graduated. The thirty figures of angels on the spandrels are, according to the late Professor COCKERELL, the work of English sculptors, and are among the most successful Mediæval examples.

The cloisters, which date from 1296, show more definitely that the Decorated period had commenced. To the fourteenth century the west windows belong and some of the chapels, but what is most interesting in Lincoln Cathedral may be attributed to the men who lived in the thirteenth century.

## ARCHITECTS AND ELECTRIC LIGHTING.

NOW that electric-lighting is a well-established fact and no longer an experiment, one is often inclined to ask why it is not more universally adopted in England. This brings us at once to a question of national characteristics which may equally quickly be put aside. We all know the Englishman's aversion to anything new, and his cautiousness in committing himself to any venture that his more volatile neighbours have not already adopted with success. In fact, he is naturally "close" where his own interests are concerned.

As this is, however, no new question, but one that has been proved many years ago, there must be other causes which determine our comparative inaction in the adoption of this very necessary means of illumination—causes which might be dealt with *ad infinitum* by the electrical engineer who has come into contact with the vestryman, the town councillor, the building committee or the private householder. And these causes in the end all resolve themselves into the question, "What will it cost?"—i.e. one of money. The point now arises, "How far can the architect assist in making the electric light more popular?"—not in the way of pulling the chestnuts out of the fire for the electrical people, but in working harmoniously with them in considering the possibilities of the electric light from an artistic and scientific standpoint; in beautifying his interiors by working in the lighting as a part of the decorations; in actually and directly cheapening the cost of first installation and in providing against excessive depreciation and repairs by insisting on the carrying out of a first-class job to begin with.

For it must be conceded that the architect has not yet grasped the possibilities of electric lighting and its importance as a part of his whole building. He turns the question over to the man who will do it for the least money, and takes no further responsibility in the matter. The work is outside his pale altogether; the clerk of works will have nothing to do with it, unless it be to obstruct the wiremen, who, it may be at once admitted, want very little encouragement to scamp a job. The mistake made by many architects is that they know certain firms who always do their plumbing work or supply gas-fittings; and when these firms wake up one morning to discover that they are full-blown electrical engineers, our archi-



tect accepts them as such, provides them with a schedule of lights to quote to, and invariably accepts the lowest tender without troubling to inquire whether the material even will not cost more than the price tendered. We all know the result. If the firm find they are losing money they scamp the work, and the architect is not one whit the wiser.

The object of this article is to attempt to indicate some ways by which good electrical work may, by the help of the architect, be made obligatory and at the same time cheaper.

Now, if a householder is asked why he does not adopt the electric light, his answer is sure to be that the installation is too expensive and inconvenient. He does not always want to re-paper his walls, or have his cornices spoiled or his floor-boards ripped up. All these objections are valid and the things complained of are unpleasant. But they may be greatly modified by making certain provisions in designing and building a house which is certain, sooner or later, to be fitted with electric light. Now if we ask what provision does the architect make for electric-light runs in building a house, the answer is "None."

In wiring a house the first thing that is looked for is an easy run for the rising mains; sometimes a casing for gas and water-mains is found running right up the house; more often than not there is no room in this casing for electric-light mains, more frequently still there is no such casing at all. Then an unsightly electrical casing, sometimes a foot wide or more, is run up some wall of the house. The same may be said about circuit mains, there being no provision of any sort for hiding runs.

All this might be improved if the architect would recognise the claim of electric light. When he designs the house, would it not be desirable for him to provide casings from basement to attic? Or in default of this, to build a galvanised iron pipe—diameter in proportion to the probable number of lights—into the wall, with a break at each floor between floor-board and ceiling level? This would avoid any cutting away of plaster if the house is wired at any future time, and materially cheapen labour.

Again, consider the unnecessary time occupied in taking up floor-boards for wiring a room below. If the boards are tongued and grooved, the expense is very great and the final appearance of the floor is not good. Now, as ceiling lights are nearly always in the middle of the room and brackets are fed from the side, would it not be possible for the middle board on every floor to be screwed down? Also, if all the boards were stopped off at the last joist but one and the remaining space boarded over by boards running at right angles, or with the joists and supported on bridge pieces—all boards at the skirtings being screwed down—it would then be possible to run casing all round the room under the floor, by merely unscrewing the boards round the walls. This is no doubt heretical and quite contrary to recognised principles, but it might be considered. Skirting-boards again give a lot of trouble if they have to be taken down, because they are sprigged on, and very frequently are split by careless joiners. Why should not these skirting-boards be screwed down, the heads of screws being countersunk and puttied over? Parquet flooring is another stumbling-block to wiremen. If the usual herring-bone or lozenge pattern were stopped—say, two blocks' width from the skirting, the space being then filled up with two rows of blocks running straight—the taking-up and making good would be a much simpler matter. These and many other small points should suggest themselves to architects when designing a building; they should bear in mind that electric light will ultimately be adopted, and make the necessary provisions for the same, so as to cause their clients as little inconvenience and expense as possible.

We may next consider what should be done when it is decided to adopt the electric light immediately the house is built, *i.e.* what is then the best system to adopt? There are many systems of wiring, but roughly these may be divided into two, *viz.* surface work and hidden work.

Now, it is obvious that the best system is that which will give the least trouble in the end, no matter what it costs in the beginning; but the public do not always look at it from this point of view. The surface system of wiring is undoubtedly the cheaper in either a new or an old house, but decidedly so

in the former, because the making-good follows as a matter of course. But for that very reason it is more expensive in cases of repairs, extensions, &c., because it always necessitates the presence of the decorator.

On the other hand, the hidden system, when once installed, gives no further trouble as regards repairs, because new wires may be drawn in at any time without disturbing the decorations. It is also possible to adopt the hidden system in an old building, but this—although the best, if the client will pay—is expensive, as all the walls have to be chased to let in tubes. (Sunk casing is not considered here, as being out of date.) Now, there is no reason why, if gas and water-pipes are put out of sight, that electric-light wires should not be equally hidden; that architects are only now beginning to recognise this is however a fact. Look where you like, in town halls, banks, churches, private houses and anywhere, you will see the walls disfigured with hideous casing, with no attempt at arranging the same artistically even, so as to conform with the decorations. That this is often, in fact usually, the fault, not of the architect, but of the owner or a building committee of Philistines cannot be denied, for the architect is frequently not consulted in the matter. All the more, therefore, where and when he has a chance he should use his influence to make a good job of the electric light.

Now, casing may be worked into the decoration of rooms in a most artistic manner, if a little thought and trouble be only given to the question. If on the walls, it may be worked in with oak or other dados, with mouldings for friezes or with panels, and on the ceilings it can be laid out in lozenges or any form desirable. In some country houses this is occasionally done; but how often, after awarding the contract, does the architect trouble himself to see that the same is artistically carried out, not merely thrown on to the walls?

There are also other means by which an appearance of neatness may be attained, especially where the building is not new, and it is desired to avoid much cutting away. All the runs under the floors may be in casing as usual; but drops to switches, plugs, or brackets are run in round—or, preferably, half round—brass tubing, secured to the wall by neat clips, and subsequently carefully painted the colour of the wall-paper. The half-round tubing is especially to be recommended because it is hardly visible, and if run down corners of chimney-breasts, or along door or window architraves, is not noticed at all.

To return, however, to the hidden system of wiring. This is now rapidly coming into use, but, unfortunately, the main principle is lost sight of in the attempt of everybody to have a different system of details; for example, galvanised iron pipe, iron pipe served with composition, compo pipe, brass pipe, compressed paper sheathed with brass, iron pipe coated inside with compressed paper, &c.

Now, what is required of these systems is cheapness, mechanical strength, incombustibility, facility for inspection and renewals, and insulation. The only system which conforms to all these qualifications is iron pipe pure and simple, with a proper system of draw and inspection-boxes, the whole either compounded or galvanised to prevent rust. This method is invaluable for public buildings, banks, insurance offices, &c., especially where there are mosaic floors and marble or tiled walls. Two large insurance offices in London have recently been completed on this principle, under the superintendence of a firm of consulting engineers who make this form of wiring a specialty, and also with the advice of the architect in this instance, and there is no doubt that in many other such buildings the same plan will be adopted.

For private houses this system may be worked very well in conjunction with brass pipe for small drops and casing under the floors, the iron pipe being used for rising mains. The brass pipe, being only half-inch, requires a very small chasing in the plaster, which can easily be made good with Parian cement, and, if the house is not new, by a strip of wall-paper of the same pattern as the rest, cut with jagged edges. Or if the wall be covered with Lincrusta, this may be cut with a sharp knife and pressed back for about an inch, being afterwards stuck down again.

In conjunction with these hidden systems, it is usual to sink switches and plugs flush with the wall, and a very nice effect is produced by covering the same with a carved wood or



embossed metal finger-plate, leaving merely the handle of the switch protruding, or in the case of plugs drilling two holes in the cover for the prongs to enter.

All these systems are, as has been said, relatively expensive for first installation, and this again raises the question of cost.

Now the gullibility of the British public is extraordinary, especially on a point of this sort; and if a man asks for tenders for wiring his house and gets sums ranging from 15s. to 30s. per light, he will usually accept the lowest tender after receiving an assurance by the firm tendering that he will have the very best work and material—in fact, as good in every way as that offered for the highest price, which latter was going into the pockets of the tenderers as 50 per cent. profit.

This is the ordinary bourgeois way of asking for and accepting tenders when the architect does not appear. But when an architect does the same thing, what are we to think? Especially if he is building a house for a rich client—say for 10,000l. or upwards—it is idle to state that the owner will not pay—say 200l., or only 2 per cent. of the cost of his house—to have his wiring done properly, *i.e.* by a responsible and well-known firm acting under expert advice. Instead of this some young gentleman goes down to see the house, where he is taken round by the owner's wife, who settles the positions of lights, &c., with the result that the house is often ridiculously overlighted or underlighted. Furthermore, the question of fittings is also left to this lady, who chooses articles without any relation to their intended future environment, and with the sole object of having something different to that of her friends.

It is therefore just as necessary from the point of view of economy, safety and art, to see that this contract is properly carried out, and to have expert advice in the matter, as to see that a building contract is carried out honestly and to specification—for which purpose the architect has a clerk of the works. For the risks to life and pocket are just as great, and in time the bad work will have to come out if the house has not been burned down before.

Now when a man wishes to build a house he consults an architect, and when he wants his drainage repaired or extended he (if he is wise) consults a sanitary engineer. Also when he intends adopting the electric light he ought to have the advice of a consulting engineer, for just the same reason that he would not entrust the work before-mentioned to a builder without expert advice. And, just as this consulting electrical engineer would not, as a point of professional etiquette, think of getting out plans for the building of his client's new wing or even his engine-house (whatever ideas of architecture he might have), but would place his requirements for the due carrying out of such a building before his client's architect, so the best results would be obtained if, when a building were to be lighted by electricity, the architect would advise his client to call in an expert on electric lighting and illumination, so that the two may consult as to the best methods to be adopted—the consulting engineer on the system and quantity of illumination, the architect on the means to facilitate the due carrying out of the work, and the difficulties to be overcome in the way of runs—after the scheme of distribution has been submitted to him.

This state of things may seem rather utopian—the lion lying down with the lamb—but it has been done before, and there is no reason why it should not be done always to the confusion of the absurd jealousy that undoubtedly exists between these parties and also between their respective employés.

In conclusion, whether these last suggestions be adopted, or the architect undertakes to provide for and see to the work himself, the point must not be lost sight of that there is as much cutting, scamping and jerry-work in the electric-lighting trade as in the building trade. But whereas the latter is usually only due to excessive competition, the former is frequently due to gross ignorance and carelessness, by people who have had little or no scientific and commercial experience, and who are either drapers and ironmongers, or else young fellows straight from college who have never wired a house or employed a workman, but are subsidised by their fathers, and who will quote any price so as to get a job. People of that class are the enemies to the industrial progress of electric lighting; they not only eventually find themselves in the courts, but also injure and discredit the trade they are engaged in by

shaking people's confidence, and driving them to the incandescent gas light.

These are the sort of firms that the architect should beware of, and for this reason some of the afore-mentioned suggestions are made in the hope that, by recognising electric lighting as separate from architecture, by providing for its claims, and by entrusting its execution to good people acting under expert advice, the architect will secure for his client an artistic, economical and first-class job.

## RENAISSANCE ARCHITECTURE IN ITALY.\*

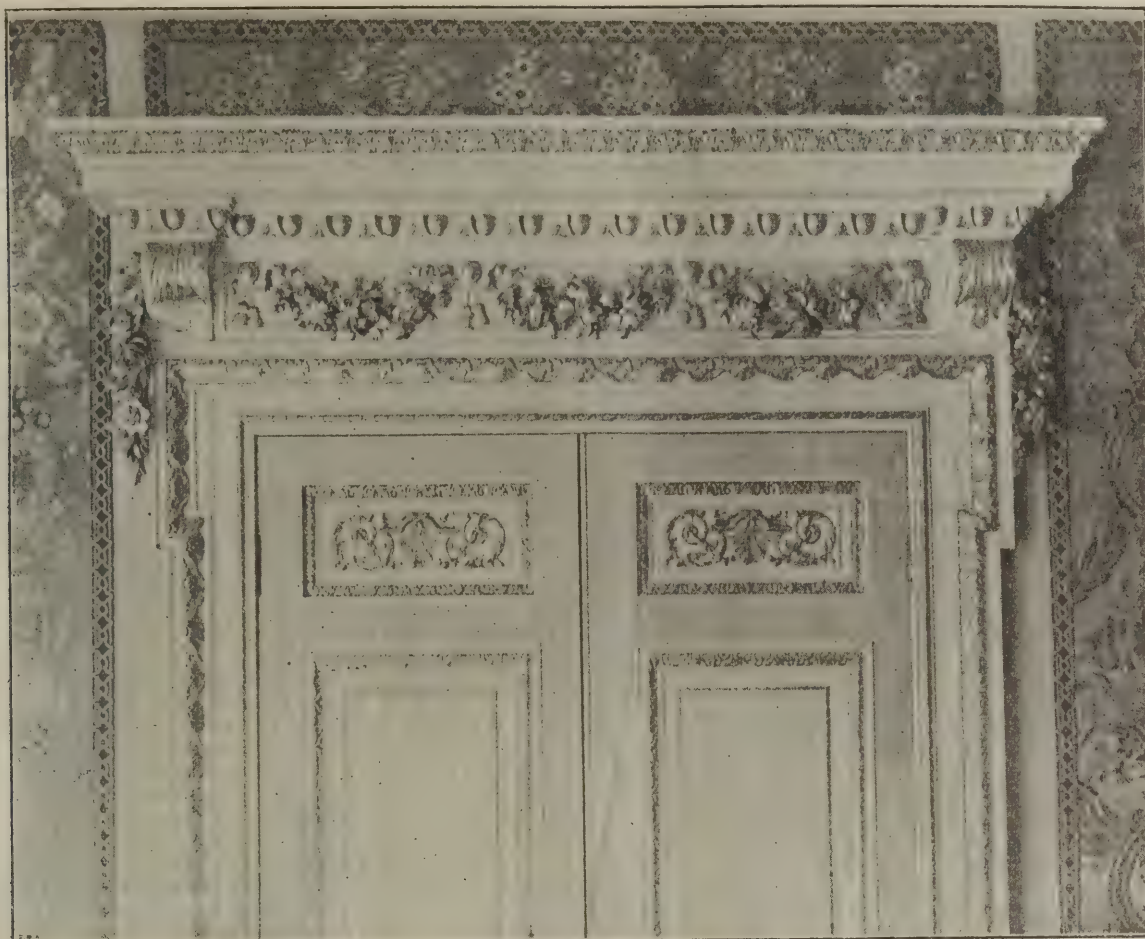
IT would have been an advantage if Mr. Anderson's book appeared some thirty or forty years ago, when the Renaissance was, especially in architecture, supposed to be one of the pestilences which periodically afflict the human mind. The author has constituted himself a champion for the style, and in those days he would have found opponents as courageous as himself. In our time the coming and going of styles is considered as phenomena which, for all we know, may be inevitable. If we allow the existence of certain natural tendencies among men, and events which excite those tendencies, it seems to be inevitable that there must be a sort of game of see-saw in art—in which what is to-day looked down upon has a turn and becomes an object for admiration. Or we may describe the alternation as an ebb and flow which we are powerless to resist because they are in some way connected with the evolution which we are doomed to undergo. If, however, we can consider Mediæval architecture as a temporary diversion of the onward movement of art, then the Renaissance will be no more than a resumption of the former direction of a current in its true channel. That is the opinion which Mr. Anderson holds, and which he thus explains in the beginning of his book:—

The higher mental activity and adaptability of the Aryan race, joined to the disturbance caused by Northern Teutonic elements out of sympathy with the Roman, has brought about a more frequent and further divergence from the established type than anything in the history of Egyptian and Oriental art. The brilliant Mediæval or Gothic period in Europe is the most notable example of such divergence, ending as the strength of the Roman element in race, literature and sentiment asserted itself first in Tuscany, but involving the four corners of Europe in its rising flood. The Renaissance was, in fact, a reversion to type, if a biological expression may be applied in this connection without confusion; and this recurrence rather than permanence of type appears to be characteristic of European civilisation, so far as we have had experience of it in some 2,000 years. In this view of it the historical architecture of Europe is one complete whole to this day, its main characteristic features the combination of Greek column and lintel with Etruscan arch, pediment and dome. Its mouldings still show to trained eyes their wooden origins, though a stone character has been gradually impressed upon them. European architecture is a variety as distinct as the Egyptian or the Arabian, and in a corresponding degree a racial expression, pointing, if not to the identity of the origin of Romano-Germanic peoples, at least to their now essential unity.

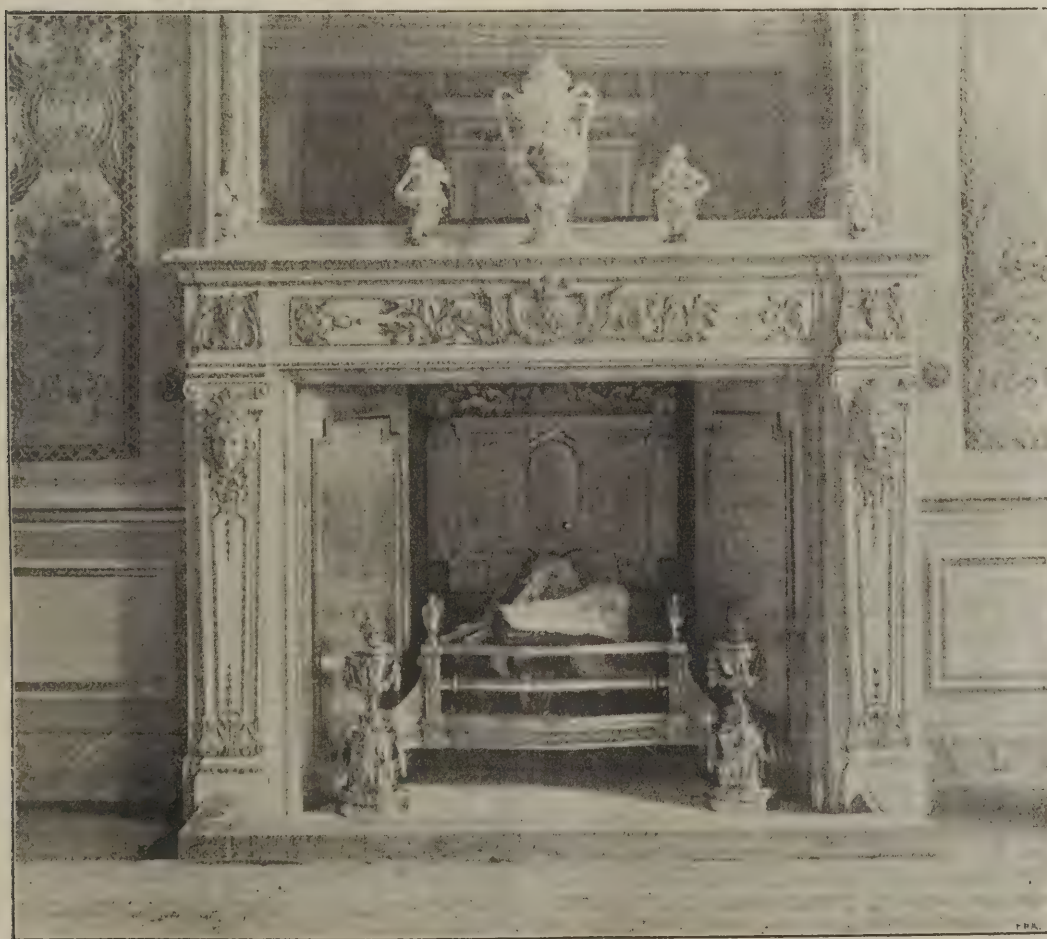
The words we have quoted will by themselves be almost enough to suggest the aim of the author. He believes in the unity of the architecture of which the Renaissance was a phase, because it was the product of a race having common characteristics. Looked at in that way, Mr. Anderson believes that Italian Renaissance especially is no mysterious production; it becomes to him a mirror of contemporary life. As he says:—“By the operation of the universal law of natural selection it has registered the awakened enthusiasm of the time for what was glorious and beautiful in the ancient world, the enlarged consciousness, of its free-will, and the possibilities of human life and effort; while it records on the very face of it, so that he who runs may read, the habits of the people, the condition and nature of trades, commerce and arts, and the character and varying power of the governments of the Peninsula.” In the majority of books on architecture by English authors there is no such attractive promise held out to allure readers, but we should remember that Mr. Anderson's book originally was prepared in the form of lectures to students in Glasgow—a city where it is expected that a subject is to be proved to have a very wide circle of relations. Mr. Anderson is no compiler, he has studied the Renaissance buildings which he describes, and in criticising them it is evident he is not too submissive to authorities, but can think for himself. The book is evidence of the earnestness with which architecture is studied in the north, and it will exercise a beneficial influence on students.

\* *The Architecture of the Renaissance in Italy.* By William J. Anderson, Director of Architecture and Lecturer at the Glasgow School of Art. London: B. T. Batsford.





CASTLE GROVE, HEADINGLEY, YORKS. THE DRAWING-ROOM OVERDOOR.  
*T. Butler Wilson, F.R.I.B.A., Architect.*



CASTLE GROVE, HEADINGLEY, YORKS. THE DRAWING-ROOM MANTEL.  
*T. Butler Wilson, F.R.I.B.A., Architect.*



THE necessary legal notices have now been lodged for the introduction of a Bill next session to obtain powers for the compulsory acquirement by the Office of Works of all that suitable ground known as the Carrington House (Whitehall site) and of all rights in connection with it. The freehold of the properties on this site, says the *Standard*, are part of the hereditary estates of the Crown, and the select committee of the House of Commons which, under Mr. Akers-Douglas, considered the subject last session, reported at the end of July that it was, in their opinion, desirable to acquire the various interests in the property, subject to an actual or contingent recoupment of its value to the land revenues of the Crown. They advise the erection of the new War Office here, chiefly because the necessity of further accommodation has long been recognised as urgent, and because this site would be more quickly available than any other. They also regard its position, in respect of its contiguity to the new Admiralty and otherwise, as most practical and convenient. There is another point of view from which the site has claims upon public attention, namely, that it is part of the historical area of 24 acres which formerly constituted the so-called Palace of Whitehall, or as Philip II. wrote it in a despatch to Mendoza, "Huylal," whose isolated buildings, courts, squares and gardens stretched from the water-gates of York and other mansions on the river bank to the place now known as the Horse Guards Parade. The locality was formerly highly esteemed for its accessibility, and its capacity for architectural development is pointedly indicated by Inigo Jones's ambitious proposals to James I. for a royal residence. What was beyond the monarch's resources to build or to maintain is being fast realised by modern speculative enterprise, and the Carrington House site is to-day an island area surrounded by some of the finest modern edifices in the Metropolis. The dimensions of the property in process of acquirement, stated roughly, may be taken at 600 feet on its northern limit, which the roadway of Whitehall Place separates from some of the offices of the Woods and Forests, the house of the Ecclesiastical Commissioners and the southern frontage of the huge Hôtel Métropole. The eastern side, 450 feet long, is delimited by Whitehall Avenue from the gigantic towering pile of Whitehall Court, at the corner of which is the National Liberal Club. Its southern face measures 400 feet, including the now vacant space from which the famous Carrington House was cleared a few years ago. This face is



kept well apart from the mean buildings occupied by the Board of Trade and from the memorable banqueting-hall, the scene of the martyrdom of Charles I., by the recently opened road, called, from its particular location, Horse Guards Avenue. The western boundary, about 320 feet, is in Whitehall, on the route from Charing Cross to Parliament Street. In the centre of the plot is Middle Scotland Yard. The occupiers of tenements and offices, let or leased, in the existing congeries of houses who will be affected are the Gas Light and Coke Company, the Vestry of St. Martin-in-the-Fields, the Metropolitan Electric Supply Company, the London Electric Supply Corporation, the Charing Cross and Strand Electric Supply Corporation, the London County Council, the Chelsea Waterworks and the National Telephone Company. The committee's report does not finally deal with the question of increased accommodation for other Government departments; with other sites in Parliament Street, Downing Street and Spring Gardens; or with the public improvements with which they may hereafter be connected. But it advises a further reference to the committee when the subject is brought again before Parliament.

## TESSERÆ.

### Thirteenth-Century Gothic.

THE series of changes from the Early Romanesque to the establishment of Pointed architecture, and thence again to its final extinction, differs materially in the different countries of Europe; all however seem gradually to approach nearer and nearer to one another till towards the close of the thirteenth century, when all appear, though by different routes, to have arrived, in the main at least, at the same point; and though some differences still remained, as might be expected from slight varieties in climate and materials and local habits, the essential principles and elements of the style at that time were perfectly coincident with France, Germany and England. This coincidence, however, was of short duration, for from this point all again diverged, so that at the final extinction of the style its national varieties differed as widely as at its commencement. It is by no means self-evident that this coincidence of principles and details at one particular epoch is a proof of its being the culminating point in the style; it happens, however, to be the very point which, perhaps, the majority of those who have thought on the subject, judging only from æsthetic evidence, have selected as about the period of perfection; and if we must select a style other than a local one, an era of general rather than of national perfection, this period of coincidence, to say the least, comes in very conveniently as the only one which can be shown to be applicable to all the principal countries where the Pointed style prevailed.

### Contrast in Architecture.

To obtain the due effect of size the architect must study scale. He needs something to mark greatness by contrast. The pyramids seen in solitude appear much smaller than when surrounded by life and marking their real dimensions by contrast with the Arabs swarming over and upon them. A colossal statue in the same way gives no idea of its actual bigness until an ordinary human being is placed beside it. It then asserts its real importance, just as a great man stands out from among his fellows, because his actions are nobler and better than theirs. The Greeks did not erect large buildings because they did not require them, and their temples impress us rather as beautiful shrines for sculpture than as grand architectural monuments. The effect produced in the case of the Parthenon, for example, is by exquisite proportions combined with beautiful detail and not by size. The Roman architects, on the other hand, fully appreciated the value of this means of obtaining architectural effect. Large edifices such as the Coliseum were the fruit of their energies, and Rome, as the capital of the civilised world, became the centre to which all turned in art, as afterwards in religion and literature. The Roman Empire, extending from sea to sea, gave security to subject races and assured to them material prosperity. Architecture as an art of peace consequently flourished, and throughout the vast empire imposing buildings arose, such as temples, theatres and baths, while public works of utility, like aqueducts and roads, were not neglected. The Coliseum impresses us at least as much by mere size as by the beauty of its parts. These, indeed, are in no way remarkable, although from their frequent multiplication they give a value to the whole structure and supply the necessary measure by means of which its vastness may be appreciated. The great Roman baths are in too imperfect a condition to enable us to speak confidently of their original architectural effect, but from the remains that have been discovered, particularly of mosaics and sculpture, we have every reason to conclude that their vast size was not thrown away, as has been done at St. Peter's, but that details of moderate dimensions and statues but little exceeding the size of life gave that opportunity of comparison

which is essential to the architecture of a noble building. In the Middle Ages we find the same principle worked out and with even more technical skill. The builders of our cathedrals did not, indeed, aspire to the reproduction of the broad surfaces and spacious vaults of Imperial Rome. They sought to produce architectural grandeur rather by a repetition of parts than by any single exploit. Their works contained details of moderate dimensions often repeated. The effect of such multiplication of small parts is to give scale to the whole building and to make the latter appear larger than it really is.

### Antiquity of the Propylæum.

Students of Greek architecture have long been familiar with the fact that the entry to Greek sacred areas, such as the Acropolis of Athens and the domain of Demeter at Eleusis, was entered through a noble propylæum, of which the form is constant and fixed. The Greek propylæum consists of two porches set back to back, whereof one looks outward towards the outer world, the other inward towards the enclosure. At the common back of the two porches runs a solid wall with great gates. The construction combines, as do most Greek contrivances, great beauty with great convenience, since the two porches offered a pleasing shelter to those waiting for the doors to open, whether they wished to go out or in. Such is the fixed Greek custom, but it is not a little surprising to find a propylæum of precisely this kind guarding the entry to the upper Acropolis of Tiryns. This fact by itself seems to carry back the history of Greek architecture some centuries. Of course, though the essential idea is the same in the prehistoric as in the historic Greek doorway, the details differ. We should be disappointed if we sought at Tiryns the marble pillars, the sculptured friezes, the stone roofs which were the features of such propylæa as those of Pericles. At Tiryns there were pillars indeed, but they were of wood let into limestone bases, and the roofs instead of being slabs of stone or tiles, were almost certainly made of rushes covered with clay, after the fashion still usual in the East; but while materials change form persists, the idea takes a new expression but does not itself change.

### Influence of Stained-Glass on Oil-Painting.

Absolute opacity, to judge from the older specimens of stained-glass, seems to have been considered inadmissible. The window was to admit light, however modified and varied in the form prescribed by the architect, and that form was to be preserved. This has, unfortunately, been lost sight of in some modern glass-painting, which, by excluding the light in large masses and adopting the opacity of pictures (the reverse of the practice above alluded to) has interfered with the architectural symmetry in a manner far from desirable. On the other hand, if we suppose painting at any period to have aimed at the imitation of stained-glass, such an imitation must of necessity have led to extreme force, for the painter would set out by substituting a mere white ground for the real light of the sky, and would thus be compelled to subdue every tone accordingly. In such an imitation his colour would soon deepen to its intensest state, indeed considerable portions of the darker hues would be lost in obscurity. The early Flemish pictures seldom err on the side of a gay superabundance of colour; on the contrary, they are generally remarkable for comparatively cool lights, for extreme depth and a certain subdued splendour—qualities which would necessarily result from the imitation or influence in question.

### Buildings in Earthquake Countries.

The prescriptions which the architect has to follow in preparing his buildings to resist the strains of a moderate earthquake are simple, and do not require any great increase in the cost of construction. It is well to understand that the actual movement of the ground, even in violent shocks, is slight. In those which have been termed of the first order it is doubtful if the movement ever amounts to a foot in amplitude, and probably the shock only swings the earth to and fro within the space of an inch. The destruction is done in part by the suddenness of the to-and-fro motion, which breaks the foundation from the superstructure, but in larger measure by the pendulum-like vibration which is set up in the building. This pendulum movement may cause an oscillation of 1 inch at the foundations to be several feet in a sixth floor, or, say, 100 feet above the ground. The rending effect of this pendulum-like swinging, especially in weak masonry, may easily be imagined. Many well considered directions for the protection of buildings from earthquake shocks have been given. Of these the best may be found in the excellent work on earthquakes by Professor John Milne, late of Tokio University, Japan. From these directions we extract the following:—1. So arrange the openings in a wall that for horizontal stresses the wall shall be of equal strength for all sections at right angles. 2. Place lintels over flat arches of brick or stone. 3. Let all portions of a building have their natural periods of vibration nearly equal. 4. Avoid heavy-topped roofs and chimneys. 5. In brick or stonework use good cement. 6. Let archways curve into their



abutments: 7. Let roofs have a low pitch and their tiles, especially upon the ridges, be well secured. It is also important where the prevailing direction of motion of the shocks is known to have the blank walls of the house placed so as to be parallel to the course of the shocks. It is also worthy of note that generally hill-tops are more shaken than the ground at the base, for the same general reason that the upper part of a house swings more during a shock than the basement. Last of all, the higher the edifice the more risk of disastrous oscillation, and the more need of binding its parts firmly together.

#### Perronet's Method of Striking Centreing.

It is a delicate business to strike the centreing of bridges. Were it removed in an instant all would probably come down, for the arch-stones are not yet abutting on each other, and the joints in the middle are open below. Perronet's method appears to be very judicious. He began to detach the centreing at the very bottom, on each side equally, where the pressure on the centreing is very slight. He cut away the blocks which were immediately under each arch-stone. He proceeded gradually upwards in this way with some speed, till all was detached that had been put out of shape by the bending of the centreing. This, being no longer supported, sunk inward, till it was stopped by the abutment which it found on the arch-stones near the crown, which were still resting on their blocks. During part of this process the open joints opened still more and looked alarming. This was owing to the removal of the load from the haunches of the centreing. This allowed the crown to sink still more by forcing out the arch-stones at the haunches. He now paused some days, and during this time the two haunches, now hanging in the air, gradually pressed in toward the centreing, their outer joints closing in the meanwhile. The haunches were now pressing pretty hard on the arch-stones nearer the crown. He then proceeded more slowly, destroying the blocks and bridgings of these upper arch-stones. As soon as he destroyed the support of one, it immediately yielded to the pressure of the haunch; and if the joint between it and the one adjoining toward the crown happened to be open, whether on the under or the upper side, it immediately closed on it. But in proceeding thus he found every stone sink a little while it closed on its neighbour; and this was like to produce a ragged soffit, which is a deformity. He therefore did not allow them to sink so much. In the places of the blocks and bridgings which he had cut away, he set small billets, standing on their ends, between the centreing and the arch-stones. These allowed the pendulous arch to push toward the crown without sensibly descending, for the billets were pushed out of the perpendicular, and some of them tumbled down. Proceeding in this way, he advanced to the very next course to the keystone on each side, the joints closing all the way as he advanced. The last job was very troublesome, viz. the detaching of the three uppermost courses from the centreing, for the whole elasticity of the centreing was now trying to unbend and pressing hard against them. He found that they were lifted up; for the joints beyond them, which had closed completely, now opened again below; but this job was finished in one day, and the centre sprung up 2 or 3 inches, and the whole arch sunk about 6 inches. This was an anxious time, for he dreaded the great momentum of such a vast mass of matter. It was hard to say where it would stop. He had the pleasure to see that it stopped very soon, settling slowly as the mortar was compressed, and after one or two days settling no more. This settling was very considerable, both in the bridge at Neuilly and in that at Mantz. In the former, the sinking during the work amounted to 13 inches. It sunk 6 inches more when the blocks and bridgings were taken out, and one and a half when the little standards were destroyed, and one and a fourth more next day, so that the whole sinking of the pendulous arch was  $9\frac{1}{2}$  inches, besides what it had sunk by the bending and compression of the centreing. The crown of the centreing was an arch of a circle described with a radius of 150 feet; but by the sinking of the arch its shape was considerably changed, and about 60 feet of it formed an arch of a circle whose radius was 244 feet.

#### Mediæval Employment of Stone.

If the early Gothic builders used soft stones for their points of support (as they were often forced to do in default of finding others), they took care to leave them a great height, of course, for in this case soft stone is less liable to be crushed. As to hard stones and among others the thinnest, which are generally the strongest, they used these as ties, as lintels prolonged to connect distant piers with one another, and they formed the supports which were to carry a very heavy burden either by piling the stones one upon another, if the supports were very thick, or by setting them upright against their stratum, if the supports were very slender. With regard to these stones set against the stratum, we recognise all the delicacy of observation shown by the builders. They were not ignorant that stones set against the stratum are liable to split; wherefore,

they chose them with particular care with shallow, very homogeneous and very compact ledges, in the building stones at Paris, in the hard stones at Tonnerre, in Lower Burgundy and Champagne, in the small ledges of Upper Burgundy, hard as sandstone and without strata. Experience had shown them that certain stones that were hard and fine in grain, like the "Cliquant" and the small, hard ledge at Tonnerre, for instance, were composed of very thin courses of limestone set one upon another and united by a solid cement; that these stones through their very texture have, when set up against the strata, so to speak, an extraordinary strength; that they resist enormous pressure, and that when heavily loaded with a powerful weight they split less readily than if set on their natural bed, for what makes these stones split is the moisture which they secrete between their thin layers, and which causes the particles of marl to swell; now if set flat they are more apt to preserve their moisture than if set upright. In this latter case the water runs along their sides and does not penetrate the courses resting one upon another. As a proof of this statement we might cite a number of gutters, drip-stones and copings made of slabs of lias or cliquant set on their natural bed in very old buildings, and frequently found to be split; while the same materials in the same structure when set upright against the stratum are perfectly preserved and are injured only through accidents, like the oxidation of cramp-irons or gudgeons, or through some flaw. We should not omit here one important fact in the constructions of the Middle Ages, that the beds are cut with the same perfection as the facings to be left in sight, and that the stones are always set in a thick bed of mortar and do not have the mortar put in with a trowel, or poured in, which is worse.

#### NEWCASTLE SOCIETY OF ANTIQUARIES.

A MONTHLY meeting of the Newcastle Society of Antiquaries was held on the 23rd ult. in the Old Castle, under the presidency of Mr. Horatio A. Adamson, who read a paper on "Gleanings from the Records of the Parish of Tynemouth." The records, he said, went back to the seventeenth century, and treated of the stormy time of the Civil War; of parishioners going to the castle church in 1668; the building of a new parish church at the end of the eighteenth century; and the turning of the old castle chapel into a powder magazine in 1810. Referring to the longevity of vicars at Tynemouth, he remarked that the records showed that there had only been four vicars during the last 142 years. A vote of thanks was passed to Mr. Adamson for his paper.

#### GENERAL.

Sir E. J. Poynter, P.R.A., has consented to become a vice-president of the Society for the Encouragement of the Fine Arts. Lord Leighton and Sir John Millais were vice-presidents of the Society.

A Cathedral has been commenced in Bendigo from plans by Messrs. Reid, Smart & Tappin, of Melbourne. The contract for the first portion of the work, which is to be completed in three years, has been let to Messrs. T. Cochran & Co., of Melbourne, the amount being 31,000*l*.

Alderman Harding has offered to provide and erect in the City Square, Leeds, a bronze equestrian statue of the Black Prince, modelled by Mr. Thomas Brock, R.A., besides eight bronze figures to hold glow lamps.

The Work of M. Eugène Müntz, on "Florence et la Toscane," has been published by MM. Hachette & Co., of Paris and London.

The Exhibition of Paintings and other works by the late Lord Leighton of Stretton will be opened at the Royal Academy on Monday next.

The General Purposes Committee of the Metropolitan Asylums Board recommend that a Bill should be introduced in the next Session to enable the Board to raise money on loan for the purchase of a site and providing office accommodation on the Thames Embankment.

A Remonstrance expressing sorrow at the proposal to rebuild a portion of the west front of Peterborough Cathedral, the beauty and value of which it is impossible to over-estimate, is in course of signature. Among the artists whose names are appended to it are Sir E. Burne-Jones, Mr. Watts, R.A., Mr. Richmond, R.A., Mr. Onslow Ford, R.A., Mr. Holman Hunt, Mr. Walter Crane and Mr. Sargent, A.R.A.

A Landscape Exhibition containing works by Messrs. R. W. Allan, J. S. Hill, T. Hope McLachlan, A. D. Peppercorn, Leslie Thomson and E. A. Waterlow will be opened next week at the Dudley Gallery.

"A Pearl of Price," by Philip Skippon, a Puritan sergeant-major general, was exhibited at the last meeting of the Glasgow Archaeological Society. The copy, which is dated 1649, is believed to be unique, and belongs to the Mitchell Library, Glasgow.



# The Architect.

## THE WEEK.

THE action of Lord PENRHYN in dealing with the strike of his late quarrymen may cause many people to exclaim, "It is excellent to have a giant's strength, but it is tyrannous to use it like a giant." They should not forget that many employers of labour have long felt that without some decisive exercise of power the British workman will continue to feel that he is to be at liberty to paralyse industry according to his whim. The strike, which has reached so unfortunate an end, was not to have commenced until March next, whereas it has been in operation already for nearly three months. It is impossible to calculate the consequences of so long a disturbance. A large quantity of Penrhyn slates are used abroad, and several markets will probably be lost through the strike. If there is a return of buyers the conditions of supply will be embarrassing to the producers, for it is not to be expected that contracts for Penrhyn slates or for works on which they are to be used will be entered into without special conditions. It is also unfortunate that so little respect should be shown to the Conciliation Act. In the disagreement between the London and North-Western Railway Company and their employes, the interference of the Board of Trade, with the aid of the Act, was a national benefit, and in the much less important case of the Penrhyn quarries a satisfactory result was also to be anticipated.

THE report of Professor R. B. RICHARDSON, the director of the American School, shows that the excavations at Corinth in 1896 were of more importance than was supposed. They occupied nearly three months, and at times 100 men were employed. There was nothing but the ruins of a temple to suggest a place for operations. The first trench disclosed thirty-five Ionic columns used as foundations for a later building. In the second trench were fourteen rock-cut graves with skeletons in most of them, and many vases of common red ware. Twenty-one trenches were dug altogether; but it was not until the eighteenth was made that five flights of steps, innumerable lines of seat-foundations and two seats in position were found, indicating the Greek theatre, upon which had been erected a Roman theatre with seats of steeper pitch. In the upper part of the theatre were uncovered many terra-cotta figurines. Other trenches brought to light a huge drum and the broad pavement with a water channel on each side, these indicating the old agora or a broad passageway into it. The old temple is supposed to have been dedicated to APOLLO rather than to ZEUS. The chief find in sculpture was a group representing the youthful DIONYSUS between PAN and a nymph. Nineteen vases grouped about skeletons were also discovered. The vases are unbroken, of interesting shape and very primitive in appearance. The director suggests laying down a track and dumping-cars for next season's work at Corinth, and estimates at 5,000 dols. the cost of next season's excavations.

LAST week we briefly suggested to the students of the newly-formed Architectural Association of Ireland that they possessed in Dublin examples of architecture which merited attentive study. We are glad to find that Mr. THOMAS DREW, R.H.A., the president of the Irish Institute of Architects, in his address to the Association treated the same subject. He said he boldly maintained that for the study of architecture as a living art they had in Dublin remarkable advantages. Let them take stock of the gifts vouchsafed to them in the mere luxury of living in an old, historic city, with many dignified monuments of a past time, with a picturesqueness of architectural effect—spontaneous, unstudied; the growth of accidental creation, not made, as it was impossible to make it in a brand new town or city. Let them think what the difference would have been had their lot been cast as students in such new towns as Birmingham, Bradford, Leeds, Wolverhampton, even Manchester. Let them even take in his native city, Belfast. How much was there in the modern makings of such towns to inspire the architectural student with one spark of genuine enthusiasm

for the art of architecture as he went to his work in the morning and returned in the sunset effects of the evening. London had great wealth of noble and illustrative architecture, if the student could find it out—from its unmatched Abbey of Westminster, running through all the gamut of progression of styles of the Middle Ages, up to the grand chord of the Renaissance architecture in St. Paul's Cathedral, than which there were few more satisfying examples in all the world of Classic Renaissance architecture. In London the architectural student had the run of all that if he were appreciative and discriminating and lived on a bicycle. But the interests and objects were too widely apart and overflowed by a teeming modernism and a sordid flood of building of a greater modern city. Edinburgh had native charms to inspire the architect artist with a fire of enthusiasm in his daily life of going to and fro, such as he knew nothing to approach in all the lovely cities of these kingdoms. There was nothing of pictorial, theatrically-imagined architecte and aerially enchanted effect to be conceived like the picture of Edinburgh from Princes Street. Dublin might not afford exhaustive examples of every age and style, but he maintained that it presented examples which were wanted to illustrate methods of architectural study. The lecturer then spoke of the architects and architecture of the Custom House, the Bank of Ireland, the Four Courts, Trinity College, and of the residences of the Irish nobility and gentry in Dublin a century ago. Every English architect who has visited Dublin will agree with Mr. DREW. It is strange, however, that so little attention has been given to the buildings. But that may be caused by the remembrance that so many were designed by Englishmen.

M. ROLL, the French painter, who is equally successful with single figures in the nude and fêtes in which crowds take part, is commissioned to paint the laying of the foundation-stone of the new bridge in Paris by the CZAR. He has visited Russia in order to submit his sketches, and was received at the imperial residence, Czarskoë-Selo. This consists of several palaces, the principal being the "old palace," designed by STARELLI and CAMERON, and the Alexander Palace. In the old palace is a chapel, which is decorated by means of lapis-lazuli and gold. One room is covered with mother-o'-pearl, another with Chinese lacquer, a third with amber, a fourth with porcelain. In the picture-gallery there are several works by Dutch painters. The Alexander Palace contains several paintings of the Napoleonic campaigns painted by French artists. In the park is a Chinese theatre in form of a pagoda, a Gothic chapel, a Turkish kiosk, a hospital for invalid horses, a museum containing relics of NAPOLEON I., besides memorials to commemorate the history of Russia. A more diversified combination of architecture, painting and sculpture is not to be found in Europe.

As the opinions of Frenchmen are prized in America the *New York World* has obtained several *à propos* of the new year from representatives of politics, literature, science and art. M. BENJAMIN-CONSTANT, the painter, who has recently won golden opinions in the States, has offered a few axioms, which he entitles "Pensées de Peintre." They are as follows:—Art masters genius. Art without genius creates a pedant; genius without art creates a fool. The man who criticises always appears to know more than he who admires. It often happens that an artist who begins like a master finishes like a pupil. *A propos* of what is called "peinture littéraire," it may be said that nothing is less literary than the "Salon carré" (the treasury of masterpieces) in the Louvre. It is more easy to impart character by drawing than by colour. Drawing (*dessin*) may come from colour, but colour cannot come from drawing. Nature is invincible. The "thoughts" will suggest some of the qualities of M. BENJAMIN-CONSTANT's paintings. They are remarkable for colour, and it might be supposed that, as the artist has a gift for colour, so much effect was easily produced. But apparently he finds it as difficult to be a colourist as weaker men. His success has been mainly in representing incidents, but M. BENJAMIN-CONSTANT apparently longs for a time when form rather than subject will be attractive.



## THE LEIGHTON EXHIBITION.

IT is so commonly believed there is scarcely a painter who can sustain the test of an exhibition of all or most of his works, it is a wonder one is ever organised. But whatever may be said about the failures, it must be felt that the test is hardly fair. There, never was a painter, architect or sculptor who executed his works with a prospect of that kind in view. Artists, like the rest of men, must think of the present rather than of the future, and cannot enjoy the satisfaction of laying out a plan of life in which every creation of theirs is devised for a predetermined place. The works may be compared to tesserae, but when they are combined they cannot be expected to form a mosaic of a geometrical pattern, and much less a picture. As each one is generally executed without much concern about the relation to those which preceded or followed it, and has to be complete in itself, how can fifty or five hundred be expected to constitute a series that will have much unity, or be like the chapters in a book, which, however various, conduce to one end? When painters on principle limit their field, the sight of several of their works is as oppressive as those which are displays of versatility. ROSSETTI'S long-necked dames were found to be as monotonous as the numerous quadrupeds of LANDSEER which were endowed with an expression of more than human intelligence. But in spite of all those drawbacks "one-man exhibitions" are not likely to lose their interest.

It was anticipated that the late Lord LEIGHTON'S works were peculiarly unfitted to form a special exhibition. A painter cannot expect that everything he produces will be in eternal remembrance, and LEIGHTON'S style was associated mainly with his later works. They may be called neo-Greek, and the important decorative principle of repose is pre-eminent in the majority of them. They are illustrative of myths rather than of histories, but they are accepted as representing the spirit of Greek life. In looking at them it is difficult to resist the conclusion that in Greece the great aim of life was to become a model of deportment, and that some ancient TURVEYDROP, rather than the philosophers, or the moralists, or the heroes, was accepted as the expounder and representative of the Beautiful. A couple of pictures of sleeping or reclining beauties with Greek names were delightful additions to a summer show, but the prospect of long rows of them was not inviting, and there were misgivings about the exhibition which is now open.

Through the tact of the arrangers of the pictures, the exhibition is the most successful of its kind we have had in this country. If a chronological order had been adopted, or if LEIGHTON'S Renaissance or neo-Greek examples were placed together, more or less monotony could not be avoided. But by the judicious mixture of examples of various periods, any diversity of talent which the artist possessed is emphasised. LEIGHTON made many experiments in colour, but those seen in the Academy are generally found to produce an harmonious effect, just as if the decoration of the walls of the galleries had been contemplated by the artist.

There are over three hundred pictures and studies, besides some examples of sculpture. As five galleries are occupied it will be evident there is no crowding, and generally there is only one row of pictures. The study of the collection is, therefore, more easy than is usual with winter or summer exhibitions, and many visitors will, no doubt, be tempted to see the pictures repeatedly during the coming two months. They will be repaid for their labour by the pleasure received.

The examples of LEIGHTON'S art range from the *Cimabue finding Giotto in the Fields of Florence*, painted in 1850, when he was in his twentieth year, to the *Vestal*, *Bacchante*, *Fair Persian* and *Clytie*, which were left unfinished through his death. We have consequently examples which suggest the labour of nearly half a century. Happily, also, we see only evidence of growth, for not only are signs of decadence absent, but it could not be supposed that LEIGHTON had reached the full extent of his powers. His last works reveal that his spirit was courageous enough to undertake more daring feats in colour than were attempted when the painter was twenty years younger.

It is the progressive power which seems most striking in a journey through the galleries. His *Cimabue finding Giotto* is not remarkable, and gave no indication of the power seen in the large *Cimabue's Madonna carried through*

*Florence*. It surprised Academy visitors by its excellence in form and colour, as well as by the courage shown in presenting such a subject when the Ecclesiastical Titles Act had made people suspicious of Romanising agencies. But what is most remarkable about the picture is the novelty of the treatment. It appears to be inspired by the *Panathenaic Procession*. In the relief the Athenians have no spectators, but the seated Olympians. In the picture only a privileged few and DANTE are allowed to witness the ceremony. It might have been only a rehearsal within a sacred enclosure. If, however, we accept the tradition as recorded by VASARI, what was remarkable in the incident was the enthusiasm of the populace. "All the men and women of Florence," it is said, "hastened in great crowds to admire the picture, making every possible demonstration of delight," and the part of Florence where CIMABUE lived was called in consequence ever afterwards "Borgo Allegri." But of the popular delight the painter has taken no notice. In the Academy the *Procession of the Madonna* is faced by the *Daphnephoria*, painted twenty years afterwards. In it we see another event which gave rise to a public festival. But the Thebans are represented by no more than three or four little children, who are introduced to fill up a corner. It was a braver act to insist on his own principles of composition being paramount in 1855 than in 1876, regardless of the conviction of improbability which was sure to arise in the minds of spectators, and it was safe to conclude that LEIGHTON would henceforth be indifferent to many a convention. The *Salome*, of 1857, is not according to the Academic type, and suggests French influence. The *Mermaid*, of 1858, displays a passion in the sea spirit which was unfamiliar at that time, unless in ETTY'S works, and may have shocked good people—the Greek sailor being made lackadaisical as compensation. But the *Count Paris*, in which we see the visit of the suitor favoured by the CAPULET family to the chamber where JULIET is lying in the trance, suggests that LEIGHTON was not assured of his principles. In intensity it would pass for a specimen of pre-Raphaelitism. Some of the *dramatis personae* are evidently portraits, and of unhandsome people. The background, where several servants are seen carrying dishes for the bridal feast, is also remarkable as the work of the designer of the *Procession*. The *Roman Lady*, of 1859, is curious. It is evidently a portrait of some mocking dame, and on account of the expression must have been a novelty. It forms a strange contrast to the *Pavonia*, also of 1859, in which peacocks' feathers are introduced as ornament. The *Mrs. Sutherland Orr*, of 1861, is interesting from its unaffectedness; but another work of that year, a portrait of *Mr. J. H. Walker*, who is clad in a smock frock and is supposed to be playing on a shepherd's pipe, is as commonplace and affected as any portrait that could be found in a London exhibition. Too apparent are the signs that it was painted in England. The *Michel Angelo Nursing his Dying Servant*, which was painted in 1862, looks like a much earlier work, or the painter was temporarily retrograding. We doubt if any one of the students now in the Painting School would care to put his name on it, and the introduction of the mallet and chisel in the sculptor's hand denotes that slight regard was then given to probability. The *Star of Bethlehem*, of 1862, representing one of the Magi, who stands out well against the sky, observing the strange star from the terrace in his house, is excellent in design and colour. But why was it necessary to introduce a scene of revelry beneath the terrace, as if the star-gazer had shared in it? That might also be considered a pre-Raphaelite notion; and the figure of LEANDER under the *Last Watch of Hero* proves that LEIGHTON was not free from a belief in the advantage of a supplementary picture in 1887. All the paintings which belong to the first twelve years of practice are still remarkably vivid in colour, and appear as if they would outlast some of the works belonging to the last twelve years.

The *Eucharis*, of 1863, suggests a change. It is a painter's as distinguished from a sculptor's version of a canephorus, but is more English than Grecian in type. Belonging to 1864 (the year of LEIGHTON'S election as an Associate) is his *Golden Hours*, which has much more of the grand Italian manner than any of the other works in the collection. The man is of a refined type, with a head of black hair surpassing in mass any seen on a modern model; he is clad in black



and is supposed to be playing on a spinet. Only the back of the woman is visible, and she is clad in a white robe richly embroidered. It was self-sacrifice to refrain from painting a woman's face that would be comparable to the musician's, but this was another case of obedience to a self-imposed law. The *Orpheus and Eurydice* shows three-quarter figures somewhat larger than life-size. The two are modelled with an emphasis of the muscles which was disregarded afterwards, and the chiaroscuro is pronounced. The two pictures were superior to any produced since the *Procession*, and it was gratifying to know the painter was resident in England. In the following year, 1865, was seen the *David*, which was better suited to English taste. The Psalmist is seen seated on the housetop watching two doves, and is supposed to be exclaiming, "Oh, that I had wings like a dove!" But it must be said there is little power of characterisation in the figure, which appears to be taken from a model in comfortable circumstances; and not much disturbed about spiritual matters.

In 1866 LEIGHTON was in Spain, and in 1867 he visited the East for the first time. An increase of power is, therefore, visible in the works of 1867. The *Roman Mother*, a bust, is a portrait of one of those representatives of the ancient republic and empire which amaze visitors to Rome. A woman with such a head and neck should be capable of doing something sublime or terrible, and an American would allow she was as good a representative of "The Mother of the Gracchi" as Mrs. HOMINY of New York. The *Pastoral* is a shepherd and his lass, like DAPHNIS and CHLOE, engaged in performance on the pipes. The *Greek Girl Dancing* is another attempt to realise the past. A girl is posturing before two sunburnt men, who, in spite of their antique garb, are modern Spaniards. The original title was the *Spanish Dancing Girl: Cadiz in the Old Times*. The figures have more force than LEIGHTON commonly favoured. The *Venus Disrobing for the Bath* was the first nude figure on a large scale which the painter attempted in England. The goddess is removing the sandal, which is her last article of dress; but, as in the case of the antique statue, it is open to doubt whether the figure is not beginning to clothe herself. In modelling it is equal to any of LEIGHTON's more recent works.

The success of the neo-Greek experiments is suggested by the appearance of three works of the class in 1868. In *Ariadne Released by Death* we see a full-length of the hapless daughter, of MINOS, in white drapery, stretched on a bier at the sea-shore. It indicates that as yet the artist had not attained that esteem for beautiful lines which was afterwards to characterise him. In the small nude figure, *Actæa, the Nymph of the Shore*, and the *Acme and Septimus*, from CATULLUS, we have more attention to line. The *Dædalus and Icarus*, of 1869, is a masterpiece. There is earnestness in the figure of the artist, and enterprise in the look of the adventurer; but with those qualities there is fine colour and figures that are expressive of different ages of manhood. This work has masculine vigour, and testified that LEIGHTON's election as an Academician was justified. The *Helios and Rhodos* was also masterly in the contrast between the god and nymph. The abundant roses growing at the sea-shore are admissible for the sake of their colour. There was, too, a fine figure of *Electra at the Tomb of Agamemnon*, in which roses again appeared. The *Nile Woman*, a single figure bearing a pitcher, is the only work in the exhibition which belongs to 1870, but 1871 was signalled by *Hercules Wrestling with Death for the Body of Alceste*, and by a much smaller and quieter painting, *Cleoboulos instructing his Daughter Cleoboulina*. The *Hercules* is the most ambitious work of LEIGHTON's up to that period, and there are not many pictures in the world which present an equal number of difficulties which have been overcome. In the *Ariadne* he had depicted a dead body, and placed alongside it white drapery. In the *Hercules* he painted a girl that might be considered as dead, but "ere decay's effacing fingers had swept the lines where beauty lingers," a condition that was almost similar to JULIET's in the painting of the *Count Paris* already referred to. A strong contrast to the placid figure is presented by the *HERCULES*, who has seized by the wrists—

The poisonous impalpability  
That simulates a form beneath the flow  
Of those grey garments,

while around are figures of men and women who witness the struggle.

Close, each to other agonising all  
As fastened, in fear's rhythmic sympathy,

The "rhythmic sympathy" which BROWNING admired pervades the picture and extends to the sea. Even the trees have their branches lopped where they would interfere with the prospect. It was an unusual feat for the artist to attempt so much power in action, and he may have felt that so reposeful a subject as *Cleoboulos instructing his Daughter Cleoboulina* was a necessity after the exertion. The wise man who, with outstretched arm, teaches his child, it is evident did not despise a comfortable home, for there are richly-embroidered cushions on the bench. But so simple and natural a scene appears out of place among the other Greek pictures. One can hardly believe the subject could be selected by LEIGHTON.

(To be continued.)

## CHARACTERISTICS OF SOME GREAT LONDON THOROUGHFARES.—II.

[BY A CORRESPONDENT.]

A PROPOS of what may be termed breathing-spaces opening out of our crowded streets in the centre of London, where there are the possibilities of making them, and where a reasonable outlay of money is the main requirement, there is a crying want of such at the west side of Trafalgar Square, a want, too, which is apparent at Charing Cross and the West Strand. It has been previously stated how disappointing is the outlook forming the finish of Northumberland Avenue at its river end, owing to the particular angle at which it strikes the Thames (how different to the beautiful view of the dome of St. Paul's along Whitehall Place!) In making this remark, the writer does not wish to be hypercritical, because there were obvious difficulties in the way, and the immediate object was to gain the shortest road on to the Embankment. But what is still much needed is the revelation to the eye of the existence of a lovely wooded public park literally but a stone's throw from "the Square." Now, even those who have lived in London for many years, and are well acquainted with its principal streets, must acknowledge that a very small peep of the trees in St. James's Park is obtained from Trafalgar Square, the only evidence of their existence being occasionally afforded when a late autumnal gale from the south-west litters the road with hundreds of dead leaves. Of course the long-talked-of prolongation of the Mall into Charing Cross would afford the needed prospect, but a much less ambitious undertaking would suffice for the sylvan view, though the widening of the entrance into Spring Gardens, by DENT's shop, and carrying the extra width into the Park, whether for carriage or foot traffic, must necessarily be very costly, considering the value of property in this important situation.

To continue the remarks on the historic Strand, but farther eastwards, the proposition so often brought forward by "outsiders" (but not by the responsible Government of the day) for a further extension of Somerset House on the Strand and Wellington Street fronts up to the corner has always seemed to the public a most excellent and feasible thing, but for some, no doubt, good reason has not commended itself to the authorities. The opportunity appears to have been entirely lost until the advent of the Greek Kalends, as now a great building is being put up at this prominent corner. The writer has come to the conclusion, and is disposed to think very many will be of the same opinion, that it is futile to send letters to newspapers suggesting the Government ought to do such and such a thing, and how easy it would be and at such small expense. For they have good and sufficient reasons for their decisions, which it would be impolitic to "proclaim on the house-tops." Moreover, the concentration of the various public offices in the "City of Westminster" seems to be much recommended by the permanent Government officials. Before quitting the locality of Wellington Street, how much it is to be wished there were some sheltered but slightly elevated place on the Middlesex side of the



approach to Waterloo Bridge, which would give a view eastwards over the river and its surroundings. There is, indeed, not much to choose in the prospect, either up or down stream, at this point where the bend occurs, both being so charming, though that with St. Paul's Cathedral as the great feature is probably the most popular. Of course, the best views are from the bridge itself, but then one must be wind and weather-proof, and this elevated and exposed spot does not invite loitering unless the weather is very favourable, independent of the feeling that one is "in the way," owing to the incessant traffic across the water. Perhaps these notions may seem Quixotic, but it is the belief of the writer that the delights of the river scenes so very near to that great artery of London, the Strand, are by no means as much appreciated as they should be. What is wanted is something like the grand stand of a racecourse, only of course on a much smaller scale, with some covering and protection over it and open to the public *free*—the latter feature is essential. It is needless to say that such a place would have to be well watched, quietly, for obvious reasons, so as not to be misused. The effects of grand architectural compositions, specially in the case of towers and spires, are never seen to more advantage than with the foreground of a fine stream, with the constantly varying changes of London atmosphere about it.

It is unfortunate that notwithstanding all the arguments which have appeared in the Press in different forms, there is still a very large and thoughtless section of the general public who will persist in clamouring for the removal of the church of St. Mary-le-Strand, though it is true their voices are hushed for the present, only, it is to be feared, to break out at some future time with renewed vigour and added prejudice. They call it an obstruction, regardless of the fact that even were it so (which it certainly is *not*) this and the sister church of St. Clement Danes form one of the unique features in the Strand which differentiate it from that huge class of big streets without any special character of their own. For example, can anyone imagine the most casual observer who had once traversed this street confusing it with some other he had been through? The answer must be a direct negative. It is almost superfluous to remark how grateful anyone with the slightest artistic feeling ought to be that the once-favoured project of bringing the new street from Tottenham Court Road down to the Strand, opposite St. Mary's, has been abandoned. Without enlarging on the point, which has been already treated by abler pens, it is plain this beautiful design of GIBBS was never intended to be the termination of a long vista on its side elevations. As has been aptly remarked by Mr. GRAHAM JACKSON, the tower is not square, but wider on its east and west sides, proving that its architect, like his master, Sir CHRISTOPHER WREN, "had a head upon his shoulders," and so designed the work with an eye to its place. It is not pretended that the other church in the Strand, St. Clement Danes, is equal in merit architecturally to the one in question, specially as regards the body of the building. But both structures must be taken together in any complete scheme for improvements in this part of London; so that nothing commends itself more to the mind of the writer than the substitution of the south side of Holywell Street by a pleasant-looking garden of narrow width extending from church to church, with only the necessary few openings for ready access from north to south, on a somewhat similar plan to that of La Rambla at Barcelona, strongly advocated by the late HERBERT CARPENTER. The writer has fortunately seen the excellent effect of the treatment of this main thoroughfare in that Spanish city, which in one respect resembles London owing to its cosmopolitan character, though in other ways utterly different. There is no reason, where there is a special and particular object to attain, why the carriage traffic in both directions should not have a kind of *pleasance*, as has been suggested, in the centre, for a short distance, and this would be an immense boon in this crowded part. Witness the beauty of the green sward and shrubs on the west side of the Law Courts, as compared with the departed hideous wilderness which had sole possession for years of the possible site for an extension of the "Palace of Justice." Should any more buildings be required, as is probably inevitable (unless

human nature alters a great deal!), the fine Bankruptcy Offices, so well set off by the garden below them, will be practically hidden and out of notice. This building has an advantage possessed by scarcely one of the Government offices in London, with the exception of the recent new Admiralty buildings, where a lawn comes up to the balustrade of the area in front of it. What an enormous improvement it would be to have a narrow grass border with flowers round the Foreign Office next St. James's Park, instead of that dreary expanse of gravel spreading quite up to its walls! Surely there is object-lesson enough given by the examples of our old cathedral closes, such as Salisbury and Wells, or in the Colleges at Oxford, with their refreshing greenery.

There is probably no finer prospect of its kind in Europe (and the writer speaks with knowledge of some of the capitals on the Continent) than the view of St. Paul's when first caught sight of after passing Chancery Lane, and it cannot fail to impress even the most unobservant person. This effect has several very sufficient causes, one being the narrowness of Fleet Street, which gives scale to the great west façade of the Cathedral, and another is that this majestic building is seen on the farther side of a valley, and on the highest ground in the City. Supposing, for the sake of argument, Ludgate Hill were done away with by the formation of a viaduct, the writer is convinced much of the impressiveness of this striking approach would be lost; even if the road were straight instead of slightly winding as it is, that, too, would take off some of the good effect. The spire, also, of St. Martin's, Ludgate, about half-way up the hill, comes just in the right place to serve as a foil and contrast with the majestic dome on the higher ground beyond. Then there is no very lofty building either in Fleet Street or Ludgate Hill to take away the impression of the great Cathedral beyond. To those who recollect this thoroughfare before the London, Chatham and Dover Railway bridge was built, this "ornamental" structure has no doubt somewhat injured the general prospect eastwards, but fortunately it crosses the valley nearly at its lowest level.

It is not proposed to make any observations on the great thoroughfares on the Surrey side of the Thames, which are certainly to a great extent far less interesting than those on the opposite bank, until the rising ground in some of the southern suburbs is reached, when they become less monotonous. The flatness of the ground and the generally straight or nearly straight roads, a very large proportion being modern too, all these causes tend to deprive the leading thoroughfares "over the water" of "characteristics."

How entirely different is that great road running continuously from west to east through the centre of the Metropolis as compared with the streets just commented upon at length! For although Oxford Street must necessarily be one of the old roads, a considerable part of its length, save what used to be called New Oxford Street, has very little of that picturesque character which the route next the Thames possesses, as has been evident in many ways. Taking Oxford Street from the Marble Arch as far as Gray's Inn Road there is nothing of any antiquity to notice, and a singular dearth of churches to pass, too, whether ancient or modern. An honourable exception is St. Saviour's Church for the Deaf and Dumb, which brightens up Oxford Street. St. George's Church, Bloomsbury, with its extraordinary spire, is just out of a great thoroughfare, though very near it, and then there is nothing ecclesiastical till St. Andrew's, Holborn, is reached. Considering the mileage as compared with the streets near the river (the points of interest of which have been mentioned), this long, nearly straight and level road (with some few exceptions) presents a great contrast to that from Abingdon Street, Westminster, up to St. Paul's. However, in one respect, Holborn, with its Mediæval half-timbered houses in Middle Row, has the great advantage. But their days must be numbered, and destruction may come upon them "by the effluxion of time," though long may it be before that consummation is arrived at!

Tottenham Court Road has never been an interesting street to the architect, but has had the merit, for practical purposes, of a good width, and it is that which has led the authorities to unconsciously ruin whatever good effect there was in a broad thoroughfare by cutting it into halves so as to more economically light it by the electric light.



There can be no more fatal error in principle than this, artistically speaking, not only in a street but in a Church, where in some cases pendent gas lamps are hung over the central passage. The eye demands the centre of a road or otherwise should be clear and unobstructed, and not with lofty iron standard lights as in Tottenham Court Road.\* This ought to be looked upon as a cardinal maxim in such cases.

(To be concluded.)

### PETERBOROUGH CATHEDRAL.

ALTHOUGH the controversy on the restoration of Peterborough Cathedral was supposed to be ended by the decision of the Dean and Chapter, the following letters appeared in the *Times* on Tuesday. Mr. T. G. Jackson, R.A., writes:—

I should not have intruded myself into this controversy had I not been invited to sign the appeal to the Dean and Chapter of Peterborough, which is now going about, expressing sorrow at the proposal to rebuild their west front and asking them to reconsider their intention.

With the first part all will agree. Everyone will be sorry if the west front is rebuilt. We may assume that the Dean and Chapter, Mr. Pearson and Sir Arthur Blomfield will be as sorry as the rest of us. But to ask that the proposal may be reconsidered is a very different matter. For a man to commit himself to such a request without first ascertaining that the proposed work is unnecessary would be mere impertinence.

The appeal, however, we are told is being largely signed by persons eminent in literature and various walks in life—persons who have not examined the building themselves, and who, if they did examine it, have not the knowledge of construction and masonry requisite to make their opinion of the slightest value.

This is a typical instance of the way in which those who pose as protectors of our ancient buildings injure their own cause. They love them so well that they are indignant if others pretend to love them too. They seem to think that any one but themselves who has to do with an old building is liable to be seized with a sort of mania, leading him to destroy it unless he is stopped in time. An architect who, after satisfying himself of the need of repairing an ancient structure, is thick-skinned enough to undertake the task and to brave the obloquy which will be poured on his head finds himself nowadays in the position of a surgeon called upon to perform a delicate operation in the midst of a circle of his patient's friends, who cry out on his cruelty and pray him to spare the knife, while some will offer to take the instruments out of his hands and do the thing better themselves.

Such a situation is not conducive to the deliberate composure necessary for the success of an operation on a structure either of flesh and bone or of masonry.

I do not wish to express an opinion on either side of the present controversy, not having sufficient knowledge of all the facts; but I do protest against the absurdity, and worse than absurdity, of complicating a very difficult question by an irrational petition such as that now going round for signature.

Mr. J. Oldrid Scott writes:—I cannot lay claim to any special knowledge of this vexed question, but I have read the greater part of what has appeared on the subject in the papers, and in most of the letters and other communications protesting against the action of the Dean and Chapter it seems to me that an essential point has been intentionally or unintentionally put in the background, namely, that in placing themselves in the hands of Mr. Pearson, the Dean and Chapter have beyond all question taken the best possible means for obtaining trustworthy advice on a matter involving the greatest responsibility. Various other architects have been mentioned as advising a different mode of dealing with the gables of the west front, but I have no hesitation in stating my opinion that all their experience of such questions combined cannot be equal to that of Mr. Pearson, who at the present time stands quite unrivalled. Over forty years of incessant work in old and new churches gives Mr. Pearson's opinion on a point like this a weight to which no one else can aspire, and it would be nothing short of madness for the Dean and Chapter to put it on one side as they are daily urged by their critics to do.

The rival scheme which has been suggested appears to me, from my general knowledge of such cases, to be most hazardous, and if it were adopted I should expect it to lead to some serious catastrophe.

May I add a word as to the qualifications of Mr. John Thompson, the contractor? His practical knowledge and sound judgment is so great that I, as well as some other architects, have refused to undertake highly critical work unless we were allowed to appoint him as builder. Doubtless if the beautiful gables could by any means be rendered safe without

rebuilding them, everyone who loves our ancient buildings would rejoice, and no one more than the Dean and Chapter and their architect; but this having been pronounced on the highest authority to be impracticable, their careful reconstruction, stone by stone, with the least possible quantity of new material, is surely the next best thing, and I venture to predict that when it has been completed not one of the objectors in a hundred will be able to see that any rebuilding has been carried out.

Professor Baldwin Brown writes:—Many who are in principle neither restorers nor anti-restorers, but who would have each question of this kind dealt with independently upon its merits, are greatly dissatisfied at the present condition of affairs. The fabric of Peterborough is under the control of responsible custodians in the persons of the Dean and canons, but there is at the same time much force in the contention of those who claim it as in a sense public property. It is going too far in this direction to demand that such national monuments should be handed over, as is often the case on the Continent, to the care of Government. Those who have called for this can have but little experience of how some Governments carry out their work. Buildings may have suffered a good deal in this country at the hands of restorers, but fully as much or more mischief has been done in this way across the Channel. Were the west front of Peterborough handed over to the tender mercies of some foreign Government departments, it would probably be pulled down and rebuilt with new stones, and perhaps not even on the old lines, but with the additional height in the upper storey which there are grounds for thinking was originally intended by the designer. Our ecclesiastical fabrics are well enough off in the hands of their present custodians if these will exercise their trust with tact as well as with devotion. There is no question here of "destruction"—a word used by some who are in danger of spoiling a good case by too fervid advocacy. The Dean and Chapter do not want an old building remodelled to suit modern taste, or to substitute something new and neat-looking for antique stonework. "Restoration" on these pretexts would be rightly resisted by all, but the question here is one of arresting imminent, or at least very possible, ruin. If the cathedral authorities wished to give the public confidence they would perhaps have been better advised had they looked in a different direction for the control they desired to obtain over the report of their original adviser. Each of the distinguished architects they consulted is a man of independent judgment as well as of large experience, but in the eyes of most people they are too much alike in standing, education and traditions—the opinion of the two gives really no more confidence than the opinion of the one. There has, it is true, been a certain amount of antagonism in the past between antiquaries and architects, but when there was so much at stake the representations of the former might well have been allowed more weight than has been accorded to them.

Is it too late for a satisfactory settlement? Only the other day, when two powers in the railway world were standing apart in antagonism, a threatened disaster was averted by the appearance on the scene of an impartial authority in the person of the President of the Board of Trade. Could not some body of repute like the Ecclesiastical Commissioners now step in and negotiate a conference on the spot of some of those experts who hold strong and divergent views on this matter? Only in this way would the public mind be satisfied that the best thing possible is being done for the preservation of this noble Gothic frontispiece.

On Wednesday Mr. J. T. Micklethwaite writes:—

So far I have not taken any personal part in the controversy about Peterborough Cathedral because the officers of the Society of Antiquaries have the case for the defence in hand, and it seemed best to leave the whole conduct of it to them. But the letters of my good friends Mr. T. G. Jackson and Mr. J. Oldrid Scott in the *Times*, if left unnoticed, may make it appear that the opinion of architects is generally upon the side of the Dean and Chapter. Mr. Jackson and Mr. Scott belong by tradition and practice to the same school as Mr. Pearson and Sir Arthur Blomfield, and their sympathy with those whose ideas of "restoring" an ancient building is to make it into a new one is no more than might be expected. Mr. Scott's letter is only a general expression of his confidence in Mr. Pearson, but there are some things in Mr. Jackson's which need answering.

I pass over the conventional expressions of sorrow at the necessity of taking down the old front. If people are so very sorry, why will they not give a patient hearing to those who maintain that such necessity does not exist? But Mr. Jackson writes of the "impertinence" of those who are asking the Dean and Chapter to reconsider their decision to pull down, on the ground that the appeal is being signed by persons "who have not examined the building, and if they did examine it have not the knowledge of construction and masonry requisite to make their opinion of the slightest value." Now, if all

\* Since this was written the same mistake has been repeated in a considerable length of Piccadilly.



those who have signed were as here described, which is not the case, there would surely be no "impertinence" in their asking for a respite and a further consideration of the case, when a body like the Society of Antiquaries not only contends that the front may be well repaired without pulling down, but offers to prove its case by doing part of the work at its own cost.

Then Mr. Jackson compares the restoring architect to a surgeon carrying out an operation in the midst of a circle of the patient's friends, who cry out on his cruelty and pray him to spare the knife. Good. But what would be done with the surgeon who said that the case of the patient was so hopeless that the best thing to be done was to bleed him to death and put him out of his misery, and who, in spite of the protests of other surgeons, persisted in doing so?

In a second letter Mr. Jackson says:—My friend Mr. Micklethwaite in his letter to you this morning puts a meaning of his own on my letter. He says I range myself on the side of the Dean and Chapter. I do nothing of the kind, but have expressly disclaimed giving an opinion on either side because I do not know all the facts. If those who have signed this objectionable petition had done the same they would have done more wisely. Mr. Micklethwaite goes on to say that I belong to the same school as Mr. Pearson and Sir Arthur Blomfield, and therefore sympathise with those whose idea of restoring an ancient building is to make it into a new one. I do not know what right he has to make the latter accusation. Mr. Micklethwaite and I were trained in the same school, and I have seen restorations by him which are carried further in the direction of renovation than I should have taken them. He calls my sorrow at the necessity of rebuilding the west front—though I never said it was necessary—conventional, by which I suppose he means insincere. This confirms what I said, that he and his companions allow no one to love an old building but themselves. He objects to my calling it impertinent in persons who have no knowledge of the subject to sign this petition, because, he says, they only ask the Dean and Chapter for a respite on the ground that there is a difference of opinion among architects. But the petition asks for nothing of the kind. Had it done so it would have been quite legitimate, and I might perhaps have signed it myself. It merely expresses sorrow at the proposal to rebuild the front, and asks the Dean and Chapter to reconsider their decision. To this irrational petition, as I have called it, are appended the names of numerous persons eminent in other ways, but whose opinion on a question of construction and masonry is valueless. You, sir, have published the list, and, though there may be a few architects among them, the greater number are such as I have described.

Mr. J. Oldrid Scott also writes:—Mr. Micklethwaite's letter is very misleading, as it confuses the purely practical question with the sentimental one; as if those who back up Mr. Pearson did so from a preference for rebuilding over preservation. There is no shadow of truth in this, as far at least as I am concerned. I should infinitely prefer to see the gables preserved without rebuilding, if it were possible, but when it becomes a question whether Mr. Pearson, with all his practical knowledge, is to be trusted on a matter of pure construction or whether his opinion is to be set on one side in favour of that of Mr. Micklethwaite and his friends, I cannot hesitate for one moment.

Of course, what Mr. Micklethwaite says about my love for turning old buildings into new ones is as absurdly untrue as his suggestion that Mr. Pearson wishes to bleed Peterborough to death, but writers of this school hardly mean themselves to be taken seriously.

### RUINS OF ANCIENT TROY.

THE first secretary of the Imperial German Archaeological Institute of Athens, Dr. Wilhelm Dörpfeld, visited the United States to attend the commemorative exercises at Princeton University and incidentally delivered a number of lectures of great interest at Columbia University, the Brooklyn Institute, &c. Dr. Dörpfeld, says the *Scientific American*, is an industrious explorer of the remains of classical antiquity on the site of Troy, at Olympia and elsewhere, and his researches have given him an enviable reputation as one of the leading archaeologists of the world. His lecture on "Troy and the Homeric Citadel" was very interesting.

The question of the site of Homer's Troy was briefly reviewed by the lecturer, as it has been discussed in ancient and in modern times. The views of Strabo, of Demetrius, and of modern scholars were briefly set forth, and the results of Schliemann's excavations and the careful and successful work of Dr. Dörpfeld himself were dwelt upon at some length. On the site now proved to be the place where Homer's Troy stood, the excavations have revealed nine strata of earth and ruins, representing recognisably distinct periods in the history of the

three cities that have there been built—first the prehistoric, before Homer's time; then the Greek, the city of Priam; lastly, the Roman city. In the uppermost, or ninth, stratum were found a temple, theatre and other buildings of unmistakably Roman construction, with many inscriptions which show that the name Ilios is historic. Below this, in the eighth and seventh strata, are the remains of small houses of the Greek city, with evidences of fortifications of no great magnitude. In the sixth stratum is an acropolis with many buildings and storehouses, strong fortifications marked by towers and gates. Mycenaean vases, the painted archaic terra-cottas that are not later than 700 B.C., found in this stratum determine its date to be that of the Trojan war, as told by Homer—that is, between 1500 and 1000 B.C. In the fifth, fourth and third layers, period unknown, prehistoric objects occur. Still deeper in the second stratum are the foundations of the acropolis hill, with sumptuous houses built of unburned brick. The wall of the acropolis is massive, with towers and gates, and shows signs of having been several times rebuilt. Here is the "treasure house of Priam," about which Schliemann had so much to say. In the first stratum, the lowest of all, the town walls rest upon the rock. Other articles discovered are of an unknown antiquity.

Summing up the testimony of these researches, which he explained in detail, showing their significance by means of pictures upon the stereopticon screen, Dr. Dörpfeld declared that the upper stratum, the ninth, was clearly made up of the ruins of the Roman city of Ilion. The Greek settlements of various periods visited by Demetrius, Alexander and Xerxes have left their traces in the eighth and seventh strata. In the sixth stratum have been found the remains of the Homeric Troy, the city of which the siege and capture, with the varying fortunes of the war for the punishment of Helen's ravisher, formed the subject of the Iliad. The excavations below this base revealed only prehistoric—that is, pre-Homeric—objects and remains.

So, in conclusion, the lecturer declared that the question of Troy was solved. ("Die trojanische Frage ist gelöst.") The site, the very existence of the city had furnished the subject of learned research for 2,000 years. The most recent excavations had settled all doubt as to the existence of the site, and the character of the city. The citadel of Troy he held to be the most interesting group of ruins now accessible to the investigator of classical antiquity and of ruins still more remote.

### TESSERÆ.

#### The Beautiful in Art.

THE epithet beautiful is applied to such widely different things as a sunset, a human face, a flower, a landscape, a musical symphony, a greyhound, a poem, a piece of architecture; and there may be awakened pleasing emotions by the consideration of any of these objects. The first and essential property of beauty, then, is that it *pleases*. In most cases the satisfaction aroused involves two elements—the one sensuous, the other intellectual. The lower is the result partly of the harmonious action of an external organic faculty, such as sight or hearing, partly of that of the imagination. Thus we describe particular hues as beautiful, certain sounds as charming and in many examples just mentioned the important part played by the quality of the organic stimulus is evident. Along with this satisfaction due to sensation, there is also usually an element of gratification dependent on the exercise of the imagination. From a knowledge of the development of sensuous perception it is easily seen what a large part the reproductive activity of consciousness plays even in seemingly simple cognitions, such as those of a house or of a tree. Consequently, the pleasure of the effect must be attributed to the agreeable operation of both the presentative and the representative faculties of the lower order. The combined energies of the external and internal senses are thus of themselves capable of accounting for much of the delight aroused by the contemplation of beautiful objects, and we think those writers in error who would deny or minimise the reality of sensible beauty. Visual, auditory and motor sensations, both actual and ideal, conspire according to their quality, their intensity and their harmonious combinations to enrich the pleasurable sentiment of admiration. Nevertheless, human appreciation of beauty is essentially rational, and the importance of intellect in this department of cognition is shown by the absence of æsthetic tastes in irrational animals.

#### Disposition of Colours.

One of the first things a young painter is told is, that whatever colour he introduces into his picture must not be kept single, but must be repeated or echoed with some difference either in its quantity or strength in another part or parts of his composition; and the principles of reflection and refraction show that we must do so, because it is in this way that nature herself paints, for these principles always detach a portion of



tint from every object to place it somewhere else. In the general arrangement of colours, though nature leaves us a wide range of choice, yet even here she has laws that we may not break with impunity. West's theory of arrangement, according to the order in which the primitive and secondary colours take their places in the rainbow, has been noticed by Howard, but it would confine the combinations of effect far too much were art to bind itself to the observance of such a rule. The rainbow furnishes a satisfactory elucidation of the soundness of the advice of Reynolds, that the warm colours, red, orange and yellow, should be placed in the lights, from which the cold colours, as blue and green, should either be excluded or admitted only in small proportions. Every eye sensible to harmony must feel that unbroken blue is always unpleasant in the high lights of a picture. Green may be made more agreeable because it is nearer the light of the rainbow than blue. Gainsborough, it is said, painted his portrait of a boy in a pale blue dress, now in the gallery of the Duke of Westminster, by way of refuting the objection Sir Joshua made to light blue as a large mass. It was the opinion of Sir Thomas Lawrence that in this picture the difficulty is rather "ably combated than vanquished." We are not sure that it is even fairly combated, for Gainsborough has so mellowed and broken the blue with other tints that it is no longer that pure bleak colour that Sir Joshua meant; and after all, though the picture is a very fine one, it cannot be doubted that a warmer tint for the dress would have made it still more agreeable to the eye. In the most congenial aspects of nature the blue of the sky always serves as a half-tint to white or golden clouds, and when it is made to tell as a light by showing itself through the openings of dark clouds, the effect is chilling. As a half-tint, blue and indeed any cool colour may be used to great advantage in very large quantities. In Titian's *Bacchus and Ariadne* there is a great proportion of blue, but as it serves for a ground of relief to the flesh and to the bright red, orange and crimson draperies, which make the lights, the effect is splendid, and the picture is a fine specimen of that golden tone in which Titian is scarcely ever rivalled.

#### Coloured Bricks in Buildings.

If coloured bricks be employed as enrichments to door or window openings, they must either be limited by definite lines, maintaining proportions which have relation to the openings themselves, or when these cannot be obtained their limits must be left so vague as to prevent their suggesting that proportion was attempted, but could not be secured owing to the difficulties inseparable from its accomplishment. We need not be reminded that if a door or window receive any kind of decoration beyond its clear opening the proportions of the decoration will materially affect those of the opening itself, and especially if the colour of the decoration be conspicuous. Coloured bricks are, for this reason, most unmanageable. Unless they are purposely moulded or cut for adaptation, like stone, they ought to be applied only to those openings which are multiples of their own dimensions. As moulded and cut bricks are not those under present consideration, the established length, breadth and thickness cannot be set aside; and while admitting the efficacy of the limits assigned to each of these for the purposes of construction, the doubt arises as to how far they are qualified to supply the elements of good proportions. This doubt is strengthened when we consider them as substitutes for moulded bands and string-courses. Three inches, the accepted thickness of a course of common brickwork, may be termed the small divisor of the vertical subdivisions of an elevation, and any bands which may be introduced to give these subdivisions prominence must necessarily be multiples of 3 inches. For the bands of low buildings three of these divisions will be sufficient if they are flat; but when their outline is varied, four at least are required, as their increased projection renders it necessary for the uppermost course to be weathered. Unless the band be of considerable length its depth of 12 inches will appear disproportionate, for, supposing the weather-course consist of headers, which is not desirable, and it projects  $4\frac{1}{2}$  inches from the face of the wall, which is as much as it should do, but little variety of shadow can be obtained below it, not sufficient, certainly, to redeem it from heaviness. The distribution of a 12-inch band, which was often adopted by the old builders in brick, and which appears to be the simplest and most effective, is 3 inches for the weather course, 3 inches for the ornamental course, either saw-tooth, billet mould, or dentils, and underneath a plain course of 6 inches to receive their shadows. In modern works the third course is frequently flush with the face of the wall, and the lowermost course projects  $2\frac{1}{2}$  inches so as to serve as a necking. This arrangement possesses the advantage of giving to the ornamental course the benefit of its entire projection, but at the same time it divides the 12 inches into four equal lines, each of which is only 3 inches in breadth. To avoid the difficulties attending the unalterable limitation of 3 inches, another plan has been adopted, which few will allow to be very successful; it is that of enclosing 9-inch square variegated tiles between two fillets of cement, each fillet being  $1\frac{1}{2}$  inch in breadth.

#### General Laws of Art.

The laws of art are nothing else than the conditions under which alone the sensibility of the soul can be excited to agreeable emotions by external forms; they determine the artistic form according to the demands of sensibility and have their foundation, therefore, in the constitution of the sensitive faculty. The artistic form must, in the first place, in order to excite a connected emotion in the sensitive faculty, possess a general conformity to laws, which is manifested in the observance of mathematical relations or organic forms of life; without this regularity it ceases to be artistic form. But this conformity to law is not in itself capable of expressing an internal life; it is only a condition of representation, the boundary of the artistic forms which range to and fro within, modifying, but on the whole preserving, this conformity. Whilst this regularity is the first requisite in the artistic form generally, beauty is a more immediate predicate of the artistic form in reference to sensation. We call those forms beautiful which cause the soul to feel in a manner that is grateful, truly salutary and altogether conformable to its nature, which, as it were, produce in it vibrations that are in accordance with its inmost structure. As the soul naturally strives after the grateful and salutary emotion in its sensitive life, so the beautiful is certainly a principle of art, without, however, being even in itself an object of representation or artistic idea in the above sense, as the latter is always an absolutely particular idea and sensation. On the contrary, beauty, carried to the highest point, even stands in direct hostility against every endeavour to produce something particular. The sublime and the graceful may be regarded as opposite points in the chain of sensations which is denoted by the beautiful; the former demands from the soul an energy of feeling wound up to the limits of her power, the latter draws her of itself, without any exaltation of her force, into a circle of agreeable sensations. It lies in the notion of a work of art, as an intimate combination of an artistic idea with external forms, that it must have a unity to which everything in the work may be referred, and by which the different parts, whether successively or simultaneously existing, may be so held together that the one, as it were, demands the other and makes it necessary. The work must be one and a whole.

#### East Anglian Church Towers.

These towers, though varying from 7 feet 7 inches internal diameter (Mettingham) to 19 feet (Wortham), have walls about 4 feet and 4 feet 6 inches thick with only one entrance, namely, at the east, and therefore from the body of the church. These windows where they remain unaltered are either small circular eyelets or narrow loop-holes, with plain semicircular arched heads pierced out of the stone, and mostly with chamfered edges. Other windows have been inserted at every age since, and also, with few exceptions, either the churches have been rebuilt or have been attached to the towers. The upper stages also or parapets have been rebuilt, mostly octagonal. In only one instance, that of Fritton, in Suffolk, is there a complete type (nearly complete, though enlarged by aisles) of all these buildings, though the tower is not remarkable except for its dilapidation, the severe cracks being merely filled up with cement. The church has a nave and chancel of early form, 51 feet long internally and 11 feet wide. This has since been widened to 21 feet, but the original was but 11 feet as stated. The east end is apsidal and very perfect. One peculiarity exists here, and only in one or two other churches. It is the "tapering" of the plan from west to east. The chancel itself is vaulted and also diminishes in height towards the east. All the other churches are equally simple parish churches, such as were common in the Norman period. The tower of Wortham Church is remarkable for its magnitude and for the sets-off. In that of Herringfleet we have a tower which, in its whole height, appears to have more of the original than others. It has the Norman billet-moulding as well as a centre shaft to the window of the upper part. This window would in many cases be termed Saxon even in the present day, but how a Saxon upper storey such as this could have been placed on a purely Norman substructure is not manifest. There are instances, it is true, of earlier work with later work both beneath it and surmounting it. St. Mary's, Leicester, has the nave of Norman work pierced below with twelfth-century arcades and with still later walling over the Norman, but a circular flint tower can scarcely have been underpinned in the same manner as a plain wall could be. It may be concluded (1) That in most cases the churches have been destroyed or rebuilt, while the towers have remained. (2) That the towers were probably built by one class (or lodge) of workmen, and are all of nearly one age. They have precisely the same characteristics—similar in material, shape and (with one exception) size, and are without staircases. (3) That they were built for use as bell-towers. (4) That they were erected about 1100 to 1150. If they were of earlier date—and no doubt there is very great difficulty in determining their date from the mere walling—it may be assumed that all the towers had been originally detached and that the churches had been built against them, and that all the principal openings had been made subsequently to their first erection.



## NOTES AND COMMENTS.

It is commonly supposed that steel-plates will sustain a higher tensile strain than is usually assigned. But the Steel Investigation Board appointed by the Government of the United States have found that armour-plates for war-ships can be produced which are below the standard quality. Several specimens failed to pass the contract test requiring 60,000 lbs. tensile strength to the square inch, as well as the requirement of 25 per cent. elongation. Of twenty-eight tempered and as many untempered plates fourteen of the former and eighteen of the latter failed in the tests. The cold-bending trials have shown lack of ductibility. As the latter test is considered to be most important further trials are to be made with specimens 2 inches in width, cut from steel that is new. It is believed by the authorities that the defects are to be attributed to careless inspection. Price may also be a factor. As the American ironmaster said to EMERSON, "If there is slag in the price you must expect slag in the metal," and in America more will be sacrificed to profit than in Great Britain. The failure of the tests at Newport will induce many people to approve of the action of the Board of Trade in fixing a lower constant for the strength of steel than is justified by experience with English products.

In the course of the summer the "Erinnyes" and "Antigone" will be represented before the French President in the old Roman theatre at Orange. It will then be possible for a much larger number of people to witness the performances than hitherto, or, at least, since the Roman power declined. After lying neglected for centuries, M. FORMIGÉ, of Paris, was requested to undertake the restoration of the ruins. It will be remembered that, as was usual in ancient theatres, there were steps which formed benches rising from the ground level. But no more than six rows remained. The vaults which were constructed to support the benches had also disappeared. The reconstruction of the vaults is nearly complete, and various breaches in the walls will be filled up. The theatre will be far from appearing in its ancient grandeur, but it will be more suggestive of Roman days than any of the ruins of similar buildings in Athens or Taormina. The auditorium is 340 feet in diameter—the stage wall being that length and 116 feet in height. From its immensity the theatre must have been a valuable quarry for the engineers of a later time, who used the stones for fortifications.

ONE of the Paris papers has had lately a series of articles concerning what is to be done with the sons of Frenchmen of the middle class. As ideas appear to be diffused in some sort of atmosphere which all minds must inhale, no one is surprised to find the *Chicago Record* dealing with the same question in a different manner. In considering the American young man and his chances of success it was natural to inquire about the architectural chances. Mr. D. H. BURNHAM, the architect, in reply, draws the following satisfactory picture of the state of business in American offices:—The architects' offices in which a large amount of work is done are all of them picking and choosing from among the choice young students from the schools. The man who comes with a ringing name from an eminent school will not only find a place to work and expand in, but there is competition for him. The offices of to-day do not readily take those who have had no special training in the schools, and who are never as valuable as the trained men; therefore their chances are much less in art. However, in an architect's office there are many problems which have comparatively little to do with art, and which are more especially engineering in its broadest sense. These afford opportunities for the employment of another class of men, who are indispensable in a large practice, and whose services are much more valuable for the purpose for which they are used than are the men from the architectural schools. There are plenty of chances for both, although the prizes within the reach of one class are far above those the other may ever hope to grasp. I would sum up by saying that "the opportunities for young men in architecture" in the

future are going to be very extensive; that the fellows who are really well trained need not fear about bread and butter or opportunities to shine, and that they may hope to rise as high as their powers will permit. There never were in the past, and are not now, such opportunities as the future holds in store for men of high worth in architecture, either for material compensation or for undying distinction.

It is sometimes found to be difficult to discover a book which would be suitable as a present for a young engineer or one aspiring to a similar calling. The "Thames Bridges, from the Tower to its Source," by Mr. JAMES DREDGE, and published at the offices of *Engineering*, would serve that purpose. There is no river which is spanned by a greater variety of bridges than the Thames. Timber, stone, cast iron, wrought iron and steel have been employed in the work, and if a new material is discovered which is suitable it is sure to be quickly utilised for crossing the river. Many attempts were made to describe a series which epitomises bridge-work, but Mr. DREDGE is the first who has persevered until completeness was attained. The views are reproduced from photographs, and form a collection which it is pleasing to see for the sake of the associations which are connected with the river, although too many of the bridges are ungraceful enough. The descriptions, it is needless to say, show an appreciation of the scientific principles exhibited by each example.

THE effort to secure HOLBEIN's picture of the incorporation of the Guild of Barbers with the Guild of Surgeons for the Guildhall has failed. The few subscriptions which were obtained by Sir JOSEPH DIMSDALE and Sir STUART KNILL have been returned. It is, however, not difficult to understand the indifference of the public. The picture contains many portraits, but not one of the men who are represented as kneeling before HENRY VIII. is a person whose name excites general interest. If they were prisoners imploring pardon for some municipal freak they might be popular. The price, 15,000*l.*, asked for the picture seemed excessive, although after a course of cleaning the value of the work would be enhanced. Finally, it was not quite clear whether the money or the greater part of it would not follow the ordinary course of the revenues of the majority of the City companies. The proper place for the picture would be in the Guildhall gallery, and the Barber-Surgeons, by undergoing a slight amount of self-sacrifice, could make that destination attainable.

## ILLUSTRATIONS.

## THE RETURN FROM THE CHASE.

WHEN M. CORMON was awarded the Médaille d'Honneur of the Salon a few years back there was less discussion than is usual. Concerning the ability of the artist there is no question, and if he cared to be less indifferent to the strategy which is generally needed to attain a foremost position, M. CORMON might have owned the medal at a much earlier time. He is no ascetic who despises honours and rewards, but he will not make sacrifices to get hold of them. To M. CORMON painting is what poetry was to COLERIDGE, "an exceeding great reward," and he finds more pleasure in working on his canvas than when he is the observed of all observers at a distribution of prizes. We may be sure that when he was representing his prehistoric hunters he often wished he could have a holiday in tracking a bear or any savage animal, where he could exercise his courage and unconquerable good humour, and an invitation to such a scene, we imagine, would be more appreciated by him than one to any "splendide réception." M. CORMON always contrives to impart his own exuberant animation to his figures, and his hunters are all genuine Gauls who are happiest when in action.



st, Jan. 8<sup>th</sup>







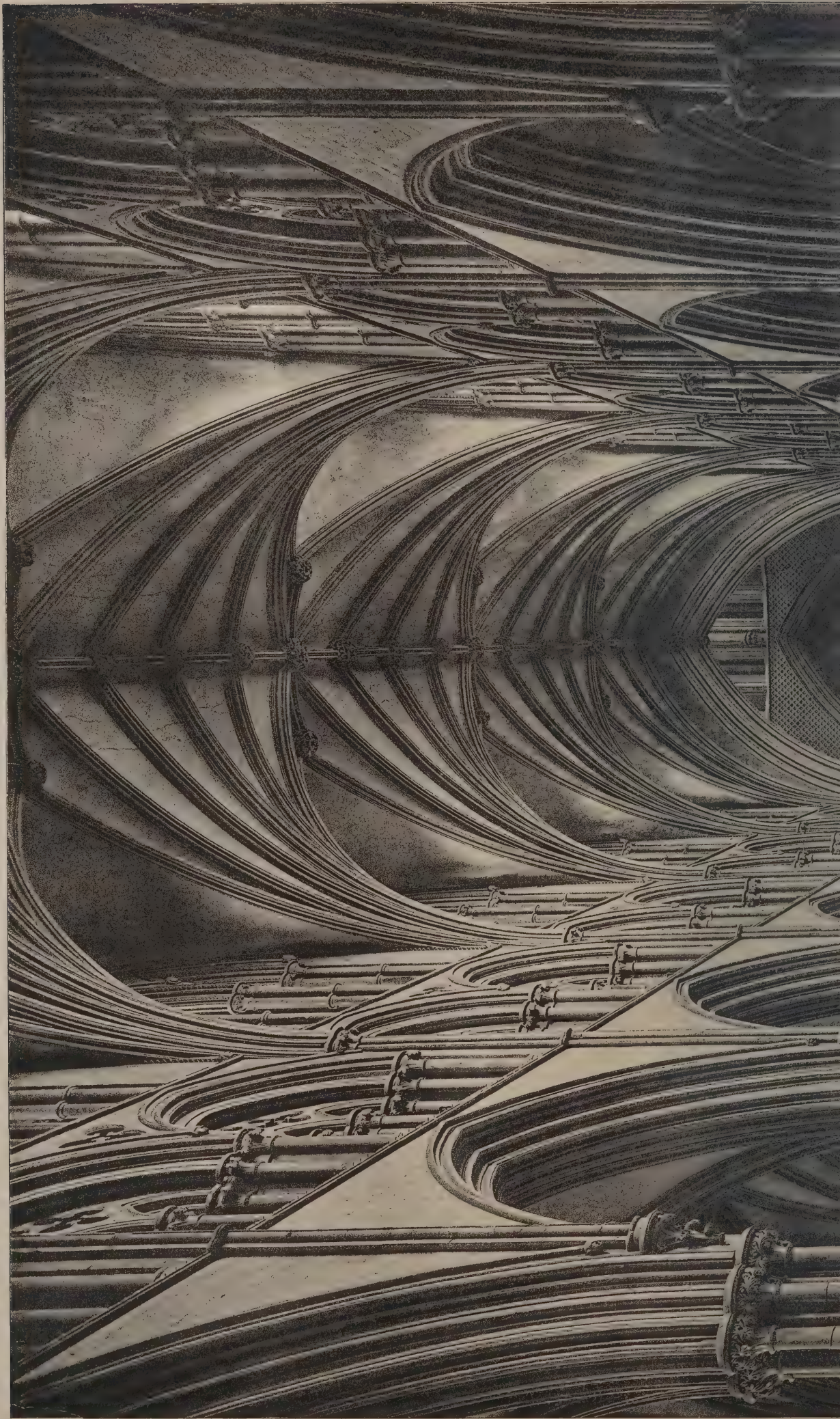
RETURN FROM THE CHASE

FROM THE PASTEL BY M. F. CORMON

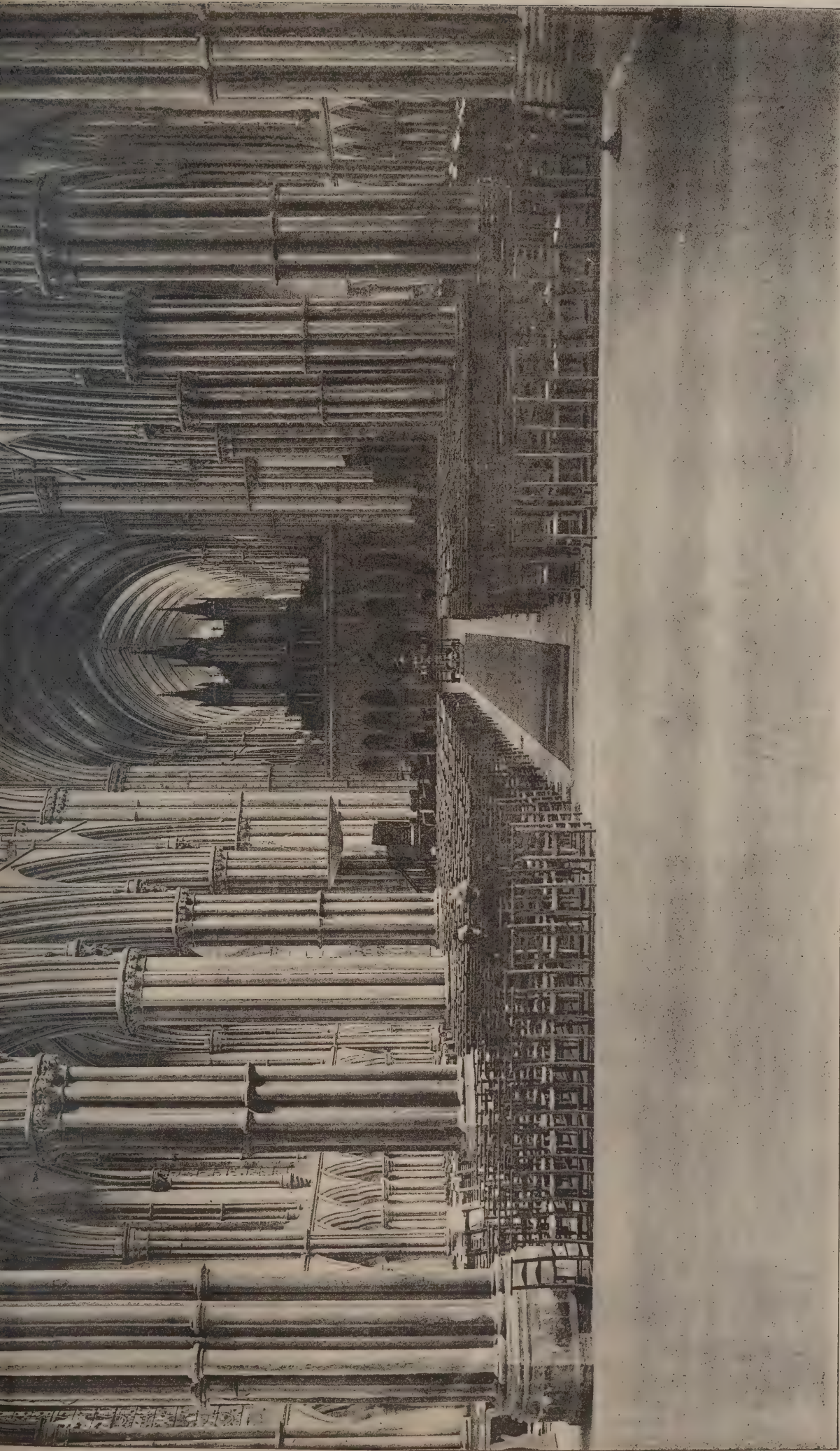












PHOTOGRAPHED BY S. B. BOLAS & CO

INK- PHOTO SPRAGUE 4 1/2 x 3 1/4, EAST HARDING STREET BETTER LANE, E.C.

CATHEDRAL SERIES, No. 2.—LINCOLN: NAVE, LOOKING EAST.













PHOTOGRAPHED BY S. D. BOLAS & CO



Jan: 8<sup>th</sup>, 1897



INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

HALL.  
OF WESTMINSTER, K.G.  
USE, R.A., Architect.







## LINCOLN CATHEDRAL.—II.

ALTHOUGH Professor WILLIS when describing Lincoln Cathedral treated the architect who was St. HUGH's friend with not much respect, he uttered the remarkable judgment that in architectural excellence the cathedral is superior to every other cathedral in England. We may say that similar words have been used concerning many of the cathedrals, and in judging them it is difficult to be impartial. Lincoln is, however, among those which possess

the most artistic qualities. The fact is suggested not merely by the admiration which general views of the building, especially the interior, excite, but by the importance attached to the details, examples of mouldings and ornaments being cited as exemplars of style. The late E. SHARPE selects the building as a type of his Geometric period as well as of his Lancet period. Lincoln at one time also presented examples of stained-glass which were comparable with any others in England. The quality of the



Photographed by S. B. Eolas & Co.

LINCOLN, SOUTH AISLE.



work can be judged from the great rose or wheel window in the north transept, which the late Mr. WINSTON declared to be one of the most valuable and perfect works in existence. The subject is the Church on Earth and the Church in Heaven, and the greater part of the ancient glass remains in its original position. The whole central part of the window is occupied with a representation of the Blessed in Heaven—CHRIST sitting in the midst. The sixteen circles which form the outer part of the window set forth the scheme of man's redemption and the efficacy of Holy Church. In the topmost circle is represented OUR LORD, seated on the rainbow, displaying the points of the nails in His hands and feet and the wound of the spear in His side. The two next circles on

each side are filled with angels supporting the Cross and other instruments of the Passion. In the next circle, on each side, are holy persons in the act of being conducted to heaven by St. PETER and other saints. The two next circles on either side are or have been occupied with the general Resurrection, and each of the lowest five circles is filled with the figure of an archbishop or bishop in Mass vestments.

In his criticism on it Mr. WINSTON said :—"The north rose window exhibits as well, I may observe, the general principles of composition common to all Early English windows that contain a number of pictures. Each picture, the design of which is usually very simple, is placed in a panel having a deep-coloured ground and a rich border.



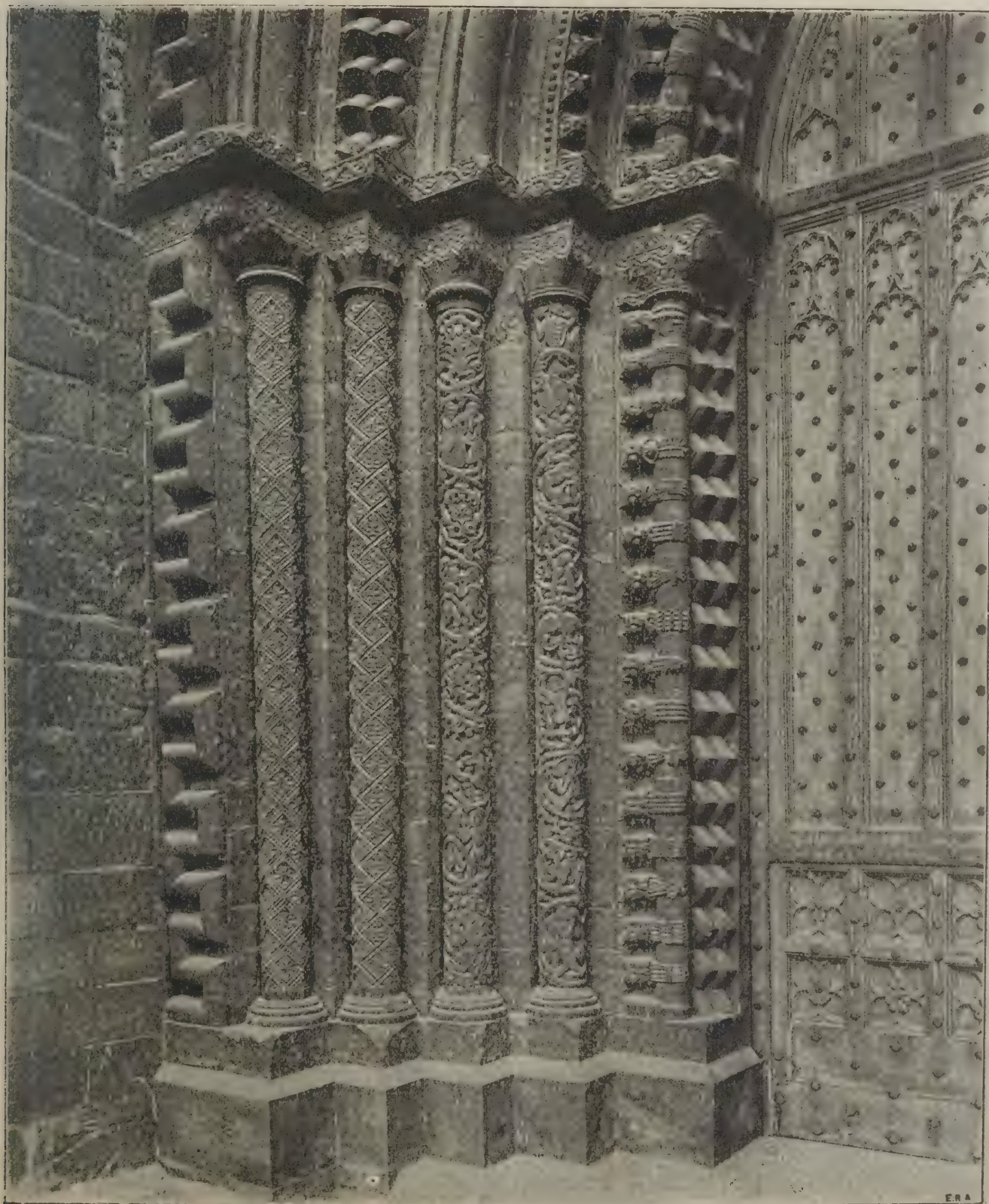
Photographed by S. B. Belas & Co.

LINCOLN, CENTRAL DOORWAY WEST FRONT.



The panels themselves are embedded in a coloured ground. Very little white glass is used, so that the window in its general effect is a mass of rich and variegated colouring in which the tints of the grounds predominate. The design, owing to the smallness of its parts, is confused when seen from the proper point of view—the floor of the transept. The various panels which we see inserted into the other windows without doubt once formed parts of medallion windows, whose general effect may be gathered from that of the north rose, and of whose general arrangement an idea is conveyed by the modern imitation window in the south aisle, and by the original ironwork still remaining in the first window from the west in the south aisle."

Unfortunately no other portion of the Early English glass in the cathedral is in its original position. The white patterns which fill the five windows immediately below the north rose have clearly been removed from other windows, and the same may be said of the contents of both the lowest north windows of the transept. In the westernmost of these two windows the figures of five angels playing on musical instruments have been inserted. These are Decorated, and belong to the west window of the nave. Most of the glass in the southern rose is also Early English, and as well as that with which the four south windows of the transept are filled, has been collected from other windows. As ancient stained-glass is almost essential to give character



Photographed by S. B. Folas & Co.

LINCOLN. DETAILS OF CENTRAL DOORWAY.



to a Mediæval building, it becomes evident that Lincoln Cathedral suffers from its absence, or from substitutes which, however excellent, have not the same effect as old glass.

Another drawback is found in the empty chapels. Lincoln possessed about twenty chapels and chantries, for the adornment of which endowments were provided. For some of them it was necessary to have special keepers to watch over the altar-plate and other ornaments. It is not difficult to imagine how the appearance of the cathedral was enhanced by so many masses of rich colour which compensated for the coldness of the masonry. In the deprivation of its adorned chapels Lincoln is not unique, but as a building of which the plan was a "Lorraine cross,"

or with double the usual number of transepts, auxiliaries of the kind were especially needed.

There is much in the cathedral which can be considered as proof of most skilful construction. As a *tour de force* the "stone beam" or flat arch between the western towers is unique in England. The following description of it is by the late W. A. NICHOLSON, architect, of Lincoln :—

"The arch is constructed between the western towers at a height of about 80 feet from the pavement of the cathedral, and immediately over the junction of the vaulting between the towers and the vaulting of the nave; its abutments are thus formed by the eastern walls of the two towers.



Photographed by S. B. Eolas & Co.

LINCOLN, DOORWAY, WEST FRONT.



"The arch itself consists of twenty-three stones of unequal lengths; the width of the extrados is barely 1 foot 9 $\frac{1}{4}$  inches, the thickness of the arch is uniform throughout and is 11 inches. The span, measured horizontally, is exactly 27 feet 11 inches between its apparent abutments, but it is necessary to observe that the towers, which are of Norman construction, have been in several parts encased with new masonry in the interval between their original erection (about 1100) and the completion of the nave, aisles and other adjacent parts (about 1250) as they now exist. This facing is continued above the arch in question, and the formation of the joints in the new stonework leaves little doubt that the real abutments are formed by the original walls of the towers, thus making the actual horizontal span 30 feet. The southern abutment is 12 $\frac{1}{2}$  inches higher than the northern one, measuring upon the new facing just described. The haunches of the arch are filled up, and there are indications of the filling in having been continued nearer the centre than it is at present. This part of the work has been originally bedded in mortar, but is now quite loose and detached.

"In all the authorities I have had an opportunity of consulting, the arch has been considered a segment of a circle. It is true that, in a description of the cathedral drawn up by Mr. LUMBY, clerk to the fabric, and published in vol. iii. of 'Vetusta Monumenta,' its deviation from a segment is noticed, but is attributed to a 'very small settlement.' This, however, is not the case, the dimensions leading to an obvious conclusion that the arch is Pointed, and described from two centres. In order, nevertheless, to afford an opportunity of comparing the conclusions deduced by other parties who have given the dimensions of the arch, upon the supposition of its being a segment, with those which would follow from the admeasurements I have made, it may be well for the time so to view it. Thus considered, its chord would be found by calculation to be 27 feet 11.304 inches; the versed sine of half the arc, 1 foot 2.375 inches, and consequently the radius would be 82 feet 0.75 inches, and the arc would include 19° 36' 16".

"But, as I have said, minute admeasurements preclude the supposition of the arch being a segment of a circle; for had such been the case, every part of the arc would have conformed to the same law, and an investigation founded on the dimensions of any portion of the arc would have resulted in showing the same radius. On drawing the elevation from the dimensions, and whilst I was still impressed with the popular idea that the arch was a segment of a circle, it became obvious to the eye that it was of a Pointed form, and on testing this by calculations based upon the dimensions I found this minutely verified.

"The radius of the southern arc as deduced from the dimensions is about 12 feet 6 inches less than that of the north arc, and the versed sine of half the arc 1 $\frac{1}{2}$  inch greater. This inequality is perhaps the result of irregular settlement when the arch was first built, or more probably of some subsequent yielding of the abutments, as both the towers have many extensive fissures in them, which could scarcely occur without some derangement of the form of the arch. Indeed, there is reason to believe that since the publication in 1791 of Mr. LUMBY's report before referred to, a spreading of the abutments has occurred. He describes the soffit of the arch as being 12 inches above the stone vaulting, whilst at this time it is not more than 3 inches. His investigations appear to have been conducted with great care and accuracy, and it is difficult to believe he could commit so great an error in nearly the only dimension that can be obtained without the erection of scaffolding.

"The arch is constructed of stone from the Lincoln quarries, being the same as that used, with few exceptions, throughout the cathedral. The exposed surfaces are wrought with the toothed chisel in a careless and imperfect manner, and the joints, contrary to what might have been expected, are decidedly ill formed, and have beds of mortar fully half an inch in thickness within them. There is no trace of iron being used in the construction of the arch, either in dowels or other form; nor do I believe that it derives assistance from any such extraneous means. The arch vibrates perceptibly when jumped upon, and I am of opinion that the constant practice of visitors thus to prove its elastic properties has a tendency to impair its stability.

The mortar between the joints is of a very friable nature, and has detached itself from the parts where it has been used in pointing the joints to conceal the irregularity of the workmanship, and it must be still further crushed by the violent concussions to which the arch is almost daily exposed.

"It appears to me to be in vain to offer any plausible conjecture as to the purpose for which the arch was originally constructed. It is nearly certain that it was not built at the same time that the towers were erected, inasmuch as it would, in that case, have been above the eaves of the original roof; it was more probably built shortly after the reconstruction of the nave of the cathedral, when for the first time it was vaulted; but what purpose could it then answer? The vaulting between the towers would have a tendency to prevent any inclination of the towers towards each other of infinitely greater efficacy than the arch itself; and indeed its form and want of mass preclude the idea of its being built with such an object, at a period when the science of construction was so perfectly understood and so admirably applied as it was in other parts of the cathedral. It may, as has been generally supposed, have been constructed as a test whether the towers were capable of sustaining the additional height of about 60 feet, besides spires of timber covered with lead, which were superadded to the original Norman towers about the middle of the fourteenth century. But before such an opinion be received it must be borne in mind that the vaulting already executed offered a similar standard, and also that the same divergence from the perpendicular which would be indicated by the settlement of the arch would very probably have occasioned its fall, and the destruction of the vaulting beneath it; and further, it is obvious that more accurate and less hazardous tests might have been applied with greater facility. On the whole, I cannot avoid thinking that it was not erected with any view of adding to the stability of the towers, or of indicating any failure, but rather that it was built by a body of masons desirous of illustrating the amazing effects which the science they studied and practised placed within their attainment."

## THE ANCIENT CITY OF NIPPUR.

THE curator of the Babylonian department of the University of Pennsylvania, Professor Hilprecht, has made discoveries, says a Philadelphia correspondent of the *Chicago Chronicle*, which push history, of which there are written records, back to 6000 B.C. He has written eight records that probably carry back human history to nearly 10000 B.C., and is able to see beyond this period to a very ancient prehistoric period, which makes the chronology of Usher, printed in most Bibles, and which places the beginning of the world in 4004 B.C., look rather ridiculous. The discoveries of Professor Hilprecht were all made possible by the material gathered together by the University of Pennsylvania's Babylonian exploration expeditions, and these expeditions were made possible by the liberality of a mere handful of wealthy Philadelphians, who subscribed nearly 70,000 dols. to support what are now known the world over as the Nippur expeditions. The explorations of the antiquities of Babylonia have been going on for eight years, and after a lull since last spring they will be renewed next spring upon an entirely new basis, and a new campaign to last three years will be begun, of which marvellous things are expected. The work of these three campaigns has almost revolutionised all ideas as to ancient Babylonian history, and will be the foundation for some of the most important volumes on archaeology ever written. At 4004 B.C. there was a very polished civilisation existent in the valleys of the Tigris and Euphrates, and which had been existent for many millenniums before. And of this very ancient civilisation Nippur had been the holy city, sacred to the god of these ancient peoples. A city marked by massive temples and showing a high state of civilisation, and yet of such antiquity that the story of civilisation, as related by the legends of those who remembered Nippur and its greatness, declares there was a time when heaven and earth were not created and the city of Nippur did not exist. Nippur at present, then, easily figures as the most ancient city in the world, and it is through, in and by Nippur that the discoveries have been made that have unlocked the secrets of the centuries and pushed the records of civilisation so far back as to startle even those who are accustomed to delving in the remote past. The spot that is now famous over the world is a ruined city, lying between the Tigris and Euphrates, about 150 miles south of Bagdad. The ruins form



a conical hill, rising out of the level and marshy fever-breeding plain to the height of about 100 feet. The central portion of the ruins is about 45 feet higher than the mass of the surrounding *débris*. Layard, the Assyriologist, who prospected in the Nippur ruins a number of years ago, was of opinion that nothing of value would be found there. Using modern methods of research, however, and cutting down through the whole 100 feet of material by means of huge trenches, the University workers have accomplished wonders. The way in which the age of the different inscriptions and finds is determined is the same as the method used in determining the age of the earth—by means of the superposition of the strata, that lowest of all being the oldest. Applying this method to the great ruins of Nippur, as the explorers gradually worked down into the mound they found various levels, which, by means of inscriptions, were identified, and these acted as keys to the determination of the whole mass. On top of all were the ruins of modern times, from the present down to the early centuries before Christ. The first great dividing line was the discovery of the platform of Ur-Gur (about 2,800 B.C.), on which stood the great temple tower, which was rectangular in shape and about 197 feet by 177 feet, composed of three terraces, the lowest storey of which was about 21 feet high. This temple tower was built of a solid mass of brick, and was called a zigurrat. Below this platform of Ur-Gur was discovered the pavement of Sargon (3,800 B.C.) built of huge burned brick. Below the pavement of Sargon the *débris* extends over 30 feet before the ground level is reached.

Of this Professor Hilprecht says:—"If, roughly speaking, the discoveries above the pavement of Sargon represent the accumulation of about 4,000 years for about 40 feet of material, then the 30 feet below Sargon must represent at least 3,000 years of growth, as there being no great tower temple (zigurrat) to add to the *débris* by its crumbling, the deposit of *débris* must have been much slower and hence the age of the original first settlement at Nippur one of the most ancient known to history." The determination of age and periods by means of strata is only one of the ways of getting at the secrets of antiquity. The other methods are reading of the inscriptions found, study of the art works and a minute comparison of all the details of life unearthed. Having gone all over this for years, Professor Hilprecht summed it all up by telling the story of Nippur somewhat as follows:—The most ancient inscriptions found show that over 8,000 years ago, probably 10,000 years ago, there was an advanced civilisation in the Babylonian plain, lying between the Tigris and Euphrates. The Persian Gulf came farther inland then, and Nippur was near the sea coast. Forests of sub-tropical character flourished and the people lived a simple agricultural life, with the arts quite advanced and writing considerably developed beyond the simplest forms of picture writing. This country was called Kengi, the land of the canals and the bulrushes, for agriculture at that early date was pursued by means of irrigation, and among the vegetables raised the onion was highly prized. The people of the land of Kengi were not Semitic, but Sumerians, who had a curious language of a type something like the Finna Tartarian, a Turkish stock, with a vowel harmony. As none of the modern forms of language are like it, deciphering the Sumerian inscriptions is not a simple task. Nippur was the centre of the religious worship of the Sumerians. This is shown by its great prominence in the records and the fact that at Tello, a very ancient town to the south of Nippur, the gods are said to be sons of the Bel (Baal) of Nippur, and the kings of Tello ascribe their election to the Bel of Nippur. In time the Sumerians became effete—even at that early day civilisation wore out—and the Semitic nomads, who had been hovering for many years and through many dynasties on their northern border, were able to conquer some of the outlying towns. One of these was Kish, which was taken by the Semites about 5,000 B.C. There was then on the border a mingling of the two civilisations. The invaders adopted the manners, customs, writing and religion of the invaded, and in this way the Sumerians impressed themselves on their conquerors. When it is remembered that until recently both Maspéro, the great French authority, and Winckler, the German savant, put the most ancient Babylonian civilisation known to history at 3500 B.C., the revolution in archaeology accomplished by the Philadelphia Babylonian exploration fund, which allowed Nippur to be dug up, can be easily estimated.

## ST. MILDRED'S CHURCH, BREAD STREET.

THE Chairman of the City Churches Preservation Society has received the following report from Mr. Theodore Moore, of 7 Leadenhall Street, on the railway proposals to remove St. Mildred's Church, Bread Street, for an electric railway station:—

In accordance with your wish I have examined this beautiful little church, built by Sir Christopher Wren after the fire in 1666. The fabric and its details remain to this day almost as he left them, and any decision to remove the church would add another reproach to the City, which is so culpably indifferent to the preservation of such gems of art. Mr. Birch, in his fine work, has described the church and its details so well that it is not necessary for me to attempt any description. Let me dwell somewhat, however, upon the leading characteristic, which cannot fail to impress the observant. It is the masterly simplicity of the means by which the architect produced his charming effect. It is easy, one may think, to deduct a square from an oblong, to put a dome in the square, to throw two broad coffered arches over the spaces remaining, to complete the arch scheme by two outlines against the side walls, and to carry your dome on pendentives. But it is an ease which comes only by much thought of a great mind. This church, only about 60 feet by 36 feet, has, by its designer's treatment, attained an airiness of effect and a modest dignity which might have been depression and insignificance. All of it should be preserved with a care that should increase as the years go by—the fabric, with its internal grace and external propriety, the gorgeous pulpit and sounding-board, the chastely-wrought reredos and screen and panelling, not forgetting the pews (which are threatened by others than promoters of Bills in Parliament), the font, the sword rest and supporters, and all the little things. So far as can be seen without a more minute survey, there is no insecurity or dilapidation, no earthly reason why a characteristic specimen of an Augustan period in church building should not be preserved. Without going into matters of sentiment, such as the birth of Milton or the marriage of Shelley, we have here a thing of intrinsic value, which no man with a cultured perception would think of touching with a destroying hand.

It is proposed to request Mr. Moore to visit the Birmingham churches threatened by the Bishop of Worcester's Bill, as their friends in that city have applied for the co-operation of the London Society.

## ST. MARY'S CHURCH, SCARBOROUGH.

AN address on the history of St. Mary's Church, Scarborough, was lately delivered by the Bishop of Hull. His lordship said the church was only about half the size of the original one. Scarborough at one time was very rich in religious houses, and after enumerating the founding of many of these as early as about 1154, 1230 and 1306, he said the parish church was by far the greatest amongst them. It was then a Cistercian church. They were unable to tell exactly when the first church was built where the parish church at present stood. Probably, however, the earliest church of which they had any traces built there was about the year 1180, which would be in the reign of Henry II., about the time St. Nicholas Church was built on St. Nicholas Cliff. The traces of the earliest church were to be found in what is called the string-course at the end of the south aisle of the present church. There were also traces to be found in the broken capitals in the east end of the south aisle and in the vicinity of the organ. It was concluded that the early church had a nave, aisle, certainly a south transept, and probably a north transept. In the western towers, built probably in 1190, they had the transition from the Roman to the Early English. There seemed to be an apparent intention about this time to rebuild the whole church. The tower was finished about the year 1198, and then came an interesting fact in the history of the church, which those who cared about history, but did not care for one moment about architecture, might be interested in. It had been said upon the greatest authority that no church of the Cistercian order had western towers, and it was a curious fact that the parish church was an exception to the rule, and no other exception could be found throughout England. It had been conjectured that the parish church had been built before it had been determined to what religious body it should be given; that it was built and then afterwards given to the Cistercians. Richard I. was in the habit of paying a hundred marks to the Cistercian order that they might provide hospitality for the abbots of the order upon the great feast day, but eventually the king resolved to free himself from this payment, gave the church over to the Cistercians and told them to pay the hundred marks, and this, it was stated, accounted for the strange anomaly of a Cistercian church having western towers. It had often been asked whether there were any traces to be found of monastic buildings in the present church. There never were any Cistercian monks

**The Portrait** of Mr. Herbert Spencer, which is to be a memorial of the completion of his "System of Synthetic Philosophy," is to be painted by Mr. Hubert Herkomer, R.A.

**The Plans** for the French Hospital recently opened in Constantinople were prepared by the late M. Bourmancé by order of the French Minister of Foreign Affairs. On the death of M. Bourmancé through cholera, M. Carré was appointed to take his place, and has completed the work.



living there, and, as far as could be ascertained, there were no monastic buildings.

The nave was commenced about the year 1210, and was finished about the year 1225. The south transept was built next about the year 1340; then came the St. James's Chapel about 1380, St. Stephen's Chapel about 1394, and the chapel of St. Nicholas about 1397. Then the porch was built with its extremely beautiful roof. His lordship then drew attention to the magnificent chapel which they now believed to be dedicated to St. Mary the Virgin, in which a beautiful window had been recently placed. In regard to the roofs, he had been told that there were no roofs to be found in England like those they possessed at the parish church. Some of a similar character were said to be in several Scotch castles and in Scandinavia. The roofs in that church certainly were magnificent, consisting as they did of large slabs of stone placed one upon top of the other in the most beautiful manner. After referring to the St. Nicholas aisle—140 feet long and 24 feet wide—possibly built by the guild of St. Nicholas, which was in existence at the time, St. Nicholas, too, being the patron saint of fishermen, his lordship next described the old choir, which he said extended the whole length of the church, 216 feet 3 inches. It was built somewhere about the year 1450, and lasted for two centuries. The early church then, during the zenith of its splendid career, had a nave, three aisles, four chapels, two transepts, choir, aisles, a central tower and two western towers, and with the exception of the then unrivalled Whitby Abbey, was the finest church in the country. It was 216 feet 3 inches in length and 100 feet 5 inches across, whilst its walls in places were 8 feet thick.

The church remained in this condition of splendour until the middle of the seventeenth century, and then the great siege began. On October 10, 1659, the great tower of the church fell into the nave and did great damage. The tower was eventually rebuilt, but not the choir. The restoration began by a great effort, in which most of the people of Scarborough participated in 1849, but under circumstances which deprived the church of much of its previous architectural beauty. On St. James's Day 1850 the church as they saw it at present was opened for Divine service, and ever since they had observed St. James's Day in commemoration of that event.

## THE ANCIENT CITY OF COPAN.

IN a fertile river valley, shut in by the high forest-covered mountains of northern Honduras, are the ruined pyramids, terraces, temples and other edifices of the ancient city of Copan. Until recently little was known regarding the extent of the ruins which lay beneath the accumulated mould of centuries. Monolithic monuments, of sculptured stone were scattered here and there in the almost impenetrable forest of ceiba and cedar trees. These, together with a few of the more important pyramids, were known to the natives and were pointed out to occasional travellers. The extent and real nature of the ruins, however, remained unknown until 1885, when A. P. Maudslay, an English archaeologist, visited Copan, made some excavations and prepared a plan. In 1891 Prof. F. W. Putnam, of the Peabody Museum of Archaeology and Ethnology, of Harvard University, organised an expedition for the careful exploration of the ancient city. For four seasons, says the *Scientific American*, the work of excavating has progressed successfully. The forests have been cleared away, and the accumulation of earth and vegetable mould has been removed from the temples, terraces, pyramids and courts of the main structure and the ruins immediately surrounding it.

The Copan river flows by the side of the principal group of ruins, and the eastern slope of the main structure has been undermined and carried away by the river floods, exposing a section which forms a cliff of rubble interspersed with walls of faced stone. This cliff is over 600 feet in length, and at one point attains a height of nearly 135 feet.

The main structure covers seven acres of ground, and consists of a vast irregular pile of terraces, flights of steps and pyramids crowned with the remains of temples built of squared stone. Some of the stairways and portions of both the exterior and interior of the temples were elaborately sculptured, and the buildings were originally painted in brilliant colours.

This structure contains two great courts or amphitheatres, whose cement floors are 65 feet above the river. Tiers of steps or seats are upon three sides of the eastern court, and the Jaguar stairway, so called from the finely sculptured jaguars which guard the lower steps, leads from the western side of the court to the terrace above.

One ascends the main structure by a flight of well-preserved stone steps 250 feet in width. From the first landing rises a pyramid, upon whose summit are the remains of a temple 100 feet in length. A step in front of an inner door of this temple is ornamented with seated human figures covered with elaborate breastplates and other ornaments.

The sides of the doorway and the cornice which had fallen

were in like manner covered with well-executed carvings in stone. Other portions of the building, which was in an advanced stage of ruin, were elaborately ornamented with sculptures, and the wall surfaces showed traces of plaster which had been painted.

From this temple a broad flight of steps descends to an elevated court. Within this court are sculptured monuments and a broad platform with terraced sides.

Rising from the eastern side of this court is a pyramidal mound supporting a ruined temple. The sides of the pyramid are built of squared stone regularly laid in terraces. The temple is reached by a stairway divided for a part of its length by a raised structure in the form of steps, having in front rows of sculptured death's heads. The cornice of the temple was ornamented by small sculptured heads, both human and grotesque.

From the summit of the pyramid, which is 100 feet in height, one obtains a view of the extensive ruins to the south and west. Near the northern base of the pyramid is the eastern court before referred to, nearly inclosed by ranges of steps. The northern range of steps of this court leads to a platform in front of three ruined temples, the largest of these being probably the most elaborate building of the ancient city.

In front of the principal inner doorway is a step carved upon its face with hieroglyphs and skulls, and at either end of the step is a human figure sculptured in stone, seated upon an immense skull and holding in its hand the head of a dragon, whose body, together with other figures, forms the ornamentation of the cornice over the door. The upper part of the outer wall of this temple had been ornamented by artistically sculptured half-length figures in full relief, representing girls in the act of clapping hands.

Two stone incense burners in the form of grotesque heads were found within the inner chamber of this temple.

Adjoining the mound upon which this temple stands is another pyramid with three sides sloping to the level of the plane upon which the main structure is built. Upon the western side of this pyramid is the hieroglyphic stairway, one of the grandest pieces of architecture of ancient America. This stairway is about 40 feet in width, and it leads to the temple upon the pyramid, a distance of more than 100 feet. At the foot of the stairway and occupying a central position is an elaborately carved pedestal. The face of each step of the stairway is covered with finely sculptured glyphs composed of grotesque faces, masks, scrolls and numerals, records of the ancient builders. Scattered throughout the *débris* are fragments of life-sized human figures carved in full relief, which once formed portions of the structure.

From the summit of the mound of the hieroglyphic stairway one obtains an extensive view of the Great Plaza of Copan, with its surrounding steps, terraces and mounds. The Great Plaza and its extensions occupy over 7 acres, and portions of it are paved with squared stones neatly fitted together.

Within the plaza are thirteen great sculptured monolithic monuments, and before each stands a carved block of stone called an altar. The average height of these monuments is about 12 feet, and the largest of them are about 3 feet in width and a little less in thickness. One side of the monument is usually sculptured to represent a colossal human figure wearing an elaborate headdress composed of the upper portion of the head of a quadruped, from which rise great plumes of feather-work. Massive ear ornaments adorn the ears of the figure, bead necklaces surround the neck, and elaborate garments of textile fabric, with tasselled fringe, cover the shoulders, and sashes, garters, bracelets and a profusion of ornaments decorate the lower portion of the sculpture.

Elaborate symbolical decorations derived from the great plumed serpent form a conspicuous part of the ornamentation, and the sides and back of these monoliths are usually covered by glyphs, which, when deciphered, will probably tell us much regarding the personages whose sculptured representations appear upon the stones.

The altars standing before the monuments are of various sizes, and are also elaborately sculptured—some in the form of a grotesque animal or head, others having a row of human figures encircling them. The tops of the altars are frequently covered with glyphs.

Excavations were made beneath several of the monuments, and cross shaped vaults were found containing numerous jars of earthenware, some of which were decorated with well-executed drawings of human figures and glyphs. The jars contained bones of small quadrupeds, sacred shells, and pigments of different colours. A few of the shells inclosed sacred objects, such as black oxide of mercury, cinnabar, worked jadeite and a few pearls.

During the excavations a number of underground tombs were encountered, built of squared stone. These tombs were miniature reproductions of the rooms of the temples, and within them lay the crumbling skeletons of priests, surrounded with jars, food bowls and personal ornaments, together with the paraphernalia of their priestly office.



The upper front teeth of several skeletons were ornamented with circular discs of green jadeite, highly polished and having convex surfaces. The discs were inserted in holes drilled in the front of the teeth, and were securely fastened by red cement. The cutting edges of the incisors and canines were either ground smooth or notched.

The burial place of the common people of the ancient city has not yet been discovered. It is probable that the remains found in the tombs are of priests or important personages, and that the elaborately decorated human figures upon the monuments, stairways and buildings are effigies of gods whom the priests and rulers personified.

In studying the photographs, drawings, sculptures and other objects gathered by the Copan expedition and exhibited in the Peabody Museum at Cambridge, one becomes impressed with the grandeur of the ancient city.

As to the age of these ruins, there are not sufficient data upon which to base a reliable conclusion. They are unquestionably prehistoric, and the builders of this city belonged to the same civilisation as the constructors of the temples and pyramids of Yucatan. Judging from the ruined condition of the edifices of Copan, this city must be older than most of the cities of Yucatan, and more magnificent also.

### THE ROMAN BARGES OF LAKE NEMI.

THE efforts to raise the barge which was discovered at the bottom of Lake Nemi, and which, according to tradition, belonged to the Emperor Tiberius, have been described in these columns. According to a correspondent of the *Scotsman*, the Cavaliere Malfatti, of the naval engineering department, is in charge of the operations, and as the best means of securing the treasure trove recommends lowering the level of the lake by temporarily reducing its volume. Rendered shallower by the removal of 13 metres of water the lake would yield up the first barge in its integrity, while a lowering of the level by 22 metres would place the second equally within reach. Direct hoisting of the barges from their beds, according to the Cavaliere Malfatti, would bring only their skeletons to the surface, if indeed they retained enough resisting power to give themselves up without loss of framework or contents. The Cavaliere estimates the cost of lowering the lake's level at 250,000 lire (10,000*l.*), and promises to secure thereby not only the barges themselves uninjured, but whatever objects of interest and value may be found in their keeping. Once placed high and dry the barges could be so studied and rehabilitated as to minimise the risks of their more minute exploration and ultimate transport to one or other of the archaeological museums. Whether this study and rehabilitation would best be carried out on the barges left *in situ*, or moved to a convenient place on the bank, the Cavaliere Malfatti reserves for subsequent consideration. Meanwhile, if his draining or pumping operations are fairly started, it will be curious to note whether he has not underestimated their difficulty. Lake Fucino for centuries defied all such attempts to dry it out of existence, and the millionaire, Prince Torlonia, succeeded only after it had long become a proverb that "Torlonia would drain Fucino, or Fucino would drain Torlonia."

### SALISBURY CATHEDRAL.

AT a committee meeting of the Dean and Chapter of Salisbury and the leading laity in the diocese recently held at the Deanery it was resolved that no time be lost in placing before the public the urgent need of further aid for the repair of the tower and spire of Salisbury Cathedral. The tower has been strengthened, under the direction of Sir Arthur Blomfield, in every way possible; the shattered stones are being replaced by others of a more durable nature, and the foundations have been carefully examined and restored. During the past twelve months every effort has been made in the locality to raise the sum required, viz. 15,000*l.*, to carry out the restoration in its entirety, and Sir Arthur Blomfield gives assurance that he does not anticipate that his original estimate will be exceeded, and that the actual expenditure has come within the calculations made for the work actually dealt with up to the present. The sum of nearly 10,000*l.* has been raised, and the committee are now confronted with the difficulty that it is practically impossible to raise the further sum required in the diocese, which it is well known has acutely suffered from continued agricultural depression in the south-west of England. Considering the national interest evinced in the cathedral and its spire, the committee feel that the time has come when they may reasonably appeal to the public at large to help them to secure the balance of 5,000*l.* which is required to render the tower and spire safe for future generations and to preserve in its integrity this beautiful example of cathedral architecture.



### Celtic Interlaced Ornament.

SIR,—I have read the article in your issue of January 1 on this subject by the author of "Charles Lowder" with considerable interest, and I am glad that the importance of Mr. Cooke Trench's theories on the true method of setting out interlaced work is beginning to be appreciated. I think, however, that, in fairness to me, the author of the article should have stated, what is most courteously acknowledged by Mr. Cooke Trench in his paper in the "Journal of the County Kildare Archaeological Society" (vol. i. 1894, p. 240), namely, that I had independently arrived at the same conclusion as he had.

My opinion that the most common varieties of Celtic knotwork were derived from plain plaitwork by introducing breaks at intervals (as explained in the article in last week's *Architect*) was clearly expressed in a paper on the subject published as far back as 1883 in the "Proceedings of the Society of Antiquaries of Scotland" (vol. xvii. p. 236), and further enlarged upon in papers on the "Cylindrical Pillar at Llantwit Major, Glamorganshire" ("Archæologia Cambrensis" for 1889, p. 317); "The Cross of Eudon at Golden Grove, Carmarthenshire" (*Ibid.* for 1893, p. 48); and on the "Early Sculptured Stones of the West Riding of Yorkshire" ("Journal of the British Archaeological Association" for 1890, p. 301).

It is satisfactory to find that two persons working at the problem from entirely different sides—the one analysing ancient examples, and the other endeavouring to find out how to design new patterns—should quite independently have reached the same conclusion. I need only add that in the work on the "Early Christian Monuments of Scotland," which is now in the press for the Society of Antiquaries of Scotland, I have treated exhaustively the whole question of the evolution of the more elaborate forms of interlaced work from a simple plait.—I remain, yours truly,

J. ROMILLY ALLEN, F.S.A.

28 Great Ormond Street, London, W.C.

### GENERAL.

**Professor Kernot** has been re-elected dean of the faculty of engineering in the University of Melbourne.

**Mr. John Finnie** has resigned the head-mastership of the Liverpool School of Art, which he has held for about forty years.

**The Paris Municipal Council** have voted 41,000 frs. for the erection of a monument in Père-Lachaise which is to mark the burial-place of the municipal workmen. It will be designed by M. Duprez, architect, and the sculpture will be the work of M. Denys Puech.

**M. Hébert**, the French painter, whose *Peasants of Chevannes* was reproduced in *The Architect*, has been raised to the dignity of Grand Officer of the Legion of Honour, the highest attainable.

**Mr. Joseph Griggs**, first mayor of Loughborough, has offered to erect a technical institute and public baths at Loughborough in commemoration of the Queen's reign. The offer has been accepted by the Council.

**The Fiftieth Anniversary** of the French School in Athens is to be celebrated on April 20 by a performance of "Edipe Roi," an adaptation from Sophocles, in the theatre of Bacchus, at the foot of the Acropolis, by actors from the Théâtre Français, who will be sent to the Greek capital at a cost of 1,000*l.*

**The Statue** of the late John Bright, by Mr. A. Gilbert, R.A., was removed on Tuesday from the outer lobby of the House of Commons by order of the First Commissioner of Works.

**The Opéra Comique** in Paris, when completed, is to be decorated by able artists. The cupola is to be entrusted to M. Benjamin-Constant, and the grand staircase to MM. Luc-Olivier Merson and Flameng. A special commission will shortly arrange for the remaining works.

**The Applied Art Section** of the Society of Arts will begin meeting on the 26th, when a paper on "The Artistic Treatment of Heraldry" will be read by Mr. W. H. St. John Hope, M.A. At subsequent meetings the following papers will be read:—"Lithography as a Mode of Artistic Expression," by Mr. George McCulloch; "Gesso," by Mr. Matthew Webb; "Lead-work," by Mr. W. R. Lethaby; "Delft Ware," by Dr. J. W. L. Glaisher, F.R.S.; "A Half Century of Line Engraving, 1780-1830," by Mr. George Chulow.

**The Plans** sent in by Mr. J. H. Swainson, Wrexham, for the new church to be called St. Peter's, and to be erected at Rhosrobin, in the parish of Rhosddu, a suburb of Wrexham, have been adopted by the building committee.



# The Architect.

## THE WEEK.

WE publish the "specification" prepared by the Society for the Protection of Ancient Buildings, at the request of the Society of Antiquaries, to show how the northern gable and its supporting arch at Peterborough Cathedral can be repaired without adopting the method approved by the Dean and Chapter. When it is remembered how many able architects are members of the Society of Antiquaries, it was somewhat undignified to shirk the duty of devising a scheme of reparation for which the Society would be responsible and to commit the task to others. When the Society for the Protection of Ancient Buildings undertook the task, it is to be regretted that the preparation of the specification was not entrusted to members who have had as much experience with restoration, or with masonry construction and underpinning, as Mr. PEARSON and Sir A. BLOMFIELD. The multitude of letters and articles on the subject of the restoration suggest that the victory is not to be gained by means of written or printed arguments, which in such a case are futile. What is desirable is to ascertain on which side will men possessing most experience be found. For that reason we recommended at the beginning that the Dean and Chapter should seek the judgment of one or two prominent engineers (as was done formerly at Lincoln Cathedral), who would consider the proposals without any bias of sentiment, and therefore free from what easily perverts the judgment. Or a committee of independent architects could be consulted. The controversy appears to be as far as ever from an end, and no doubt it will continue until Parliament meets and the columns of newspapers will be occupied with subjects that are not archæological. But up to the present no impartial judge has appeared, for those who have joined in the conflict could not take a different side without being exposed to a charge of inconsistency. The Dean and Chapter are responsible for the safety of the building, at least in theory, and it would be difficult for a higher authority to interfere with their privileges; but there never was a building case in which it was more advisable for a Government to interfere and nominate a committee of inquiry than the "Preservation of the Western Front of Peterborough Cathedral."

THE difference between misfeasance and nonfeasance was exemplified in the Court of Appeal on Tuesday. The plaintiff owned houses in Peter Street, Workington, which were damaged through being flooded by sewers which were constructed by the Corporation of the town. In the assumption that by the Public Health Act of 1875 the Corporation were liable for any neglect of duty imposed on them by that Act, plaintiff sought to recover damages from them. The action was tried by Mr. Justice CAVE, who nonsuited the plaintiff because his lordship held there was no evidence of misfeasance, while for the nonfeasance the remedy provided by the Act was either an application to the Local Government Board or to the courts for a writ of mandamus. The plaintiff applied for a new trial. The Master of the Rolls and the Lords Justices held that section 299 of the Public Health Act provided the only remedy in cases of nonfeasance, which was an application to the Local Government Board or to the courts for a mandamus. There was no remedy for misfeasance. In other words, it is not penal under the Public Health Act to construct sewers of inadequate dimensions, but a neglect to construct them, whether adequate or inadequate, makes a local authority liable to a mandamus or an intimation from the Local Government Board.

THE decision given by Lord Justice CHITTY in *LIST v. THARP* on Wednesday is important to speculative builders and others in London, as it proves that the privileges, as well as the responsibilities, attached to the ownership or tenancy of a site may commence before the deeds, conveyances or leases are completed. The case in question arose out of a simple cause—a neglect on the part of the defendant to give a notice relating to a party wall or party fence wall to the plaintiff, or, in other words, did not recognise him as an adjoining owner. The plaintiff had entered into an agree-

ment with Sir CHARLES OPPENHEIMER in December 1894, for the demise of property held under the Commissioners of Woods and Forests, the rent being 550*l.* It was agreed that buildings of the value of 100,000*l.* were to be erected, and the production of a certificate of their completion from the Surveyor of the Commissioners was to be a condition precedent to the granting of the lease. When the buildings were near completion the defendant, who wished to have some works executed in connection with the wall, in February 1896, served notices on Sir C. OPPENHEIMER, but ignored the plaintiff. An *ex parte* interim injunction was applied for and obtained by the plaintiff (although a lease was not granted until August, 1896), to restrain the defendant as building owner from interfering with the wall. It was now sought to continue the injunction until the case was tried. Lord Justice CHITTY held that a man is not the less in possession because as between himself and the person from whom he receives it he is under a contractual obligation to use the property for some particular purpose, as, for instance, when he is under a covenant to use a house for the purpose of a private dwelling-house only. The plaintiff, after his entry on the land, was in possession as between himself and Sir C. OPPENHEIMER, although he was bound by the contract as to the user of the land. As against strangers he had all the ordinary rights and remedies incidental to possession. His lordship, therefore, approved of the continuation of the injunction, but declined to consider what was the character of the wall in question, whether it was a party wall or a party fence wall.

ON Wednesday a meeting was held at Mercers' Hall, to receive a report of a special committee appointed to inquire into the expenditure of the Central College of the City and Guilds of London Institute. The inquiry arose out of a pamphlet with the title "Is the Central College a Failure?" The special committee appointed sub-committees, whose reports were adopted. It was stated that in the opinion of the committee the governors possess in the Central Technical College an institution which has well and economically carried out the objects for which it was founded, which objects are deserving of every support and encouragement that the Corporation and City Companies of London can give them. The expenditure of the college for 1895, which includes a sum of 502*l.* for apparatus and books, was 11,682*l.*, and the receipts from students 4,933*l.*, making the net cost to the Institute 6,689*l.*, which compared favourably not only with the original estimate, but with the four years preceding. The original estimate of the gross cost per student was 75*l.* During the past two financial years, taken together, with 210 students, the gross cost, excluding board and lodging, was 54*l.*, and the net cost 31*l.* These figures are lower than the cost at Coopers Hill, the Royal College of Science, the Massachusetts Institute, the Cornell University, Johns Hopkins University, McGill University (applied science), similar institutions in Germany and at the Zurich Polytechnic. There are four professors who receive 1,000*l.* a year without any share of students' fees, which the committee consider is by no means excessive. On the contrary, if their position is compared with that of professors in the older universities, in the Royal College of Science and in some of the provincial colleges, it is found that several of the professors in other institutions are more highly remunerated and enjoy at the same time a larger measure of liberty. At Liverpool the payment to the professor of physics for the year 1894-95 was 1,177*l.* 16*s.* 7*d.*, to the professor of engineering, 1,039*l.* 17*s.* 7*d.* At University College, London, the payment to the professor of chemistry for the same year was 1,100*l.* 13*s.* 4*d.* At Owens College, Manchester, the professor of mathematics received 1,048*l.* 6*s.* 8*d.*, the professor of chemistry 1,220*l.* 13*s.* 8*d.*, the professor of physics 909*l.* 9*s.* 8*d.*, and the professor of engineering 916*l.* 11*s.* 8*d.* At the Royal College of Science the emoluments of the professors of mechanics, chemistry, physics and geology range from 600*l.* to 1,000*l.*, with a retiring pension, but they may also receive additional fees for the annual examinations of the Science and Art Department. At the Scotch Universities the salaries of the science professors are considerably higher. At the meeting on Wednesday it was decided to receive and circulate the report as being satisfactory to the Institute.



## THE LEIGHTON EXHIBITION.—II.

THE three works in the exhibition of the Royal Academy which belong to the year 1872 differ in character. *After Vespers* is a figure of a girl in an Italian church holding a rosary in her right hand. She is somewhat listless in appearance, and apparently was only a model employed to enable LEIGHTON to paint a beautiful dress of green brocade. The colour pleased him. Costume was occupying his attention at the time, for the design for his first lunette at South Kensington, *The Industrial Arts as applied to War*, also belongs to 1872. It must be admitted that the artist, however skilful in composition, was not as successful as was anticipated in his colour scheme for so many figures. The picture itself is therefore disappointing, but the design which is in the Academy is one of LEIGHTON'S noblest works. There is not one figure which is unsatisfactory, and, although subservient to restraint as becomes a piece of decoration, the groups are suggestive of the animation which might be supposed in an Italian city when war was imminent, which was not unusual. Of course, there is idealising throughout. There is no suggestion of controlling power, for the youthful warriors are all in common inspired by patriotism. Disciplined veterans are also absent, as well as soldiers who are drawn from the ranks of labour. All might be said to be representatives of a patrician class; all are lithe and slim and flexible. Their attitudinising is consequently not unnatural. In many points the design recalls MACLISE'S chivalric compositions, but LEIGHTON was less acquainted with the anatomy of the human figure, or considered smooth surfaces were better suited in decorative pictures. The *Summer Moon* is another piece of decoration in which a circular opening or unglazed window in a building is combined with figures of two girls with clasped hands, who are asleep in front of it. The painting suggests LEIGHTON'S ability to adapt figures to any kind of space.

The work of 1873 is not unlike that of 1872. *The Industrial Arts as applied to Peace*, of which the finished work is also in South Kensington, is inspired apparently by the belief that as women are to be admired they are most fittingly employed when endeavouring to make themselves attractive. The central compartment is, therefore, a dressing-room. It is open in front to a canal, river, or seashore, but the boatmen who carry wares to the women, although they have eyes, are not supposed to see. Spectators appeared to be disagreeable elements to LEIGHTON, and he either ignored them or treated them as if they would not look at his charming figures. *Moretta* is another girl in a green dress, and *Weaving the Wreath* shows a child, who wears a garland of leaves, seated in front of a bas-relief and engaged in weaving one for a companion in a spectacle. The picture is small, but from the simplicity and naturalness of the subject and the excellence of the workmanship it will be preferred by many visitors to some of the larger canvases. The companion, *Study*, produced in 1877, is a still more delightful cabinet picture. The little girl who finds it is possible to be tired with the contemplation of pictures was never surpassed by MILLAIS or REYNOLDS. The pink-flowered robe, inlaid book-stand, dark unglazed blue tiles, which are marvels of softness, and luxurious carpets, are painted with extraordinary care, and seem to enhance the beauty of the child's face. She is seen again, but a little older, in *Kittens*. The *Antique Juggling Girl*, of 1874, presents a nude figure tossing balls in front of a narrow strip of curtain with delicate bordering, while on the ground are a sword, vase and other "properties." The curtain is of a pale yellow, and consequently there is no such contrast between it and the figure as would be inevitable if the luxuriant peach trees of the background were not screened. Another work of 1874, the *Moorish Garden*, a *Dream of Granada*, reveals LEIGHTON under a new aspect, and from its beauty is enough to excite a doubt whether he would not have been more successful if he devoted himself to the "Arabian Nights" than to Greek mythology. The scene is a vision of cypresses, leafy arches, land and water in one of those "high-walled gardens, green and old," which were created as if to anticipate the Mussulman's paradise. Eastern influence is also seen in the *Slinger* standing on his raised platform, the interior of the *Grand Mosque of Damascus*, the artist's most elaborate painting of architectural work, and the *Little Fatima*, which belong to 1875.

In 1876, however, the *Daphnephoria* proved that LEIGHTON'S allegiance was again faithful to ancient Greece. That procession is comparable to the one which KEATS has described in "Endymion," and both painter and poet have imparted life to traditions with a success which archæologists must envy. The *Daphnephoria* is alone sufficient to form an exhibition, and the opportunities to see it should always be seized. Among the Greek scenes it holds the foremost place, and by a coincidence it was accompanied by the painter's masterpiece in portraiture, his *Sir Richard Burton*. The principal work of 1877 was the *Athlete struggling with a Python*, of which an excellent cast is in the Academy. The athlete is a type of the majority of LEIGHTON'S figures, agile and vigorous, but slight. The *Music Lesson* is an Eastern scene—one girl teaching another to play on a stringed instrument. The seat on which they rest is so high that their feet do not touch the ground, and those of the elder girl are so close together as to appear a deformity when seen at a distance. The paintings which were produced in subsequent years suggest that LEIGHTON rarely cared to depict costume that could be called Eastern. Although the robes were worn by men and women who were supposed to be Greeks, there was no archæological exactness in the forms. LEIGHTON could paint the nude, but for the sake of contrast he preferred to employ a vesture which suggested rather than concealed the form. The *Nymph of the Dargle*, an Irish inspiration, was originally called *Crenaia*, an adaptation apparently of the name of the Irish girl (NORA CREINA) whose dress corresponded with the artist's idea of what should be worn by womankind, and which FATHER PROUT pleasantly describes:

Nōte tunicam præferres  
Plante zephyrō volantem;  
Oculis et raptis erres  
Contemplando ambulātem  
Veste Norā tam decorā  
Semper indui memento,  
Semper puræ sic naturæ  
Ibis tecta vestimento.

Wherever she originated, *Crenaia* makes a prettier picture than *Iosephane*, who is clad in a greenish-yellow drapery, and has marble columns for a background. Green is also the colour of the robe of the elder girl in a *Sister's Kiss*, a simple subject but made charming by art. For a few years LEIGHTON was contented to paint pictures that were no less free from passion or fervour, and single figures, *Whispers*, *Idyll*, *Bianca*, *Day Dreams*, *Vestal*, and *Kittens* are examples. Any or all of them might be hung in a bishop's house without offending the most fastidious censor. In 1884 was produced the *Cymon and Iphigenia*, which surpasses all known versions of the subject. The official description is accurate when it says: "IPHIGENIA in white drapery is lying asleep under the shade of a large tree with her arms above her head; several attendants asleep near her; on the right the figure of CYMON in red drapery gazing down at her; sea in the distance, with the moon rising." The elements of the picture are inventoried, but the words cannot suggest the beauty which seems to emanate from all parts of the canvas. The quality is so genuine, it is natural to suppose it must, like all earthly beauty, be only evanescent. For that reason this picture and the other tribute to sleep, *Summer Slumber*—the last of LEIGHTON'S masterpieces—will, we trust, be treated reverently by time and fate.

The President's work of 1885 is one portrait, and for 1886 the statue of the *Sluggard* and a statuette, *Needless Alarms*, a girl looking over her shoulder at a frog. The *Jealousy of Simoetha the Sorceress*, a rather wicked-looking woman dressed in pale orange and white, with her head turned aside as if gazing at some unpleasing spectacle, and the *Last Watch of Hero*, who is gazing sadly from a window, were the paintings of 1887. The year 1888 is memorable by the production of *Captive Andromache*, which in size comes after the *Cimabue's Madonna* and the *Daphnephoria*. When exhibited, it was hung in the place now occupied by the *Procession*, and we imagine it looked better in its former than in its present position. It continues to be one of the painfulest of pictures, for it brings before us the cruelty of the heroic age, and yet a worse scene might be painted from the woes which were imagined by HECTOR for his wife. LEIGHTON had not much



data to inspire him. All that the diffuse CHAPMAN could make out of HECTOR's vision was the following:—

When some rude Greek shall lead thee weeping hence,  
These free days clouded, and a night of captive violence  
Loading thy temples, out of which thine eyes must never see,  
But spin the Greek wives' webs of task, and their fetch-water be  
To Argos, from Messeides' or clear Hyperia's spring;  
Which howsoever thou abhor'st, Fate's such a shrewish thing,  
She will be mistress; whose cursed hands, when they shall crush  
out cries

From thy oppressions (being beheld by other enemies),  
Thus they will nourish thy extremes: "This dame was Hector's wife,  
A man that at the wars of Troy did breathe the worthiest life  
Of all their army."

The picture raises a point in what may be called the ethics of art. HECTOR anticipated that his wife was soon to experience the usual fate of women who were spoils of war. But when ANDROMACHE fell into the hands of the rugged but youthful PYRRHUS she was treated as a princess, and subsequently she became the wife of the priest HELENUS, her brother-in-law. ANDROMACHE was not probably honoured by flatteries like those which RACINE puts into the mouth of PYRRHUS, and which in the English version recalled to Sir ROGER DE COVERLEY his own manner of trying to persuade the perverse widow. The Frenchman, however, although he supposes she was a coquette, may have come nearer the conduct of the Greeks than the painter. They were finer gentlemen than those in the court of LOUIS XIV., and as such could be respectful to fallen greatness. It is no evidence of either scholarship or insight to make them out savages. The appointment of a professor of ancient history in the Academy was intended as a means to prevent such exaggerations. Mr. GLADSTONE, who holds the office, may approve of the treatment to which ANDROMACHE is subjected in the picture, but no foreign Academician would hazard that sort of interpretation. Whether LEIGHTON was correct or not, he produced a most impressive scene. The sudden stoppage of ANDROMACHE on seeing a group of a young mother and her child that recalled happy days in Troy, and the neglect to press forward to the well, is admirable. She almost appears to shiver. The rather boisterous women who draw water are useful as contrasts, but there is a little too much of the London working-men about the fellows who pass along the road and point at the captive. The figures appear too scattered, but that effect is owing mainly to the colouring.

A sort of priestess in white with her arms elevated, *Invocation*, and a *Sibyl* that appears attenuated if compared with the muscular women of the Sistine, were exhibited in 1889. A thought-worn *Tragic Poetess* with numerous scrolls beside her, a nude figure standing in front of dark purple curtains, called the *Bath of Psyche*, and a girl leaning against a column in the *Marble Hall* are the works of 1890. In 1891 the *Return of Persephone* appeared so expressive of joy at the meeting of mother and daughter that the shortcomings of the figures were not noticed. The *Perseus and Andromeda* gave opportunity for creating a monster that is not without originality. It is not so terrible as the unsurpassed dragon which is seen in TURNER'S picture in the National Gallery, but it differs from those seen in most ancient and modern pictures of the subject, as it is not ridiculous, and it seems to overshadow the girl like a pall. But by placing PERSEUS in the sky, from where he can send arrows at his ease, for he is safe from a scratch, he is made to appear less courageous than befits a hero. The light and shade in this picture indicated an advance beyond its predecessors. In the *Garden of the Hesperides*, painted in 1892, that quality is again manifest, but with such unprecedented force in the colouring, we seem to have before us some torrid region where serpents assume dazzling colours. The *Clytie*, of 1892, is a landscape or cloudscape, with the figure of the girl in adoration kneeling beside a column bearing a figure of the sun-god. Some painters adhere to the CLAUDE tradition, and profess to give away gratuitously such figures to the purchaser of the landscape. LEIGHTON had a remarkable prepossession for his first thoughts, as if they were divinely inspired. The small figure was afterwards enlarged, and depicted unaltered as the *Clytie* of 1896. He acted wisely in again presenting it to the world. LEIGHTON'S occasional weakness in colour is manifest in *And the Sea gave up the Dead which were in it*. The

painting is less effective than the cartoon, which was reproduced in *The Architect*. If durability was desired for the design it should have been as a relief. In marble or bronze the difficulties inherent in the subject would not be so obtrusive.

There are four works belonging to 1893 and all successful. In *Hit*, the artist contrasted flesh with flesh, a wood in the back serving as a foil to the two figures, one a child who is receiving a lesson in archery from a youth. *Corinna of Tanagra* is seen crowned with laurel and resting her hands on one of those ancient lyres which were difficult to carry. As *Atalanta* is no more than a bust, there can be no certainty whether the figure represents the racing girl. *Farewell* is a girl whose expression is sad, standing on a terrace near the sea. *Fatidica* suggests a Greek PORTIA, and is a girl in white drapery seated near a silver tripod. The *Spirit of the Summit* is also cold in colour. The *Bracelet* represents a girl in light-coloured drapery, and evidently in 1894 LEIGHTON avoided rich colouring. The following year he was in another mood, of which the orange-robed *Flaming June* and the *Twixt Hope and Fear*, a girl in dark green and white, are evidence. The four unfinished figures, exhibited in 1896, indicate that they were also to be experiments in colour.

There are many more works in the Academy Exhibition which have unusual interest. The water-colour *Algerine Girl*, although it could be painted on a lady's visiting card, is as characteristic of LEIGHTON as any of his large single figures. The studies are also more suggestive of preparatory work than those we lately noticed. There are also sketches for works which are not found in the exhibition, such as the brilliant one for the fresco of the *Wise and Foolish Virgins* in Lyndhurst Church, which was copied in *The Architect*; the sketch of *Music*, a fine decorative frieze in a house in Mayfair; vigorous landscape sketches, and architectural sketches such as the *Doorway, North Aisle of St. Mark's, Venice*, the *Erechtheum*, &c. One advantage of the exhibition is that it will dispel the notions about the facility with which Lord LEIGHTON produced pictures. It is made evident that he went through as much toil as any ordinary artist. Even his landscape backgrounds appear to have been derived from nature. The pictures by themselves are evidence of extraordinary industry as well as of power, but when supplemented by the statues and studies, the collection forms a life-work that has been rarely surpassed in quantity or in quality.

## CHARACTERISTICS OF SOME GREAT LONDON THOROUGHFARES.—III.

[BY A CORRESPONDENT.]

THE approaches to London from the west are much more familiar to a large number of its inhabitants than the roads at the east end. So it may be of interest to make a few observations in this direction, beginning at Bow, otherwise called St. Mary Stratford-le-Bow, the parish church of which has been lately threatened with demolition. It is, by the way, somewhat remarkable that in the case of two well-known churches in London, viz. St. Mary-le-Bow, Cheapside,\* and Allhallows, Barking, their designations are so much like those of parish churches a very few miles further east—at Bow, which is often overshadowed in its importance by its great neighbour, Stratford; and at Barking, Essex, where the outfall of the main drainage system of London is situated. It would be curious to inquire what is the proportional number of people living in this great city who have seen *Peterborough* Cathedral, as compared with those who know the venerable old church at Bow. For WREN'S noble church in Cheapside is familiarly termed Bow Church. The former is not one of those buildings in "a hole and corner," for there it stands surrounded by a diminutive graveyard, with its trees, a landmark to all passers-by, an object that the most unobservant could not possibly help seeing. Maybe, the churchyard was originally larger, and there was not a highway on

\* To the further confusion of many, the mother church of a great London parish is called St. Marylebone, or, more correctly, St. Mary-le-Bone.



both sides of it as now, but only on one side. Unfortunately, this structure has become very dilapidated, and, notwithstanding its archaeological interest, the grey old stone tower, with the brick nave and chancel, "block the road" and are "in the way," or, as the omnibus-driver naively told the writer, "the building is of no use, being out of repair." Now, quite independent of any theological or antiquarian reasons, which ought certainly to have great weight, the writer maintains that this church is a great and distinct characteristic of an important London thoroughfare. If swept away, a prominent feature visible a long way off from the west, and also conspicuous as approached from the east, would be lost for all time. It is absurd to say the exigencies of the traffic demand the removal of this historic building, for the road on either side of it is of fair width. It is sincerely to be hoped that a determined effort will be made, and successfully made too, to ward off this threatened act of most unnecessary Vandalism. If those people in London who, with imperfect knowledge of the facts, are endeavouring to thwart the praiseworthy efforts of the Dean and Chapter of Peterborough, would turn their attention much nearer home and save Bow Church from destruction, they would be better serving public interests. Before quitting the subject of Bow, it is worth drawing attention to the remarkable and, it is believed, unique sign of the tavern a little to the east of the church, *i.e.* the Bombay Crab, where the London General omnibuses finish their journey. On inquiry there appeared to be one or two versions of the origin of the sign, but it is evident that it must have some connection with shipping, this hostelry being not far from some of the docks. The ancient church, viewed from this point, looking westwards up the rising road, is quite a picturesque object, which could be ill-spared. May that sad fate never happen to it is the fervent wish of the writer, and of many, many others, he is convinced!

Though the Mile End Road cannot be said to possess the beauty of some other great highways leading into London, such as that from Hammersmith and then on to Piccadilly, it yet has its own peculiar elements of interest, and when the young trees which the authorities have wisely planted along it have grown larger, the dull monotony of so many yards of "brick and mortar" will be much relieved. Moreover, the trees will have a great advantage denied to them in roads in more pleasant localities, *i.e.* that of abundant space around them in which to air their branches. In truth, the ample width of the road and the very liberal allowance of footway, with plenty of room to spare, is quite a characteristic nearly all the way from Bow Church up to Aldgate. Though the road is slightly narrower in some places than in others, this, in point of effect to the eye, is better than if it had been more equable. Moreover, though it cannot be said that as a rule there is any beauty in the houses and other ordinary buildings along this route, they are of no great height, and this added to the broad road and footpaths gives an appearance of light and air and spaciousness quite foreign to many other large thoroughfares some way off from the centre of the Metropolis. The quiet and simple-looking though effective modern red brick church of St. Benet, in the Mile End Road (on the north side), is in strong contrast to the immense graveyard adjoining it, with its hundreds of white-looking stone ledger tombs, for none appear to be of the more usual character. Though the great brewery, also on the north side of this thoroughfare, has a modern appearance, it is yet on the site of a much older building devoted to the same purpose for satisfying the thirst of the inner man, and, though not beautiful, has a quaintness and absence of the commonplace which has always impressed the writer. This is caused by the curious-looking iron "flying bridges" and the kind of "flying buttress" structures of the same material so conspicuous in the higher part of the buildings, a part of the mechanism of the brewer's trade. The transmutation of the floor-cloth factory at Knightsbridge, nearly opposite the Horse Guards Barracks, has always been regretted by the writer. For, plain and "stuccoed" as it was, there was a massing in its parts and an evident adaptation to the requirements of the manufacturer based on the true spirit of the Middle Ages, though the architectural character was Italian in style. That portion of the building nearest the high road has been pulled down and reconstructed for quite another purpose,

and it is not easy now to realise how very different its appearance was before it was so considerably altered. There is another factory at Wandsworth, near the Thames, a prominent object as seen from near Clapham Junction Station, which, though only of stock-bricks and without any architectural pretensions whatever, has a distinct though faint resemblance to a Mediæval cruciform church with central tower and flying buttress therefrom. Of course, it is not pretended to say that any person would mistake it for anything else but what it was built for, but there is a certain element of picturesqueness in it which is lacking in some more pretentious and less matter-of-fact structures. But to return to the Mile End Road, its north side possesses, of course, something of greater archaeological interest than anything yet mentioned, *viz.* the old almshouses recently threatened with destruction, but now, it is believed, practically safe. Not far from these are other buildings of the same character, but not so venerable. Then there is the People's Palace, which it would be a matter of superfluity to comment upon here, being so well known. "Variety is charming," it is said, and there is plenty of it in this road in the way of public edifices, most of them being on the north side, except the great hospitals on the south. Though no half-timbered houses remain in this thoroughfare, there are others of somewhat later date, but not exactly picturesque, as they are covered with plain weather-boarding. One of the quaintest survivals of the "olden times" is the Vine Tavern, also on the north side, standing on the broad open space between the road and the houses, and quite detached, looking every inch a trespasser on land which ought clearly never to have been built upon.

The fine modern church of St. Mary Matfelon, White-chapel, is admirably placed so as to be well visible, as was the older one on its site. It rarely happens that an architect who passed away before attaining middle age is called upon to rebuild, owing to fire, a church erected so short a time before, as happened to the late ERNEST C. LEE. A relic of older London remains in the row of butchers' shops on the south side of Aldgate, and probably the majority of people would far prefer to see these rough-looking shops swept away, and the business carried on in a less prominent situation. But though to most minds the exhibition of the complete specimens of dissected oxen, sheep, &c., is not a pleasing one, the houses themselves, with the irregular lean-to sheds in front where the sale of the meat is carried on, are old and have quite a different character to the spick-and-span "places of business" of the "purveyors of meat" in more fashionable neighbourhoods. This gives them some element of picturesqueness. What a complete change takes place in the character of the thoroughfare and shops, &c., when Leadenhall Street is reached, as compared with the wide road which has existed all the way from Bow Church!

The writer has commented at some length on this eastern route out of London because, though comparatively level and nearly straight, conditions which militate against one of the elements that make a pleasing impression on the traveller, there is, on the other hand, a good deal of variety. In the country roads and lanes of some parts of this favoured land there are frequent strips of turf on either side, of varying width, such as utilitarians consider great waste of productive soil that ought to have been enclosed and rendered arable. Within about the twelve mile radius, on the outskirts of Epping Forest, such delightful little bits of greenery can be seen. Now the practical lesson which it is desired to teach from the examples just given is that not only is it a mistake to plan new streets as straight as if one were driving them with a gimlet, but that even where they are on a curve, like Shaftesbury Avenue and Charing Cross Road, the monotony of the two parallel enclosing lines should be varied by an occasional expansion where the thoroughfare is of considerable length, in some such manner as Waterloo Place. Both Victoria Street and Queen Victoria Street are monotonous and formal-looking in their long unbroken stretches, though in the case of the latter there is a change in the axis near where it crosses Cannon Street.

A stranger not familiar with London, in studying its map, would be sure to observe the marked continuous line of road from east to west, extending from Bow to Shepherd's Bush, or, to call it by the modern phraseology, Shepherd's



Bush Green. But the largest amount of traffic into London on its westward side is not by the Uxbridge Road and Notting Hill, along the north side of Kensington Gardens and Hyde Park. For, from sufficient reasons, the more important approach is that on the south side of the before-mentioned parks. There is probably no more beautiful road into the heart of the great Metropolis than that commencing at the Broadway, Hammersmith, with its gentle windings and easy gradients, the first glimpse of the tower and spire of St. Mary Abbotts' Church showing forth as if set in a wood as the Addison Road Station Bridge is reached. This effect tends to deceive a stranger, and is caused by the fine trees on the south side of Holland Park and by the winding of the high road. Yet the site of this important parish church is by no means an ideal one, having several drawbacks, being only open on two sides to streets, and is much shut in on the north and west. On the other hand, it is remarkable how a distant peep of the elegant spire is somewhat unexpectedly found out when about opposite the Knightsbridge Barracks. Shortly afterwards the upper part of the Albert Memorial is seen, but, though much further off and on rather lower ground, the Kensington spire is the first sighted, proving the truth that the *scale* of great buildings is a telling factor. They are not intended to be only looked at, like dolls'-houses, close to the spectator. Continuing the remarks about St. Mary Abbotts' spire, as observed from the main road, travelling west, the contour of the ground does not allow of more than the brief glance mentioned, and then nothing more is seen of the church till the threshold of the "Royal Court Suburb," as the house agents sometimes grandiloquently call it, is neared.

In concluding these observations on some of our great London thoroughfares, the writer hopes that, although he has been unable, necessarily, to avoid sometimes repeating what others may have better expressed when treating of this subject, yet he may have thrown new light in some cases on what was either obscured before or had not been noticed.

### THE ROLLS CHAPEL.\*

THE building recently known as the Rolls Chapel was originally the chapel of the House of Converts, which was founded by Henry III. for the reception of Jews who had embraced the Christian faith. The annals of that establishment offer various points of interest, but in the present report I propose to deal with those facts only which concern the chapel.

The earliest specific reference to the House of Converts occurs in a royal charter dated January 16, 1232, by which the founder assigned a yearly sum of 700 marks for the maintenance of the inmates, "and for the construction of their church and their buildings." Three months later he made provision for two chaplains celebrating divine service in the chapel which he had caused to be erected (*erigi*) for the use of the converts, which implies that the building was at any rate begun.

Matthew Paris, the chronicler of St. Albans, states that Henry III., about November in the seventeenth year of his reign, 1233, built at his own expense "a certain church proper and sufficient for a conventual congregation with some adjoining buildings" at the place where he established the House of Converts in London, not far from the Old Temple. Opposite to this passage there is in the margin of the MS. at Corpus Christi College, Cambridge, a coloured drawing of a small church, which has been supposed to be an actual representation of the chapel of the House of Converts as it existed between 1233 and 1259, the year of the chronicler's death. It certainly corresponds with the building in question in so far as it shows a nave of three bays, with a square turret projecting southward at the eastern end of it, and a short chancel with lancet windows, but other details have evidently been supplied from memory or from imagination. It should, moreover, be observed that the drawing near the corresponding passage in the shorter chronicle of Matthew Paris, preserved in the British Museum, is somewhat different. Furthermore, the architectural evidence throws some doubt upon the theory that the turret was part of the original fabric.

The original design of the chapel appears to have been altered as early as 1275, for in that year Edward I. authorised John de St. Denys, keeper of the House of Converts, to take stone from the side aisles of their chapel of the Holy Trinity, in order to extend the body thereof lengthways (*linealiter*). The

light of the Holy Trinity in the chapel of the Converts is mentioned in the will of one of the chaplains called Hugh de Convers, which was proved in 1274. The chapel, however, appears to have been dedicated to the Virgin Mary. Edward I., Edward II. and Edward III. alike made grants for the maintenance and adornment of the fabric.

Out of nine persons who were keepers of the House of Converts between 1307 and 1377 no less than eight were also keepers of the Rolls of Chancery, their secular services to the Crown being thus rewarded, in part at least, out of ecclesiastical revenues, and the arrangement proved so convenient that Edward III. in the last year of his reign definitely assigned the House of Converts to the clerk for the time being in charge of the Rolls of Chancery, granting the patronage of the offices thus amalgamated to the Chancellor of England or the Keeper of the Great Seal. His letters patent, dated 1377, recite that William de Burstall, the then keeper, had found the house, the chapel and other buildings in a ruinous state (*quasi totaliter in ruina*), and that he had spent a considerable amount of his own money in repairing them. This union of the two keeperships, so different in character, was at the request of Burstall and his successor confirmed in the following reign. Thenceforward the chapel of the House of Converts came to be known popularly as the Rolls Chapel.

Dr. John Yong, Master of the Rolls and Dean of York, who died in 1516, left directions in his will that his body should "be buried in the chapel of the Rollys," and "that a tombe" should "be made over the place of" his "sepulture." Richard Alington, of Lincoln's Inn, was buried in the chapel in 1561, his wife being a sister of Sir William Cordell, Master of the Rolls, and she was probably buried in the same vault in 1604. The next interment recorded is that of Edward, Lord Bruce of Kinloss, Master of the Rolls, who died in 1611. In that year his successor, Sir Edward Phelips, set up in the windows four panels of fine heraldic glass, and three more, uniform with them in size, were added in the later part of the seventeenth century. Marriages were sometimes performed in the chapel, as in 1608, when William Cavendish, afterwards Earl of Devonshire, married Christiana, daughter of Edward, Lord Bruce of Kinloss, Master of the Rolls, and in 1615, when Sir Julius Caesar, Master of the Rolls, married Mrs. Hungate, who was given away by her uncle, Sir Francis Bacon. The fact that a marriage between John Livingston and Mrs. Marwood took place at the Rolls in February 1619, goes far to discredit the oft-repeated statement that the chapel was being rebuilt at that time. For this statement there is no authority earlier than that of Thomas Pennant, who in his "Account of London," published in 1805, asserts that the Rolls Chapel "was built by Inigo Jones; begun in 1607, and finished at the expence of two thousand pounds," and proceeds to say that "it was consecrated by George Mountaigne, Bishop of London, and the sermon preached by the famous Doctor Donne." Inasmuch as Mountaigne did not become Bishop of London until September 1621, the alleged consecration could not have taken place any earlier, and the chapel would presumably have been unfit for use in February 1619. It is, however, practically certain that Pennant somehow confounded the Rolls Chapel with the neighbouring chapel of Lincoln's Inn, for every one of the five statements quoted above with regard to the former proves to be true with regard to the latter. The rebuilding of Lincoln's Inn Chapel was undertaken in 1617, "the consideration of a fit model" for it was "commended to Mr. Inditho Jones," the estimate came to upwards of 2,000*l.*, the new structure was consecrated by Mountaigne, Bishop of London, on Ascension Day 1623, and the sermon on that occasion was preached by Dr. Donne, Dean of St. Paul's. There is, in fact, no evidence whatever to connect Inigo Jones with the Rolls Chapel, and the episcopal registers of the time do not contain any allusion to the alleged consecration. That the building was to a great extent reconstructed in the seventeenth century is unquestionable, but the date of the work is probably forty or fifty years later than that erroneously assigned to it by Pennant.

The existence of two chaplains and of converts from Judaism, four in number, is mentioned for the last time in 1608, and in the reign of Charles I. we read of a preacher at the Rolls during the law term, admitted by the Master of the Rolls with the approbation of the six Clerks of Chancery. Although the converts, for whose benefit the chapel had been founded by Henry III., had ceased to exist, the Master of the Rolls did not obtain the exclusive use of it. In 1708 it was reported that the preacher received 10*l.* a term from the Master of the Rolls, and that the salary was made up to about 100*l.* a year by the Masters in Chancery. As late as the beginning of the present reign "the Masters, six Clerks, Registrars and other officers" of the Court of Chancery were entitled to seats in the Rolls Chapel on payment of fees amounting to about 49*l.* 2*s.* 8*d.* a year to the preacher, who also received rents for pews let "to persons not entitled to seats."

Under the Presbyterian régime, it was resolved by the lords and commons in Parliament, in December 1643, "that the Chappell of the Rolles, the two Serjeants Innes and the lower

\* From the appendix to the report of Mr. H. C. Maxwell-Lyte, Deputy Keeper of the Public Records.



Innes of Court shall be a Province of themselves," "that the Presbytery of the Chappell of the Rolls, the two Serjeants Innes and the fower Innes of Court shall be divided into two classis," and "that Lincolnes Inne, Grayes Inne and Serjeants Inne and (*sic*) Chancery Lane and the Rolls shall be one classis."

Almost immediately after the Restoration, the Master of the Rolls was empowered by Act of Parliament to grant leases of portions of his official estate; but "the Chappell of the Rolls" was specifically excepted from the scope of it, and there are indications elsewhere that it was regarded as national property.

At some time in the middle of the seventeenth century, the Rolls Chapel was seriously mutilated. No written record has been found showing the date or the nature of the work done, and we have to rely exclusively upon architectural evidence. From this it appears probable that the chancel was entirely demolished and a new wall built at the eastern end of the nave, that the other three walls were considerably altered, that a new roof was made over the nave, that most of the Mediæval windows and doors were blocked up, and that two or three monuments and four or five panels of heraldic glass were taken down and refixed.

Particulars will be given later in this report, but it may be desirable to suggest here that, if all these changes were made at one time, the date must be sought between 1648 and 1667. That it cannot be earlier than the middle of the seventeenth century seems clear from the general character of certain fragments of stone and marble which were used for filling up two of the windows on the south side. With a little trouble it has been found possible to put together several pieces of an oval shield, surrounded by scroll-work and stiff drapery, which bears the following arms:—On a chevron, between three annulets, a crescent, impaling on a saltire a rose; and this proves to be the shield of George Goring, Earl of Norwich, who married Mary, daughter of Edward Nevill, Lord Abergavenny. Inasmuch as both these persons were buried in Westminster Abbey, it is difficult to account for their arms being found at the Rolls Chapel, except upon the theory that the mason employed to fill up the windows supplemented the material which was ready to hand with useless fragments from his own workshop. However this may be, it is certain that the Countess of Norwich died in 1648 and the Earl in 1663, and so the former year appears to be the earliest possible date of the closing of the windows.

That the chancel had disappeared by 1667 is clear from Hollar's map of London, published in that year, which is confirmed by the larger map issued by Ogilby and Morgan ten years later. It may possibly have been injured in the Great Fire of London, and consequently demolished. A letter received at Claydon House on September 9, 1666, contains the following passage:—"Your friends in Chancery Lane are safe, but the fire was near them, behind the Rowles, where it gott a great check, so that we hope it is stopt." Among other premises which were either burned or pulled down at that time, mention is made of several tenements held by John Howe, gentleman, "situate in Fetter Lane, built upon part of the garden called the Rolls Garden;" a messuage held by Benjamin Hill, citizen and clockmaker, "built upon a parcell of ground, parcell of the garden called the Rolls Garden;" "four new houses," on the west side of Fetter Lane, "over against unto a certain stret called New Street," and extending westwards from 106 to 123 feet "to the wall of the said Rolls Garden;" and also the St. John's Head tavern in Chancery Lane, upon the estate of the Bishop of Chichester.

In this connection it may be mentioned that some fragments of wrought stonework not older than the fifteenth century, which were found in the walls of the chapel, show signs of having been exposed to the action of fire. At the same time it is clear from other fragments that the interior cannot have been burned, and Hollar's map, already mentioned, shows trees growing in the Rolls Garden. Furthermore, a date somewhat earlier than 1666 for the removal of the monuments is suggested by the fact that some hexameter lines in praise of Dr. Yong, which are given in Weaver's "Funeral Monuments," which was published in 1631, are not mentioned in the first edition of Dugdale's "Origines Juridicales," which was printed shortly before the Great Fire of London.

Edward Stillingleet, who afterwards became Bishop of Worcester, was preacher at the Rolls in 1664. Eleven years later Gilbert Burnet was appointed to that office, but he was ejected from it under somewhat remarkable circumstances. Having occasion to preach in the chapel on November 5, 1684, on the anniversary of the discovery of the Gunpowder Plot, he took as his text, "Save me from the lion's mouth, thou that hast heard me from the horns of the unicorns." According to his own positive statement he "made no reflection" on "the two supporters of the King's scutcheon," but he showed "how well popery might be compared to the lion's mouth," and mentioned "that wish of King James I. against any of his posterity that should endeavour to bring that religion in among us." A report of the sermon was carried to the Court, and there the text was thought to be "levelled against the king's coat of arms."

Accordingly, at the end of the law term, the Lord Keeper wrote to Sir Harbottle Grimston, Master of the Rolls, saying "that the king considered the Chapel of the Rolls as one of his own chapels," and that, having dismissed Burnet from the Court as a person disaffected to his Government, he would not have him suffer "to serve any longer in that chapel." Burnet adds that his "employment at the Rolls would have fallen in course within a month if the Court had delayed" his ejection "from it in such an open manner, for that worthy man, Sir Harbottle Grimston, died about Christmas." This explanation is interesting as showing that the position of preacher at the Rolls was not regarded as a benefice, and that it naturally determined upon the occurrence of a vacancy in the office of the Master of the Rolls.

In a "New View of London" by E. Hatton, published in 1708, we read:—"The chapel is an ancient structure built of brick, boulder and some freestone (the doors and windows are of the Gothic order), roof covered with slate. The ornament of the presses for Rolls on the inside is columns and pilasters of the Ionic and Composite orders. It is in length 60 feet, breadth 33." The writer proceeds to mention the monuments and adds that "at the N.W. angle of this chapel is a bench, &c. where the Master of the Rolls hears causes in Chancery out of term time."

John Strype, in his edition of Stow's "Survey of London," mentions "the old and decayed house" of the Rolls as "much wanting new building," and expresses an opinion that "the chapel also would admit of new building." This was published in 1720, but it must have been written some years earlier, for in 1717 Colin Campbell, the architect, was appointed "to pull down the House of Converted Jews in Chancery Lane and build a new edifice for the use of the Master of the Rolls, and likewise to repair and improve the Chappell of the Rolls and other appurtenances of the said house." The whole cost of building the Rolls House between the years 1717 and 1724 inclusive was defrayed out of the exchequer, but although minute accounts have been preserved of the expenditure on labour and materials, they do not afford any information as to the exact nature of the alterations then made in the chapel. Architectural evidence, however, shows that Colin Campbell must have been instructed to connect the Rolls House with the chapel, so that the Master of the Rolls and his family might be able to attend divine service without going out of doors. This he did by erecting between them a small lobby over a narrow vaulted passage sloping down eastwards from Rolls Yard to the basement of the new mansion, and by cutting a large arched opening through the north wall of the chapel. The latter operation involved the destruction of the lower part of the only remaining lancet window of the thirteenth century, and the closing of the upper part. Inasmuch as the floor of the lobby was several feet above the pavement of the chapel, there were no means of communication from the one to the other; but a raised pew was provided for the Master of the Rolls, which formed a sort of gallery projecting from the north wall of the chapel, and accessible only through the lobby. It was probably at this date that a Gothic doorway on the north side of the chapel was demolished, and a new entrance substituted for it at the west end of the building, almost opposite to the gateway from Chancery Lane into Rolls Yard.

An engraving by B. Cole in the 1756 edition of Maitland's "History of London" shows that at that date there was only one window in the south wall of the Rolls Chapel, the two eastern ones having been blocked up as mentioned above. The turret still had a low four-sided spire, and there were two buttresses dividing the south wall into three bays. These buttresses, however, were removed, and the turret was altogether hidden from view, when, pursuant to an address of the House of Commons in 1784, a building was erected immediately south of the chapel, for the use of the clerk of the records in the Rolls Chapel, and of the secretaries of the Master of the Rolls. Then, or very soon afterwards, a thin external layer of flints was placed over all those rubble walls which were not protected from the weather by adjoining buildings.

The result of successive repairs and alterations at the Rolls Chapel was that seven years ago there was not a particle of Mediæval work visible within or without. The inner roof was of lath and plaster, put up about forty years ago, and the inner walls were lined throughout with plaster. The external walls were covered with a thin layer of flint, except in places where there were patches of comparatively modern brick, stone and stucco. The buttresses had been removed or mutilated, and the four large windows were devoid of tracery. Altogether it was a mean and ugly building, entirely without architectural merit, and interesting mainly on account of its monuments and its panels of stained-glass. Even these could not be properly seen, the former being in the eastern part of the chapel, which was very dark on the brightest day in summer, and the best glass being high up in the western window.

In 1889, the house known as 1 Rolls Yard, which adjoined the south side of the chapel, was demolished, and the removal of it disclosed some features of which the existence was not



previously known. Further operations were carried on in 1895 with a view to finding Mediæval remains and ascertaining what portions, if any, of the structure could be retained. The Act of 1837 clearly contemplated a possible demolition of the chapel, and in the plans for the Public Record Office made by Sir James Pennethorne in 1850, the whole site of the chapel had been allocated to rooms intended to serve as repositories of documents. On further consideration, however, it was thought that it might be possible to incorporate the chapel in the new block of the Public Record Office, removing only the roof, which, being made of wood, could not be permitted to form part of a building which had to be fireproof. A design was accordingly prepared for erecting massive piers on the south side of it, which would have allowed the old walls to show between them. There are at least two precedents for such a course, one at Southampton, where a Norman house was incorporated in the town walls of the fourteenth century, the other at Rimini, where the walls and windows of a Mediæval church show under the Renaissance arches erected by Alberti for Sigismondo Malatesta. This scheme was, however, abandoned when it was found that the old walls were thoroughly rotten, stonework and mortar having alike decayed with age. The rubble walls were, in fact, rent with long fissures, and there was no architectural work that could be "restored" without being altogether remade, mostly from entirely new designs. Under these circumstances, the First Commissioner of Works decided, with great reluctance, that the chapel should be pulled down. Special treatment will, however, be given to that portion of the new building which will occupy its site, and the old monuments and stained-glass will be refixed therein.

### GOTHIC ARCHITECTURE.

ON Saturday evening Professor Baldwin Brown, Edinburgh, lectured to a large audience in the Academy, Moffat. Dealing with Gothic architecture as illustrated in some of the great Mediæval buildings, the Professor showed how the arch, the soul of the fabric, reached its logical conclusion in French Gothic churches of the twelfth and thirteenth centuries, and how the round arch of the Romans was superseded by the pointed arch. In the first vaults massive walls were used to resist the lateral pressure. In the vault so formed it was found that the pressure was concentrated on the four corners. Having examined this, the French opposed the outward pressure by opposing pressure. Buttresses became essential elements of construction, and were weighted by pinnacles. The heavy intervening wall became a mere screen, and afterwards was filled with glass, and thus were obtained the traceried windows. The French style was Flamboyant and the English Perpendicular. In French Gothic cathedrals there was the advantage of additional height, from its scientific construction and western façade. English cathedrals possessed the charm of perfection and situation.

### CORNHILL.

CORNHILL was so called from its having been anciently the great city market for corn, the principal factors or dealers in which article had their stalls or standings on market days in the middle of the street. Its inhabitants at this time were chiefly drapers, who were so numerous that they formed themselves into a fraternity or guild under the name of the "drapers of Cornhill," which was extant in 1361. The drapers gave way to a lower order of tradesmen about the reign of Henry VI. called "fripperers or upholders" (i.e. dealers in second-hand apparel and household stuff), of whom an old writer says, "I have read of a countryman that, having lost his hood in Westminster Hall, found the same in Cornhill hanged out to be sold, which he challenged, but was forced to buy or go without it; for their stall they said was their market. About this time also the wine drawer of the Pope's Head Tavern (standing without the door in the high street) took the same man by the sleeve and said, 'Sir, will you drink a pint of wine?' whereunto he answered, 'A penny spend I may; and so drank his pint; for bread nothing did he pay, for that was then allowed free.' It recovered its respectability before the reign of Elizabeth, and has ever since boasted of the residence of the first and most opulent citizens.

The chief objects of an architectural nature by which Cornhill was distinguished in these early times (independently of its houses, several of which were curious), were the great conduit called the Tun; the Carrefoure and the original Bourse, or Royal Exchange.

The Carrefoure was a water-standard, which stood at the parting of the four ways formed by Gracechurch Street, Bishopsgate and Leadenhall Streets and Cornhill. It was invented in 1582 by Peter Morris, a German, and was supplied by means of an artificial forcier with Thames water, which ran every tide

through four spouts pointing towards the four streets. Being found an inconvenience from its frequently overflowing, it was several times presented by the ward inquest as a nuisance, and was at length totally removed. It is generally called in these presentments the Carrefoure, and sometimes the "Four spouts;" and appears, from old representations of it, to have been, when standing, a great ornament to the neighbourhood.

The Tun was originally a sort of cage or prison, and was situated about the middle of the street, being so called from resembling in shape "a tunne standing on the one end." It was built of stone by Henry Walleis, mayor, about 1282, for the confinement of night-walkers and other disorderly characters; but in 1401 was converted into "a faire conduit of sweet water, castellated," which was conveyed in pipes from Tyburn, and was thenceforth named the Conduit in Cornhill. The well or spring on the spot was on this occasion planked over, and a cage, stocks and pillory placed on its site, but these were subsequently removed more westwards and a pump erected in their stead. This was the same spring which supplied the pump in front of the Royal Exchange. The Tun was an object of which frequent mention is made by our early topographical writers and annalists.

The Bourse, or original Exchange, was erected in 1566, on the sites of certain courts or alleys, and their houses, described to have contained in all fourscore households, which were purchased by the City for 4,000*l.* and upwards, and sold to such persons as should take them down and clear the ground for about 47*l.* It was finished in a twelvemonth from its commencement, and in 1570 was visited by Queen Elizabeth with great pomp and named the Royal Exchange. This structure, which was only of brick and timber, stuccoed in parts to resemble stone, was burnt in 1666. It was not unlike the late Exchange withinside, but differed considerably without, particularly in the tower and front, the latter being removed farther north from the street than at present, and in part blocked up by houses; the tower also (which was of brick) was but mean. The Exchange, as just observed, was in great part hid by houses, which gave the spot an appearance quite different to what we now see it. The nature and situation of these houses are elucidated by the following passages from Stowe:

"Next adjoining to the Royall Exchange remaineth one part of a large stone house, now called the Castle, of such a signe at a taverne doore; there is a passage thorow, oute of Cornhill, into Threadneedle Street; the other part of the said stone house was taken downe for enlarging the Royall Exchange. This stone house was said of some to have bin a church, whereof it had no proportion; of others a jew's house, as though none but jews had dwelt in stone houses." He adds, "On the north side of Cornhill, from the east unto the west, have ye faire houses for merchants and others, amongst the which, one large house is called the wey-house (weigh-house), where merchandizes brought from beyond seas are to be weighed at the king's beame." Sir Thomas Lovell, knight, builded this house with a faire front of tenements towards the street; all which he gave to the Grocers' Company, of which he was himself a member."

Besides the above, which stood on the north side of the street, there was on the opposite side the celebrated Pope's Head Tavern before mentioned, which was a building of considerable antiquity and magnitude. This and other adjoining houses, all strongly built of stone, and originally forming one structure, was, from its large size, and having the royal arms in front, thought by Stowe to have been once a residence of the English sovereigns. Pope's Head Alley still commemorates the name of this tavern, and occupies its site.

### GLASGOW ARCHITECTURAL ASSOCIATION.

A MEETING of the Glasgow Architectural Association was held in the rooms, 187 Pitt Street, on Tuesday, the 5th inst., Mr. Wm. Tait Conner in the chair, when Mr. W. J. Blaine read a paper entitled "Some Scotch Houses." The lecturer limited himself to the consideration of four of the finest and most characteristic examples of Scottish castellated architecture—Crathes, Craigievar, Midmar and Castle Fraser, all situated within a short circular tour from Aberdeen.

Mr. Blaine took into consideration only the original castles or keeps, which in date lap from the latter half of the sixteenth century into the first half of the seventeenth century, leaving out the later wings, and after describing the natural surroundings gave an account of their individual history; then entering into a critical analysis of the principles of design they illustrate. Comparing the one with the other, he pointed out their strong and weak points, making this clear by diagram sketches and photos, the former of which he referred to as also exemplifying a theory of his that the size of a building appears on a drawing in inverse ratio to its size in reality. In summing up the lecturer placed these four buildings and their characteristics in the following order of merit:—Crathes—dignity, with beauty of detail; Castle Fraser—beauty of detail, with dignity; Midmar—dignity, without beauty of detail; Craigievar—beauty of detail, without dignity. After a short discussion, the lecturer was awarded a hearty vote of thanks.



## NOTES AND COMMENTS.

ALTHOUGH the French architects possess several architectural societies, they appear to be more and more tyrannised over by the authorities. It is recognised that the societies are a drag upon the individual members, who, when they join, lose their liberty of action, and dare not remonstrate through fear of offending against some corporate prejudice or other. The latest example of harsh and inequitable treatment is one affecting architects who have undertaken the important responsibility attached to the care of the cathedrals. There are sixty architects attached to the service, who are directed by three chief inspectors, MM. DE BAUDOT, CORROYER and VAUDREMER. The architects are compelled to be always on the alert, in order that any appearance of decay can be dealt with without loss of time. The French system may be said to mean restoration on a retail or petty scale, while in England the wish is to carry out works in a sort of wholesale way. The cost of reparation falls on the French Government, and it is risky for an architect to propose any scheme which would be expensive. The constant watchfulness could not be exercised unless the architects often visited their charges, and, as it is not always possible to have an office contiguous to a cathedral, it is necessary to lay out money on travelling expenses. The amounts will vary according to the distance traversed. Now the vote on account of the cathedrals which is about to be submitted to the Chambers is lower in amount than last year's, because the Government have declined to recognise any claim for travelling expenses. The total sum which will be saved is no more than 1,200*l.*, but it is too large to be drawn from the purses of architects who are not paid in proportion to the value of their services. Moreover, the rejection of the claim is a stigma on the profession, for it will be generally concluded that the diocesan architects have been drawing money from the public funds after the manner of corrupt officials. In a provincial town a suspicion of that kind does not help to increase commissions; yet the societies to which the architects belong appear to be afraid to utter the meekest protest. Some may imagine the architects have the remedy in their own hands, and if they less often visit the cathedrals the expenses for repairs must be increased. But the Government would promptly deal with a case where neglect was suspected, and moreover, it is well known that any one of the architects would submit to greater sacrifices rather than allow his cathedral to be neglected.

It was anticipated that the exploration of the Dumbowie hill fort would enable some important archæological problems to be solved. But it can hardly be said that result is attained. The collections in Edinburgh are enriched by several prehistoric objects, which are evidence of the residence of people in the neighbourhood who fought, hunted, fished and cooked, who could make various implements, and occasionally attempted a simple sort of ornamentation; but the people at Dumbowie were not more civilised than their contemporaries. The fort was built with walling without mortar, and must have been sufficiently strong to resist an attack; but by agreement with the owner it has been restored as near as possible to its former condition, and in a short time it will appear as if the turf was never disturbed to allow of exploration. It is rarely any novelty to repay the trouble is to be discovered in the chambers of one of these early defences, but the more failures the stronger becomes the desire to take part in similar operations elsewhere.

THERE are many botanists who believe the papyrus has disappeared from the rivers and marshes of Egypt. It has been said the plant grows near Lake Menzaleh, but investigation demonstrated it was not the true *Papyrus antiquorum* or the *Cyperus papyrus* of LINNÆUS. The prophet's words, "the paper-reeds by the brooks, by the mouth of the brooks, and everything sown by the brooks shall wither, be driven away and be no more," have been fulfilled. That something similar can be made to grow for a while, not only in Egypt but in London, was shown by the secretary of the Royal Botanic Society at the meeting on Saturday. Mr. SOWERBY exhibited stems of the plant

which grows in a tank in the gardens where the Victoria lily flourishes. This year the so-called papyrus has formed a clump 7 feet in diameter, with stems 14 feet long and 2½ inches at the base. From the white pith of which the stems are composed a sort of paper was prepared by slicing the pith up into flat strips and laying them side by side until a sufficient length was obtained. Under pressure the pieces adhered together, forming a perfectly smooth even sheet, which could be written upon and rolled up without further preparation. Mr. SOWERBY says that paper made in this way from plants grown in the gardens, when compared with a fragment taken from an Egyptian tomb, and, according to Dr. BIRCH, at least 3,000 years old, was found to possess similar quality. The only difference between the two was the darker colour of the older specimen.

THE Ecole des Beaux-Arts from time to time receives bequests for prizes, but this month an offering of another kind has been presented. A lady, whose name remains unannounced, has made over to the school three appartements in a villa at Neuilly, near the Pont de Courbevoie. The position is one of the most agreeable in the suburbs of Paris, and the occupants of the villa can study the valley of the Seine under one of its most picturesque aspects. The arrangement is that three of the most deserving students of the school who are not overburdened with cash are to be accommodated in the villa. The rooms are suitably furnished, servants are also provided, and arrangements can be made for meals at a fixed tariff. There is some ingenuity in the gift, and the first tenants selected who are in residence are to be congratulated, although they may be deprived of some of the gratifications which are afforded in Paris "dans un grenier qu'on est bien à vingt ans."

THE great work of M. BARTHOLOMÉ, the French sculptor, called *Monument aux Morts*, and which is monumental in another sense, will be completed in a manner which he did not contemplate when he exhibited the model in the Champ-de-Mars a few years ago. When the site was selected in the cemetery Père-Lachaise, the sculptor realised for the first time that the addition of two wings to the main body of the work would enhance the effect. The Municipal Council agreed to the alteration, although not many months ago M. BARTHOLOMÉ was forced to abandon it, owing to the obstructions of the Council and the cheeseparing policy which inspired the arrangements with him. The change is in a great measure owing to the tact shown by M. FORMIGÉ, the architect, who fortunately has charge of the arrangements for erecting the monument. The façade will measure about 50 feet by 20 feet. In the course of the summer a large part of the masonry and a part of the sculpture will, it is hoped, be erected, and M. BARTHOLOMÉ will then be able to attach the remaining parts on the spot, and can do justice to a work which will have occupied him for twelve years.

EXHIBITION buildings after the season is over are generally found to be useless. Those in the Champ-de-Mars might be supposed to be destined to have that fate. But the Municipality of Paris contrive to extract a large sum annually from them. Last year, for example, the former Palais des Beaux-Arts returned an income of 61,060 francs, the Palais des Arts Libéraux paid 80,750 francs, and the immense hall which was built for the display of machinery 80,000 francs. From the parks and gardens a sum of 45,360 francs was derived. The old buildings on the Champ-de-Mars accordingly form another illustration of French skill in drawing large profits from waste products.

LINCOLN CATHEDRAL-NORTH AISLE.

LINCOLN CATHEDRAL-ANGEL CHOIR.

EATON HALL.

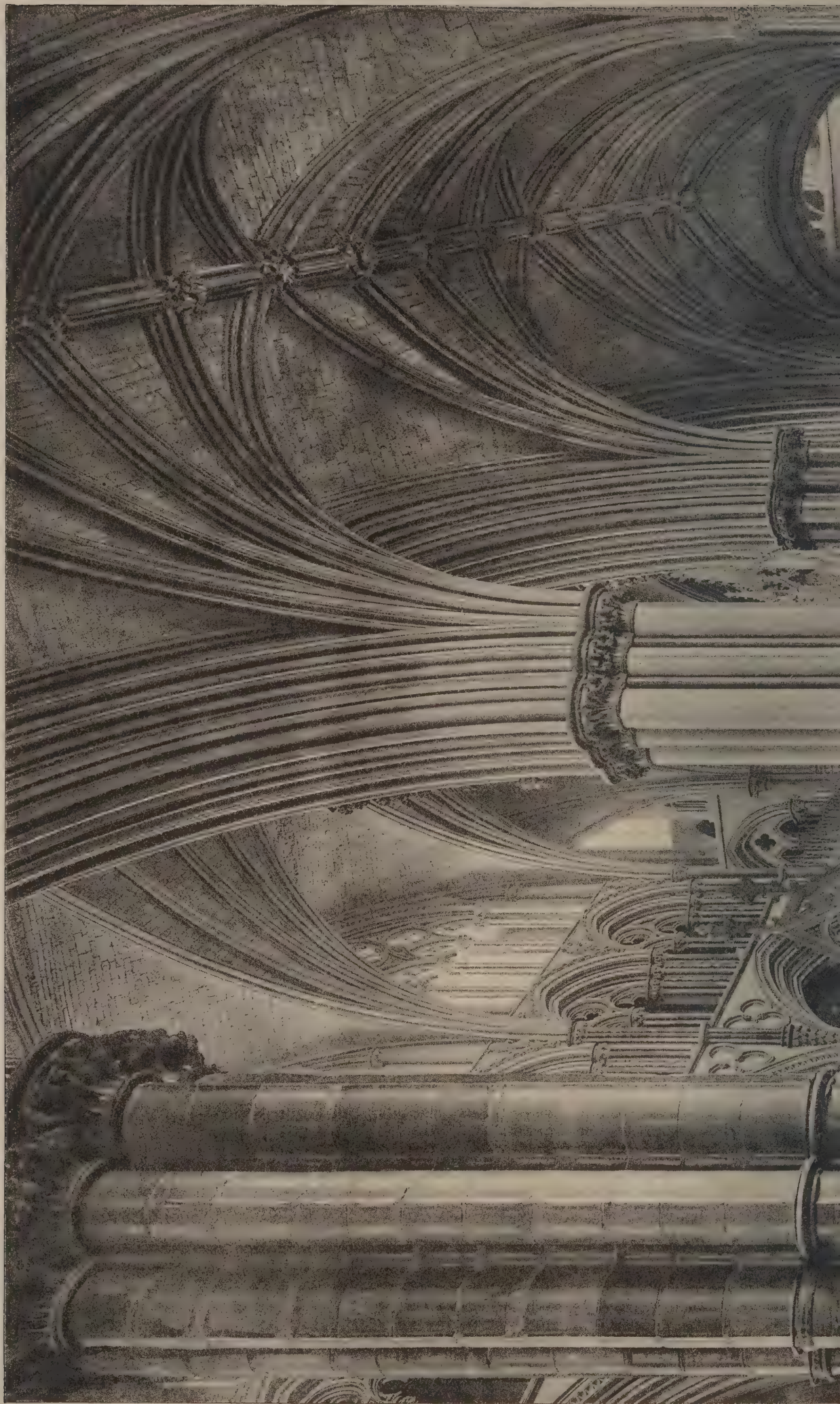
BATTERSEA MUNICIPAL BUILDINGS, LAVENDER HILL.

TUDOR CHAMBERS, CORNHILL.













PHOTOGRAPHED BY S. B. BOLAS & CO

CATHEDRAL SERIES, No. 3.—LINCOLN: NORTH AISLE.

INK-PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET, PETTER LANE, E.C.

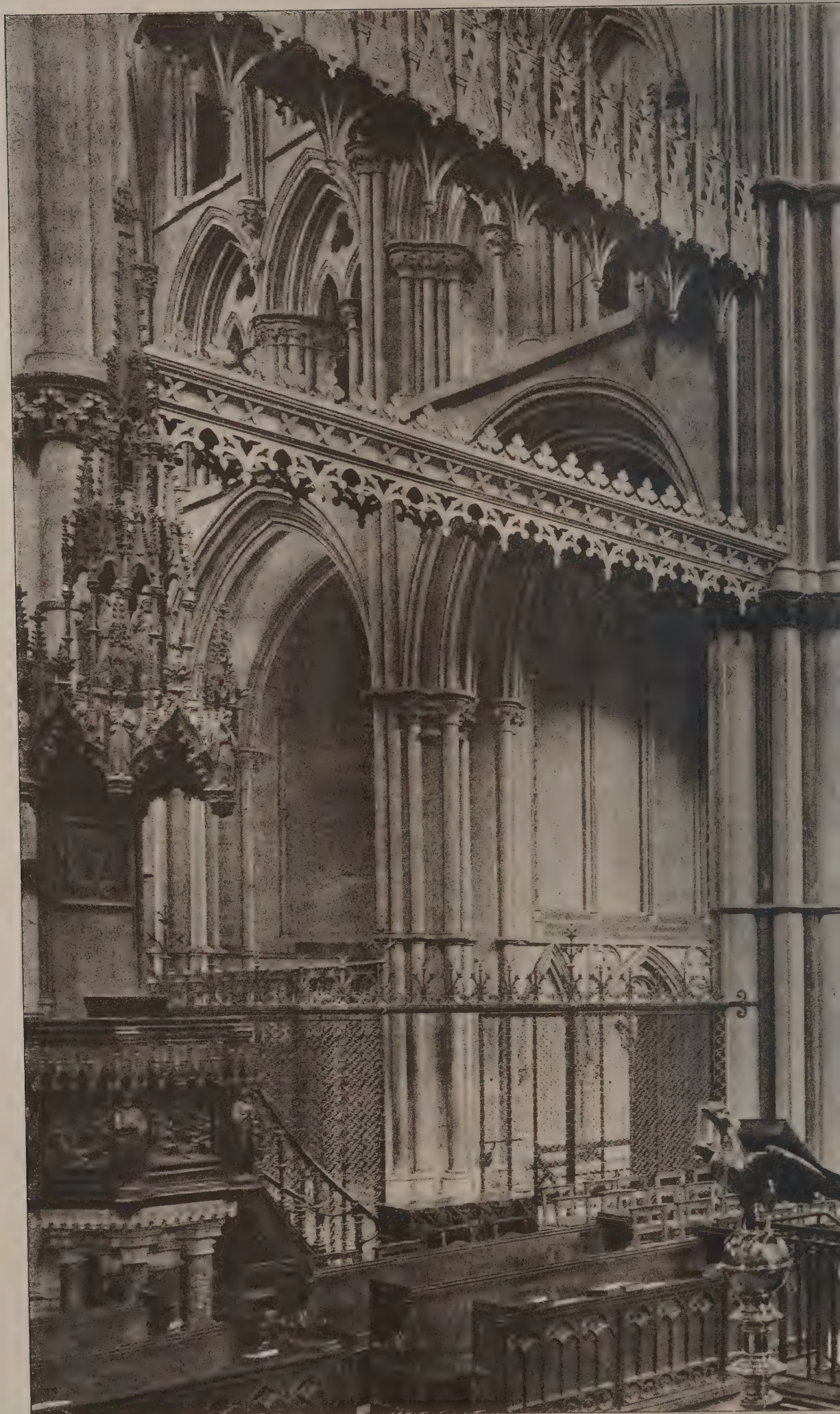












PHOTOGRAPHED BY S. B. DOLAS & CO



an: 15<sup>th</sup> 1897



INK- PHOTO SPRACLE & CO. 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

LINCOLN: ANGEL CHOIR.

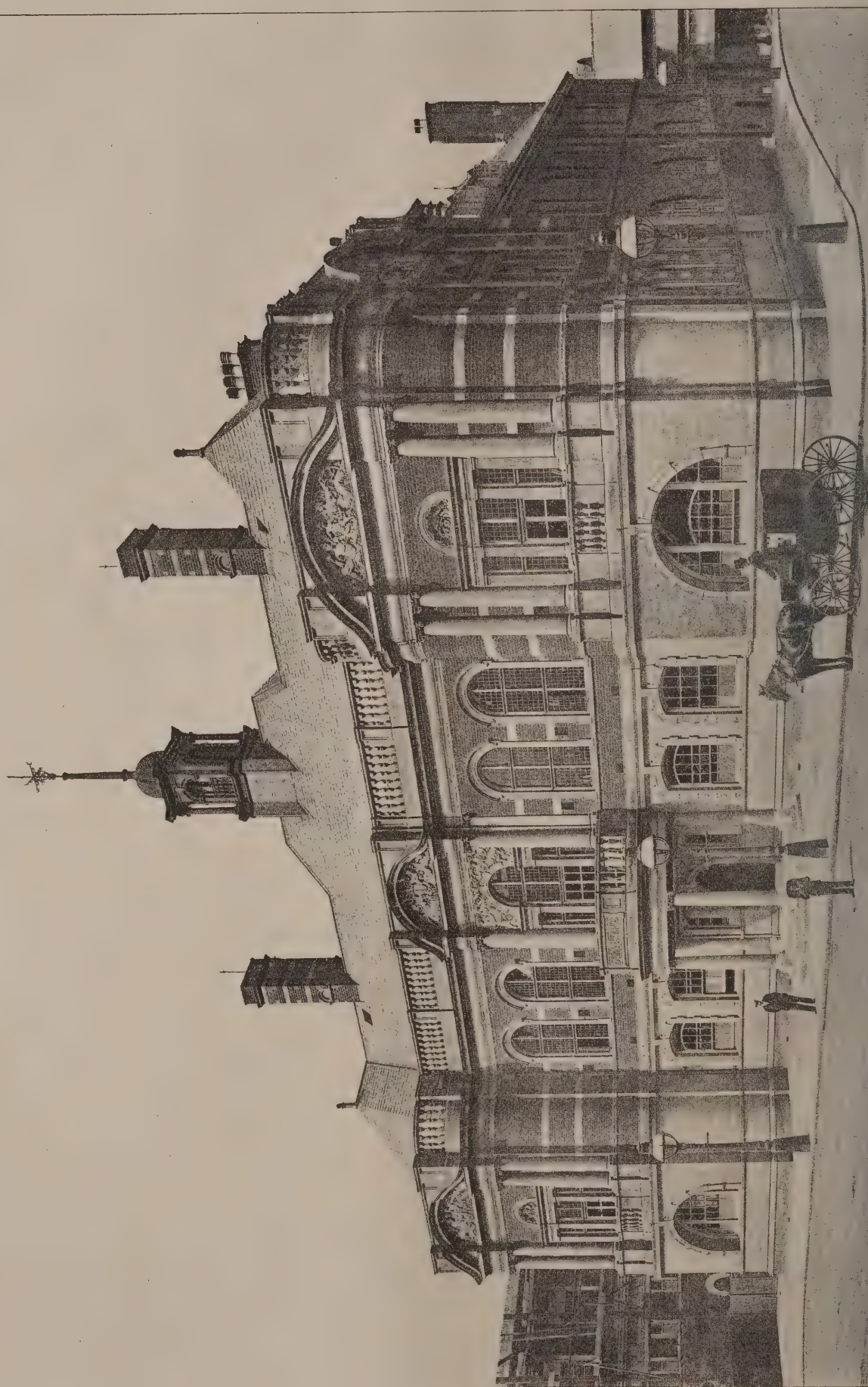












PHOTOGRAPHED BY S. B. SOLAS & CO

BATTERSEA MUNICIPAL BUILDINGS, LAVENDER HILL.

F. W. MOUNTFORD.

INK-PHOTO. SPRAQUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.





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TUDOR CHAMBERS, CORNHILL.













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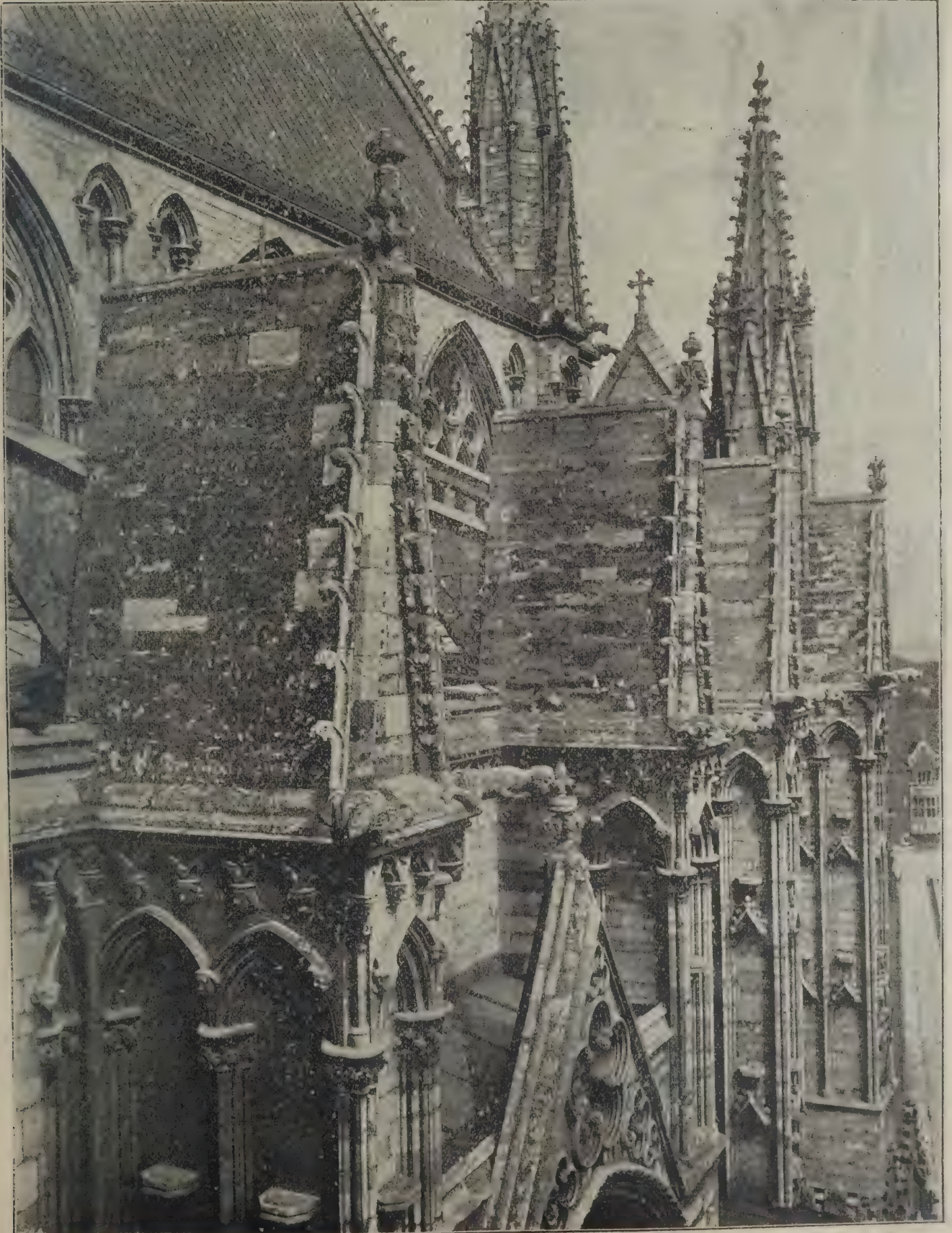


## LINCOLN CATHEDRAL.—III.

A WRITER describing the effect produced by the interior of Lincoln Cathedral says:

The great and perhaps the only defect is a want of height; the vaulting is not sufficiently elevated for the length and breadth of the cathedral. The beholder at once exclaims "This is too low." The eye cannot be satisfied with less than five-and-twenty feet more of elevation. It is almost impossible for a church in the Pointed style to be

too lofty, but it may easily be too low; this style requires a greater proportion of height to length and breadth than any other style of architecture. Beauvais Cathedral is said to be higher than need be, but no one has ventured to call it a defect; on the contrary, everyone allows it to be sublime. The vaulting of the nave of Lincoln Cathedral is somewhat higher than that of the choir and presbytery, the height of both which is again lessened by the pavement being raised above the pavement of the nave. In the length of



Photographed by S. B. Bolas & Co.

LINCOLN CATHEDRAL, GABLES, PINNACLES, &C.



the nave are seven pointed arches on each side, supported on eight clustered columns, six of which are isolated, and two—one at each extremity—engaged. The two first arches westward are narrower than the others, and more acutely pointed. The open arches, above these last named, are divided down the middle into two; those over all the others into three. The windows of the clerestory are all alike,

aisles—which are of one light each, and two within each compartment—the wall is adorned with a line of trefoiled-headed arches upon short clustered columns. Having walked along the nave to the eastern extremity of it, we are brought into the greater transept, and under the central tower. The four clustered columns which support it are regular and well-proportioned; they are composed of



LINCOLN CATHEDRAL, ARCADE.

Photographed by S. B. Bolas & Co.

viz. three in each division, side by side, of one light each, the middle one rising higher than the outer ones; except, indeed, that those over the two narrower arches of the nave are of course narrower, being inserted in a less space. The vaulting of the two first, or western compartments of the nave, is much more simple than that of all the rest, and of the nave itself. All along under the windows of the side

twenty-four attached columns of various diameters, of which twelve are of stone and twelve of Purbeck marble; they rise to the height of 48 feet, and the massive arches they sustain are made to assume an air of lightness by the number and delicacy of their mouldings, and the decoration of the spandrels with trellis-work. Above these arches are two tiers in each side of the tower, with columns and



arches deeply receding; behind which, on the upper tier, are windows of one light each; at this height the further view of the interior of the tower is prevented by a vaulting of stone, with elaborate tracery, erected in the time of the treasurer WELBOURNE. The west side of the greater transept is very similar to the nave, the north and south ends of it have each a circular window of the same dimensions, though of different designs; they are each 24 feet in diameter, and, together with the windows below them, are both filled with ancient stained-glass, which gives to the interior of this transept that rich, glowing, but subdued light, the want of which is felt so keenly in every other part of the cathedral. The east side of the transept is very similar to the choir, except in the clustered columns of the principal arcade, which are each composed of sixteen shafts, chiefly of Purbeck marble. The aisle in both wings was anciently appropriated to chantries, but no vestiges of altars now remain. They are divided from each other by projecting piers of very elegant design, and from the body of the transept by screens of excellent Perpendicular character, which add greatly to its beauty.

We will now enter the choir, which it must be confessed is more curious as an important link in the history of the Pointed style than commendable for architectural merit, especially if compared with the choirs of many other cathedrals, and particularly of York, with which this cathedral is continually brought into comparison, and yet, from the great beauty of the presbytery, two compartments of which form the chancel end of the choir, the richness of the prebendal stalls and other accessories, it is by no means deficient in appropriate effect. There are sixty-two stalls for the Dean and prebendaries, with elaborate canopies, and containing misereres or half-seats, ornamented with foliage and various grave and ludicrous devices. The seats of the vicars and some others are fronted by arches, containing excellent carvings of kings, and angels playing on musical instruments; the whole of these are of oak, and appear to have been executed late in the fourteenth century. The bishop's throne is placed at the end of the south side, and, though modern, agrees very well with the stalls, a merit which the pews are entirely without. The organ also over the west end of the choir is very bad, and the front of it has displaced some rich tabernacle work, which adorned the ancient jubé, as the gallery above the screen used to be called.

The whole of the east transept corresponds in style with the choir, excepting the upper part of the south end, which appears to have been rebuilt about the middle of the thirteenth century.

We come now to the presbytery, which comprises the whole east end of the church, beyond the upper transept, and here the statues in the spandrels of the arches of the first triforium should be particularly noticed; of these there are thirty, ten of which—the centre and principal one of each bay—are of still higher merit than the rest. The greater number are represented as employed in singing or playing on musical instruments, consisting of the harp, zebec, citern, trumpet, tabor and pipe, double pipe and bagpipe, which last is designed with great taste, the upper part of the instrument being in form of a bird which rests on the left hand of the performer, while the beak appears to supply the reed on which he plays.

The great east window is filled with modern stained-glass, put up in 1762; it is poor and feeble, and the effect not good. The space beneath this window, where anciently stood the altar of JOHN THE BAPTIST, was appropriated to the chantry of Queen ELEANOR, originally founded at Heneley, where she died, and was transferred to this place by EDWARD II. in 1310. It contained an altar-tomb of marble, on which was placed her effigy in gilded brass.

**Messrs. Chessum's** claim for compensation in respect of the construction of the new offices of the Commissioners of Sewers, has been settled by arbitration at 2,738*l.*, while 3*l.* 16*s.* 2*d.* per day has been fixed on as the sum due to the builders until the buildings are resumed or the contract ended. The original claim was 7,000*l.* The work was suspended by a chancery injunction obtained by neighbouring owners on account of interference with ancient lights.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE fifth general meeting for the present session of the Institute of Architects was held on Monday last, Professor Aitchison, A.R.A., president, in the chair.

The minutes of the last meeting were read and agreed to.

Mr. Alfred Baskett Pinckney, M.A., of Worcester, was elected a Fellow, and the following Associates were also elected:—Messrs. H. J. Gee Smith, Philip Appleby Robson and Hubert W. Walker.

The deed of award of the prizes and studentships for 1896-97 made by the Council was read by the President.

### Prizes and Studentships.

Although five essays on the subject of "The True Value of Tradition and Precedent in Architectural Design" were sent in, there was not one which was considered of sufficient literary merit to be adjudged the Institute silver medal and 25 guineas, but 15 guineas have been granted to Mr. John J. Cresswell (of Grimsby), who competed under the motto "Things New and Old."

The Institute silver medal and 10 guineas were awarded for measured drawings of an ancient building to Mr. F. J. Wass.

The subject assigned for the Soane medallion and 100*l.* was a "Design for a Provincial Market Hall." It was secured by Mr. J. A. R. Inglis. A medal of merit was obtained by Mr. J. A. Swan. Mr. C. H. Holden was allowed honourable mention. Sixteen designs were submitted.

The Pugin studentship, a silver medal and 40*l.* (for travel in the United Kingdom), was given to the drawings sent in by Mr. William Haywood. A medal of merit was given to Mr. C. de Gruchy, and to Mr. Walter E. Dobson honourable mention. There were eight competitors.

The Godwin bursary, a silver medal and 40*l.*, founded for the promotion of the study of works of modern architecture abroad, was carried off by Mr. R. Stephen Ayling. There were only two competitors.

The Owen Jones studentship, a certificate and 50*l.*, was awarded to Mr. A. E. Henderson, who submitted five strainers of work in Florence, St. Mark's, Venice, and sculptured capitals illustrating Greek Byzantine, Byzantine, Saracenic Byzantine and Early Italian Gothic. Two students competed.

The Tite prize, certificate and 30*l.*, was not awarded. The subject was an Italian villa and ornamental garden.

The Grissell gold medal and 10 guineas (for design and construction) fell to Mr. S. K. Greenslade. Seven sets of drawings were sent in.

The Aldwinckle studentship, a certificate and sum of 50*l.*, has been awarded to Mr. Arthur J. Griffith.

It was announced that the next meeting would be held on Monday, January 18, when an address to students will be read by the President and the prizes presented. There will also be some critical observations on the students' work, read by Mr. W. Milner Fawcett, M.A., vice-president. On the same occasion Mr. Alfred Waterhouse, R.A., as chairman of the board of examiners, will present a testimonial to Mr. Arthur Cates, in recognition of his long and valued services as chairman of the board.

## SOCIETY OF ANTIQUARIES OF SCOTLAND.

THE usual monthly meeting of this Society was held in their library at the museum, Queen Street, on Monday evening, Mr. J. Balfour Paul, Lyon King of Arms, vice-president, in the chair. In the first paper Mr. Robert Brydale described a group of seven carved grave-slabs in the churchyard at Dalmally, which was anciently called Clachan Disert, and is stated in Dean Macgregor's "Chronicle" to have been the burying-place of the chiefs of Macgregor from 1390 to 1528. The "Chronicle" records the burial of no fewer than twelve of these chiefs successively, "in stone coffins," at the north side of the east end of the church. When the old church was demolished, about 1811, a number of stone coffins and carved grave-slabs were found in this position. Some of these slabs were appropriated by such of the clan as still continued to bury there. From the notices given of these stones by Pennant in 1769 it appears that one at least was attributed to a Macgregor, and Dean Howson in 1842 speaks of one which was then among the tombs of the MacIntyres and another among those of the Macnaughtons. He also mentions two which seemed to belong to ecclesiastics, but are not now to be recognised. Of the seven stones now described three are of the same type, showing in a panel the figure of an armed man with sword and spear, and wearing a pointed bascinet and short tunic, the rest of the surface being filled in with foliaceous ornamentation. A fourth is curious as showing this type superimposed on a larger figure obliterated, and having a cross at the top of the stone. Of the other two of this type one is curious from its small size, and the other is much mutilated. The seventh is apparently the front slab of an altar tomb, and bears a finely carved scroll of foliage, but no armed figure. Drawings of all the slabs were exhibited.



In the second paper Mr. Thomas Wallace, F.S.A.Scot., gave some notes of antiquities in the districts of Loch Alsh and Kintail, first describing Castle Grugach, a round dry-built tower or broch, like those of Glenelg, which stands at the foot of a precipitous rock called Onag, on the south shore of the extreme east end of Loch Alsh. It was cleared out in 1889, but all that was found in it was a fragment of a quern. In structure it resembles others of its class, but the stones are large and well fitted together, and there is a huge triangular stone forming the upper lintel of the doorway. There is a vitrified fort of small size between the Glennan Burn and Loch Long to the north of Bundaloch. The island on which Castle Donan stands at Dornie has been fortified by a vitrified wall on the land side. In Glen Elchaig there is one large boulder at Fadoch and another on the opposite side of the river covered with cup-marks. At Dornie there is one with seven or eight cups, at Carr one covered with cups, on a point of rock at Totay Ferry some very large and deep cups, and near the manse of Kintail a group of boulders bearing numerous cups. About a mile from Shiel Inn there is an underground structure which has been described as an earth-house, but the entrance is now closed. The rest of the paper was occupied with the old military roads of the district and their inscribed stones, of which photographs were shown.

In the third paper Mr. F. R. Coles gave a notice of the standing stones of Törhonskie, Wigtonshire, which seem to be the megaliths of a great cairn, although the accumulation of stones about them is really known to be recent, and the group of standing stones appears analogous to those at Glenquicken, Park of Tongland and hills in the Stewartry. Tradition associates it with the grave of the fabulous King Galdus, the earliest record of this association being found in the Sibbald manuscripts.

In the fourth paper Mr. R. Crawford Walker, F.S.A.Scot., gave a notice of an interesting heraldic monument at Kilmany, Fifeshire, which is probably unique in Scotland. The monument is a flat stone in the churchyard, on the top of which is inserted a copper plate, about 3 feet long by 18 inches broad, bearing an inscription in memory of John Melville, of Cairnie or Murdocairnie, a property in the parish of Kilmany, which now belongs to Mr. Gillespie, of Mountquharrie. At the foot of the plate are the arms of John Melville, impaled with those of his wife, Mary Maitland, with the addition on the dexter and sinister sides of four probative quarters for the paternal and four for the maternal descents.

#### LIVERPOOL ARCHITECTURAL SOCIETY.

THE fourth ordinary meeting of the 49th session of this Society was held at the Law Library, Union Court on the 11th inst., when a paper was read by Mr. C. E. Mumford on "Belgian Churches," illustrated by limelight views. Mr. George Bradbury, president of the Society, presided. Mr. Mumford, in his opening remarks, said Belgium was without doubt one of the countries of Europe where the fine arts had flourished and were still flourishing with the utmost vigour. The long series of great painters who succeeded each other for more than four centuries had not alone brought her the renown which she so justly enjoyed. Architects and sculptors had contributed their part. The devotion and intellectual culture of the Flemings had been shown in the vast number of churches of high architectural merit which were to be found in the country. Few of the older buildings now in existence dated back beyond the beginning of the thirteenth century. It was not until the Gothic style was firmly rooted in the adjacent countries that it came to be adopted by the Flemings. All the vast wealth of ornament accumulated in these churches up to the middle of the sixteenth century was destroyed by the Calvinist iconoclasts, and then there perished a wealth of art the loss of which was irreparable. About the commencement of the seventeenth century, the country again becoming prosperous, art and architecture received a new impetus, and many new churches were erected. The builders of Belgian churches, whilst striving successfully after the beautiful, always kept the practical utility of their work well in view. About 150 slides, photographed by the lecturer, illustrating churches in the towns of Antwerp, Lierre, Malines, Brussels, Namur and Dinant were shown on the screen. The proceedings closed with votes of thanks to the lecturer and the chairman.

#### THE VIEW FROM RICHMOND HILL.

A MEETING of the Richmond Town Council was held on Tuesday to consider a memorial in protest against any attempt to destroy, or at any rate damage the view from the terrace at Richmond Hill. The memorial was as follows:—"To the Mayor and Town Council of the Borough of Richmond,—We, the undersigned, respectfully protest against any interference with the rural character of Richmond Hill, which we consider would be seriously injured by any removal of the

holly and thorn-bush hedge on the terrace, or by placing any prominent iron fencing in lieu or in front thereof; and we trust that your Council will not sanction any such alteration, but will limit any works to the proper maintenance and repair of the hedge." The memorial was signed by Sir Edward Poynter, P.R.A., Sir James Linton, Alma-Tadema, R.A., J. Calcott Horsley, R.A., J. B. Burgess, R.A., Briton Riviere, R.A., Frederick Goodall, R.A., Thomas Ford, R.A., Ernest Crofts, R.A., John MacWhirter, R.A., Ernest Waterlow, A.R.A., W. Q. Orchardson, A.R.A., Eyre Crowe, A.R.A., Solomon J. Solomon, A.R.A., David Murray, A.R.A., Val Prinsep, R.A., and a very large number of artists, local residents, and gentlemen interested in landscape gardening. It was alleged that the hedge is a good growth and only needed the application of the necessary restoratives in the way of culture and clipping to preserve it from the objectionable "hairpins," which have already been erected at one end of the terrace as a specimen of the complete proposal. An amendment against the suggestion of the general purposes committee (to erect a fence 2 feet 9 inches high), to the effect that the hedge should be repaired throughout the old length of the terrace by planting quick and holly plants, and that no fence should be used higher than the existing hurdles, was proposed and seconded. After an assurance was given that the Council had no intention to erect a "hairpin" fence of an unsightly nature, it was resolved that the best should be made under the existing circumstances of the hedge, so as to preserve as far as possible the rural view from the terrace.

#### THE JUDENSTADT, PRAGUE.

THE resolve of the authorities of Prague to remove the unhealthiest parts of the city will be fatal to the Judenstadt, or Jews' town. Every visitor to the Bohemian capital will remember that strange quarter, which was more of a memorial of ancient prejudices against the Hebrew race than similar regions in other cities. Formerly the Jews, however wealthy, learned and skilful, were compelled to reside there, and dare not be seen outside the quarter after 8 P.M. But during the greater part of the present century that restriction has been abolished. The narrow streets are, however, the most crowded part of the Altstadt. From its proximity to the Moldau the quarter is subject to periodical floods, and its removal was long ago dictated by the necessity to keep down the death-rate in Prague and elsewhere. But many associations will vanish with the old houses. The Judenstadt is supposed to be the oldest settlement of the race in Europe, for it is believed the Jews were buying and selling and suffering there before the Christian era commenced. Whatever truth may be in the supposition, there are two treasures which date from a remote age, and which still appeal to Jews in many parts of the world. One is the synagogue, the other is the burial-ground. Both have been often described, but we doubt if any more suggestive account of them has appeared than one by the late Sir Gilbert Scott, R.A., which may not be familiar to some of our readers. It has acquired a new interest, and runs as follows:—

I had walked out for air on a sultry Sunday evening, and having heard that there was there a synagogue of the thirteenth century, it occurred to me to seek for it. Having wandered for some time through the narrow but picturesque alleys of the Jews' quarter, where one sees Hebrew signboards on nearly every house, and Hebrews of all grades about the streets and at the doors and windows, and having been once misdirected to a more recent, though still Mediæval synagogue, I at last found the gloomy edifice; a building of double, high-gabled roof, but externally with no architectural features beyond the narrow lancet-lights in the sides and circular windows of simple tracery in the gables. It was open and service going on. Having never seen a Jewish service, much less in such a place and in so interesting a building, I entered, not without trepidation, through a rather rich Gothic doorway, whose tympanum is decorated with the flowing vine, the badge of the house of Aaron, and one of whose jambs bears a stone alms-box, with Hebrew inscription nearly of the original date. Within, all was dismal and gloomy, though far from being devoid of beauty. The vaulted ceiling is sustained by two lofty octagonal pillars, of good proportion and design, and by alternate shafts and corbels in the walls; but walls, pillars and vaulting are all enveloped by a thick encrustation of black, probably from the smoke of candles, while the narrow windows, high up in the arches of the groining, shed in the dusk evening but a feeble and indistinct light. The centre of the building, including the two pillars, is enclosed as a kind of choir by a breast-wall of stone, bearing a brass screen, terminated, I think, by candles, and by the often-repeated badge (as they tell you) of the house of David, the double intersecting triangle so frequent in Christian churches. Within is a sort of stone altar, on which they say that the books of the law are laid; while in the centre of the eastern end are stone steps (flanked by dwarf walls and high obelisks, bearing candles, &c.), leading to a curious Gothic



tabernacle (now nearly hidden by later work), where these ancient Hebrew rolls are deposited, and in whose rich gable may be seen again the vine of the house of Aaron. Around the walls on all sides are ranges of stalls for the worshippers. I did not, however, distinguish all these details on my first visit, my thoughts being otherwise arrested. I shall never forget the unearthly appearance of the place; its strange arrangement, its gloom, amounting almost to horror, but above all, the uncouth appearance of the worshippers, sitting in their hats, muttering over their Hebrew prayers, while their bodies rocked backwards and forwards as if in agony, and every now and then their mutter, by general consent, raising itself into an inhuman scream. I felt as if among Eastern dervishes, or followers of some dismal mysticism, with which the outlines of our Christian architecture only the more strangely contrasted; but when the thought came over me that these were the very children and people of Abraham, those to whose forefathers the law had been given from Sinai, through whom came all the promises, and from whose race alone we know the existence of the true God, I felt so overwhelmed by the contrast presented by their now degraded and ruined state that I could stay no longer, but made a precipitate retreat. At the door I was stopped by an old Jew, who inquired if I would like to see their ancient burial-ground. This being more congenial with my feelings than to emerge at once into the land of the living, I was glad to take the opportunity of seeing the place—and a most marvellous sight it was. A narrow slip of land between the backs of ancient streets, bending and zigzagging in and out for, perhaps, a quarter of a mile among the gloomy houses, till it terminates on the silent banks of the Moldau. It dates back (they say) nearly a thousand years, and here, till the thirteenth century, they met in a subterranean synagogue. The burials have been discontinued for many years, yet the whole space is piled up with grave upon grave till mounded all over like the site of a Mediaeval stone quarry; every mound and every hollow is covered and filled with gravestones of antique appearance, bearing Hebrew inscriptions and each marked with the badge of the tribe or family of the deceased, the "stems" of David, of Aaron, of Levi and of Israel (probably meaning Judah) being the most prominent. From among these crowded and moss-grown stones protrude (like the stunted oaks of Dartmoor) the dwarfed and cankered trunks of a forest of ancient elder-trees, whose matted branches seem to sympathise with the low estate of those whose bones they overshadow, and bend down upon them so closely that one has almost to creep to make one's way among the tombs. It is difficult to say whether in the synagogue or in the graveyard are to be found more literally "the dry bones of the house of Israel;" but, sad as are the ruins of an ancient temple of God, there can be no doubt that the ruins of His ancient people present a yet more melancholy object to the contemplation.

It was nearly dark when I left this most unearthly of earthly resting-places, and returned towards the dwellings of Christians, deeply impressed with the thought of those through whom we inherit the promises having been themselves cut off through unbelief.

### BIRMINGHAM ARCHITECTURAL ASSOCIATION.

AT a meeting of this Association on January 8, Mr. E. Preston Hyth (secretary to the School of Art) gave an address entitled "The Architect as a Teacher." It was the duty of the architect, he said, to stimulate work in the allied arts. He could render to the community great service by facilitating the employment of worthy sculptors, mural decorators, wood-carvers and others. In this way his influence would also penetrate beyond those craftsmen working immediately under his supervision. This intimate connection between the arts was clearly recognised in America. The attendance of young architects at the various classes of the Birmingham Municipal School of Art was fraught with advantage to all concerned. It would be worse than a paradox if a community which spent large sums upon art education should itself erect unworthy buildings. The possibility was considered of appointing, in connection with the First Commissionership of Public Works and Buildings, an advisory council of leading architects, chosen on representative lines; precedents could be found for the establishment of such a council. Giotto would not have done his great work at Florence had he not been appointed master of the works of the cathedral and architect of the city wall and of the towns within her territory. Attention was also called to the fact that, at least since 1885, no member of the Birmingham City Council was in the municipal diary described as an architect. Birmingham did not stand alone in this matter, which was noticeable in view of the development of local duties and of their interest and importance to architects. In conclusion the lecturer summarised the work of the Municipal School of Art. A hearty vote of thanks was passed to him, on the motion of the president (Mr. William Henman), seconded by Mr. H. T. Buckland and supported by Mr. W. H. Bidlake.

### HEIGHTS OF HOUSES IN PARIS AND BRUSSELS.

AN inquiry is in progress by the Board of Trade and Transportation in New York concerning the height of houses in cities. Mr. E. G. Wilson, president of the Health Department, supplied the following summary of the regulations of the authorities in Brussels and Paris regarding the limitation of the height of buildings:—

#### Brussels.

The height of house frontages in public streets is determined by the width of the street. The maximum height of frontage is:—

1. Twenty-one metres (68'88 feet) on public places, boulevards and streets of 15 metres (49'2 feet) wide and upwards.
2. Twenty metres (65'6 feet) in streets 14 metres (45'92 feet) wide.
3. Nineteen metres (62'32 feet) in streets 13 metres (42'64 feet) wide.
4. Eighteen metres (59'04 feet) in streets 12 metres (39'36 feet) wide.
5. Seventeen metres (55'76 feet) in streets 11 metres (36'08 feet) wide.
6. Sixteen metres (52'48 feet) in streets 10 metres (32'80 feet) wide.
7. Fifteen metres (49'20 feet) in streets 9 metres (29'52 feet) wide.
8. Fourteen metres (45'92 feet) in streets 8 metres (26'24 feet) wide.
9. Thirteen metres (42'64 feet) in streets 7 metres (22'96 feet) wide.
10. Twelve metres (39'36 feet) in streets 6 metres (19'68 feet) wide.
11. Eleven metres (36'08 feet) in streets 5 metres (16'40 feet) wide.
12. Ten metres (32'80 feet) in streets 4 metres (13'12 feet) wide.
13. Eight metres (26'24 feet) in streets 3 metres (9'84 feet) wide.

The height of frontages is taken at the middle of the buildings from the pavement to the cornices of the coping, so as to include attics. The width of public roads is measured from the face of the frontage walls.

#### Paris.

The height must not exceed the following measurements, taken from the footway or from the pavement at the foot of the façade of the building, including the entablature, attics and all erections plumb with the front walls.

Ten metres (39'36 feet) for public roads less than 7'8 (25'58 feet) metres wide.

Fifteen metres (49'2 feet) for public roads between 7'8 (25'58 feet) and 9'74 metres (31'95 feet) wide.

Eighteen metres (59'04 feet) for public roads between 9'74 (31'95 feet) and 20 metres (65'6 feet) wide.

Twenty metres (65'6 feet) for roads, squares, cross-roads, streets, quays, boulevards, twenty and more metres in width.

The mode of measure indicated is not applicable to buildings on a slope, except those whose length does not exceed 30 metres (98'4 feet). Beyond that length the buildings must be lowered according to the declivity of the ground. If the architect builds several detached houses, the height must be measured separately for each according to the rules above mentioned. The height of buildings bordering private paths, passages, blind alleys, &c., must be determined according to the width of these roads or spaces, in accordance with the rules fixed for ways or spaces adjoining the public roads. Whatever the character of the buildings, more than seven storeys above the ground floor, including the entresol, can never be allowed.

### THE CASE AGAINST THE ECOLE DES BEAUX-ARTS.\*

THE title which the Secretary of the Society and I selected for the very short paper I am going to beg you to listen to with such Christian charity as you possess is hardly descriptive. It is a little in the line of a "scare-head," and I want to modify it. I don't mean to savagely attack the Ecole des Beaux-Arts, and, by implication, all other architectural schools where the academic system of instruction is in vogue. If I wanted to I should not have the right, for I never had any practical experience in any school of that kind. I should be adopting the malodorous tactics of a certain notorious personage in this city, who proceeded to damn the exquisite statue of a Bacchante, now flitting elusively through the courts of the library, before he had seen it.

What I do want to attempt, however, is an inquiry into the methods and results of this system of education, with a view to finding out if it is not defective in certain directions.

\* A paper read by Mr. Ralph Adams Cram before the Boston Society of Architects and published in the *American Architect*.



Ever since I came to look on church-building as one of the most promising fields of architecture, and as one of the most dignified and satisfying as well, I have been thinking more or less about the present system of architectural instruction, which by implication denies that architecture existed between the fall of Rome and the sixteenth century, and also ignores the fact that churches are ever built nowadays, or that they are a legitimate subject for an architect's consideration. The more I thought about this curious phenomenon the more remarkable it appeared, but I set it down to the rationalism that pervaded every department of life until a few years ago. Of course it was impossible for atheism to acknowledge any beauty in the work which owed its genius and its very experience to an exploded superstition, while it was equally impossible that the buildings which were grotesque anachronisms, the outward expression of a fast perishing folly, should be looked on as matters of the least importance. Under the circumstances, ancient and new paganism were the only modes of civilisation that offered anything of value as models for contemporary architecture.

I still think this motive lay at the bottom of the thing when the present method of architectural education was evolved, but during the last year or two various things occurred which led me to think that other criticisms might be brought against the accepted system besides its ignoring a very important branch of the art and doing nothing to assist students to acquire some knowledge that would be of use to them in this field. Among other things I became convinced that much time was wasted in acquiring useless methods and information, that false canons of taste were often laid down, that enormous labour was wasted in cramming the mind of the student with the most minute details of construction, strength of materials, &c., in order to fit him for practical work, while almost nothing was done to help him to tackle the only problems that in all probability would come before him for the first ten years of his practice.

I mean to speak of these things more explicitly by-and-by, but first I want to tell you just what the events were which brought me to my present position of antagonising this system of classical education.

Well, first of all, some time ago I knew a young draughtsman who was enthusiastic and eager to acquire all the useful information he could find. He joined a class in planning, directed by a very brilliant representative of that system which prides itself enormously on its prowess in this particular direction.

There was trouble from the start. This boy was practical to a degree and loaded with common sense. He soon found out that the questions of convenience in arrangement of rooms, their dimensions, economy of space, adaptation to function, harmony with environment were secondary considerations. There was one great thing to be obtained, and that was a decorative plan. The lights and darks must be well proportioned. Formality and perfect balance were indispensable, and a finely-drawn piece of mosaic flooring made amends for a deplorable lack of light.

In fact, he was really engaged in decorative design, not in architectural planning.

Diplomatic relations finally ceased in this wise: he grew weary of designing impossible city halls and inadmissible Italian villas, and handed in—horrible to relate—a scheme for a large village church, English Perpendicular in style and carefully arranged with regard to its needs and possibilities. Of course, he did very wrong to do this; he should have known that a country church is not to be spoken of in academic society. The plans went in, however, and there was war. When the instructor got his breath he tackled the awful situation bravely—for he was a conscientious man. I saw the result afterwards when the smoke had cleared a little. What had been a good plan, well adapted to its functions and laid out with due regard to cost and surroundings, irregular of course, and capable of very picturesque though quiet treatment, had become a nice study in black lines and spots, and white areas beautifully proportioned to them. It was admirably done and would have made a charming figure in a formal wall-paper, but it would hardly have commended itself to a building committee.

So far as the exterior was concerned, the revolution was complete. Every vestige of English spirit was gone and Montmartian Romanesque had taken its place.

A little later, a friend in whom I was very much interested and who was just about to graduate from the architectural department of a prominent school, asked me if I did not think it would be a good idea for him to submit a design for a Gothic church as his thesis. I remembered the experience of my friend the draughtsman, and tried to dissuade him from his insane idea. He persisted and fought nobly. Day after day with tears in his eyes he told me how his cherished plan was being maltreated, until it was fast becoming that kind of thing one finds in trade-books on church-building. At last he gave up the unequal fight, for he had been kindly but firmly advised that he was running an awful risk in sending in such a thing

as a thesis drawing of a Gothic church. He began again, and achieved a proud success with an Italian villa, in which the toilet-room and breakfast-room were beautiful oval apartments of equal size, balancing nicely, while the library occupied one projecting wing, the kitchen the other—the external treatment being identical.

Finally, one of our boys wanted to take a course in an architectural school, and asked my advice as to where he should go. I did my best to study up several schools, and in the process I found out things I had never known before. In one school the academic rendering was something exquisite, and the beauty of the transparent shadows and the lovely small trees was only equalled by the fabulous size of the sheets of paper on which a little square of plan was magnificently surrounded by the most wonderful gardens. I reflected, however, that it took a month of a boy's life to create one of these charming things, and that after he left the school no conceivable circumstances could arise which would lead him to indulge in this form of decorative art, and so modified my admiration.

In another school I was assured that the system of instruction was modelled with absolute fidelity on that of the Ecole des Beaux-Arts, but I reflected that in America a young architect's duties are chiefly the designing of country houses and churches, and that the results achieved in these lines by the output of the Ecole—so far as France is concerned—are not brilliantly successful. Finally, I recommended the architectural course at Harvard as the most practical and logical, and as the one least accurately modelled on French lines, and I have no reason, thus far, to regret this decision.

The result of my experiences and investigations was that I became convinced that the accepted system of education, as we see it in the Ecole and in practically all but one of the schools in America, did more harm than good, and I want to justify this position if I can.

First of all, however, I must declare my intense admiration for certain principles held in this system, and my gratitude for the influence exerted. It is unnecessary to plead for these things, however, for everyone admits them. One is the steady curbing of a student's tendencies towards fantastic originality, silly picturesqueness, crazy irregularity. I doubt if this work could be done better than it is, and it is imperative. It is about the only thing that can reform architecture in America and redeem it from its only too often fantastic absurdity. There are many other fine points in the system: the thorough grounding it gives in the Classical orders, the training it affords in proportion and composition, the solid kernel of good in its system of planning; but if none of these existed the first *raison d'être*, the civilising of barbaric impulses, would be cause for praise and admiration.

On the other hand, the faults are, I think, quite as clear and deserving of sincere condemnation.

Many of these faults, while not very grave in themselves, have a mischievous effect for the reason that in too many cases young men are subjected to them at just the wrong time. If a man could have three or four years' experience in an architect's office, then travel for a year or two on the Continent and in England, he would be proof against bad influence; his taste would be formed, practical ideas and the nature of everyday requirements would be instilled into him, and he would then be in a position to reject the bad and accept the good. And he would do this. Very few men, after a little solid experience and a fair acquaintance with the architecture of Europe, could fail to see through some of the methods and principles with which he would come in contact in the Ecole. This course is seldom pursued, however, and a raw, unformed youth goes through an American architectural school, and then passes directly to the Ecole, and the result is that in many cases his taste is vitiated, and he is in no position to select the great good which is afforded him, together with much of what I think very bad, and which if he would succeed he must diligently forget.

I have had occasion to advise a lot of boys as to how they should educate themselves for the architectural profession, and in every case I have urged them to get a little practical experience first, then see all they can of the art of the past, and then go to some academic school.

Admitting, then, that students are themselves largely to blame for the harm done them, since they start at the wrong end, let us see just what the harm is, at least, let me suggest what it seems to me to be, for I can only express my own feelings in the matter. I have no right to claim to represent any one else.

In the first place, the education in design is not practical; it does almost nothing to fit a man for actual practice. In the American school a student is crammed with stores of information that belong by right to civil engineers, sanitary engineers, specialists and experts. Judging from the list of studies in any four years' course, one would conclude that the object was to turn out men who could start in business the day after they took their degree, armed at every point and absolutely independent of experts and engineers



for all time. Look at the artistic side and you find the exact reverse. In nine cases out of ten a man just through an architectural course has never designed a country house, an eight-room schoolhouse, a country church, an apartment house or any other of the very things which alone he can get a chance at for ten years of his professional life. His custom-houses, post-offices, city halls and public baths have been designed for 10-acre lots, and with a ward politician's disregard of expense. He has been taught to space his voids and solids with exquisite delicacy, but in almost no case can he yield to this instinct in the future, for the conditions will not allow it. If by good luck he gets a chance at some big public building he lays out the plan on a system of units, and when it is too late he finds that hot-air ducts and exhaust flues have played tag with them. He has a twelve-storey office-building sprung on him, and looks in vain for scholastic precedent. Finally in despair he takes a lot of theses and pastes them together, one above the other, and trusts to the great American public to justify him.

Submit this statement to an advocate of the schools, and he will waive it away. "We teach the great fundamental principles of the art; we cannot concern ourselves with the details." But that is just what the poor architect has to do, and until he has made his reputation designing houses and churches, and his fortune building steel-framed slices of office-buildings, he must keep his mouth shut as to the great principles of the art.

Of course, it seems to me that it is a crime and an outrage for any alleged system of architectural instruction to ignore the great centuries of the Middle Ages, to deny that there ever was such a thing as Gothic architecture, and to forget that churches are still to be built. I am an awful fanatic on these points, and so I don't dare say very much about them; but it is my solemn conviction that, if we ever succeed in civilising ourselves, we shall one day admit that Gothic architecture is just as perfect in style, just as solidly based on knowable laws, just as representative of high civilisation, as the architecture of corrupt and tottering Rome and of the immoral Renaissance; while in impulse, in spiritual power, in beauty of line and mass, and light and shade, it is incomparably more worthy of study and of admiration.

Nor is the argument that it is unfitted to modern uses valid for a moment. It does not go in the matter of office buildings and synagogues. And Unitarian churches and city halls, of course, nor ever can until both style and requirements are modified by time. It is not in harmony with modern civilisation; it is an anachronism that also is sure. But it is in harmony with the nature of those still vital institutions, the Roman Catholic and Anglican Churches, which are still blazing anachronisms—thank God.

Yet the great period of architecture when it was essentially Christian, that period which expressed itself in a form which is incomparable for splendour of imagination, loftiness of spirit, sublimity of inspiration, absolute, abstract beauty of form and composition and design, has no place in the modern system of academic instruction, and I propose to hold with all the vigour I can command, that a system that wilfully shuts its eyes to all this marvellous period of art, so instructive, so civilising, so full of inspiration, is a bad system.

*To be concluded.)*

## TESSERÆ.

### Cromlechs.

THE interest of these wonderful relics consists mainly in the appeal which they make to the imagination. It is open to the mind to people times about which history is absolutely silent with men of any race, speech or social condition which it may think good. It is open to it to conceive objects of whose use or origin we have absolutely no record, as being brought into being for any end which it may think good. The imagination may work in very different ways on subjects of this kind. It may work in a discreet way, under the guidance of good sense and sound inference, or it may run about in an utterly frantic way, in any direction in which the unbridled impulse of the moment may lead it. In the former case it may reach conclusions which sometimes are hardly less certain than the conclusions to which we are led by direct evidence. A chain of links, each of the nature of internal evidence, will sometimes have a cumulative force inferior only to the very highest forms of external testimony. But, on the other hand, people who have a mind to be wild cannot be hindered from being as wild as they please on subjects where there is no direct testimony to restrain them. It is capable of demonstrative proof that a cromlech was a tomb; it is capable of proof almost demonstrative that it was not an altar. It was undoubtedly a tomb, because the remains of the persons buried have been over and over again found within it. But this argument alone would not prove that it might not be an altar as well. Perverted ingenuity might say that the remains were the remains of human victims who were first sacrificed on the top and then buried underneath. It goes a good way to shake any such theory that the top stone is always

found with its curved face upwards and its smooth face downwards. This is clearly the arrangement best suited for the building of a tomb; it is equally clear it is the arrangement worst suited for the uses of an altar. The stock answer we believe is that it was so put to make the blood run off more easily. This explanation seems wild enough, but there is no knowing what such people as those must have been who built cromlechs at all might not do. It is still more difficult to evade the facts that the cromlechs as we have them are mere ruins—that as the dead man has been dug out of his tomb, so his tomb itself has been simply detached from the mass of earth and smaller stones which originally covered it. About this there is no doubt in some cases; in others the belief solely rests on the argument from analogy. These last, the genuine Arkite or Cuthite would doubtless affirm to be a distinct class, and he would maintain that to these at least his cherished theories applied in their fulness. Nay, he might argue that, even in the cases where the cromlech has been actually disinterred from within its barrow, the persons buried were first sacrificed, then buried and lastly covered over.

### Pietro Perugino at St. Giusto.

The cloister and the church itself were the localities where the painters chiefly worked. Their choicer materials were often prepared by their employers; and fortunate was the artist, if otherwise skilful, whose lot happened to be cast among a community celebrated above others for attainments in chemistry. Such was, for example, the advantage which Pietro Perugino enjoyed when he resided with the monks of St. Giusto alle Mura. The description which Vasari has left of that convent—in ruins even in his time, and now no longer to be traced—may throw some light on the habits of the monks at earlier periods. "Above the chapter-house was a large room where those fathers occupied themselves in making glass for the windows with the furnaces and other conveniences necessary for such operations; and as Pietro, while he lived, made the cartoons for these, all the works of the monks produced in his time were excellent." After speaking of the beauty of the garden and of the careful manner in which the vines were trained round the cloisters, the historian continues:—"In like manner, the room where, according to their custom, they distilled odoriferous waters and medicinal preparations was furnished with every apparatus of the best kind. In short, that convent was among the most complete and best arranged in the Tuscan state; and I have been desirous to leave this memorial of it, because the greater part of the pictures which it contained were by the hand of our Pietro Perugino."

### Restrictions of Greek Painting.

It may be questioned whether the sculpture of the Greeks was not confined in its aim almost as much by the nature of the art as by the conditions of Paganism. As it was, the ancients seem to have felt the difficulty of combining (in permanent representation) ideas of suffering with those of beauty and physical power, and they generally contrived to restrict the expression of such ideas to the forms of early youth or of age. But, if we may judge from the descriptions of subjects and from inferior works which remain, they observed the same principles in painting, and this tends to show that they had not fully comprehended or developed the powers of that art. The less restricted means, and therefore less exclusively abstract treatment of form, which painting, as compared with sculpture, employs, its variety and individuality of character, its command of colour and light as vehicles of expression, and its "power of dealing with the eyes," constitute a language which leaves it free to assert the claims of the moral human being consistently with the full use of the best attributes of art. It was the high privilege which during the great epochs of its modern culture enabled painting more sensibly to define the relation which in all ages has been vaguely felt to exist between the beauties of nature and the moral government of the universe, for it was not till that moral order had been fully revealed and its possible connection with finite conditions ratified, that the relation could be distinctly felt.

### The Theory of Architecture.

When the revival of classical literature produced, as a natural consequence, the revival of the study of ancient art and monuments, then the enlightened men of the sixteenth century applied themselves to the patient and earnest investigation of those relations which obtained in the edifices of classic antiquity. They laid down the rules and laws of proportion in regard to the orders dimly shadowed by Vitruvius. These canons have been misunderstood and misrepresented in later times, and never more so than in the present. They were offered as elementary, liable to change as taste and refinement of perception might suggest, but they have been considered as arbitrary and empirical trammels to taste; and what were meant as merely proximate results have been assumed to be positive and final. Mediæval art has not, as yet, been so investigated, and some may say it never can be. Can positive



proportions be laid down as to the relations in size in the several parts of a column, the base, shaft and capital, in the group of a range of mouldings, in the mutual relations of proportion in the apertures of doors or windows, or in their respective dressings? No law has been discovered in the relative bearings or openings of arches of naves in their breadth and height. The just width and height of a nave, or tower, or spire have still to be ascertained. Who has yet had the patience or grasp of mind philosophically to dive into the mysterious relations and parts which constitute the beautiful in the choir of Lincoln, in the nave of Westminster Abbey, in the façade of Cologne, or in the massive energy of Durham? Whence the source of the impressions which these remarkable structures produce? In what consists the grand peculiarities of Greek art? Its moral grandeur and unequalled purity are not merely legendary, nor is our admiration based upon our religious feelings, as is the case with Mediæval productions. Our recognition of their power is apart from all passion. Our reverence rests upon objects devoted to a distinctly different theological origin. We have no immediate affinity of customs, thought or literature in common with those of the times in which they were produced. May we not be considered as impartial judges, uninfluenced by considerations that might otherwise warp the judgment, when we bow with reverence to the mighty genius of the Greeks in art and in letters?

### English Mediæval Sculpture.

It has been asserted that, during the Middle Ages, all the western countries of Europe produced remarkable works of sculpture; but it was in Italy alone that art attained to a perfection worthy of comparison with the antique, and in Italy alone can its monuments be thoroughly studied. Let anyone, however, go to Wells, Lincoln, Peterborough, Westminster Abbey, or several other of our glorious Mediæval churches and cathedrals—without asking him to cross the sea, and wander over France and Germany—and a first short view will give him magnificent examples of sculpture done by Englishmen in England better than anything of the time abroad, which, considered under the more essential aspects of art, were never surpassed, and not often equalled by the most celebrated productions of ancient Greece or modern Italy. What has been done may be done again in England by Englishmen. Richard II. granted a license to Cosmo Gentili, the Pope's collector in England, in 1382, to export three great images of the Blessed Virgin: Mary, St. Peter, St. Paul, and a small image of the Holy Trinity, without paying duty for them. Who can tell but, some future day, London will once more send statuary to Rome?

### Early English Painted Glass.

Early English painted windows are in general almost entirely composed either of coloured glass or of white glass. The coloured windows are nearly exclusively appropriated to pictures and the white ones to patterns. Both are usually surrounded with a wide coloured border, returning along the bottom of the window. The coloured windows are perfect mosaics, of the most vivid, intense and gem-like tints. Their tone of colouring is deep, harmonious and rich, but not gay; they exclude more light than perhaps any other painted windows, and their general effect is extremely solemn and impressive. Some windows of this description, from the smallness and number of the pieces of glass they contain, present at a distance only a rich and confused assemblage of various colours, their design being as little defined as that of a Turkey carpet, to which they have often been likened. The white windows have a remarkably brilliant and silvery, though cold appearance, owing to the greenish blue tint of the glass. Their effect is grand and imposing, especially when the window is of considerable magnitude. There are three principal classes of coloured windows in this style, which for the sake of convenient reference may be termed medallion windows, figure and canopy windows and Jesse windows.

### Light in Art.

Light may be considered as the representative of an important element of beauty everywhere traceable in nature, and it is the more worthy of attention since the fine and scarcely perceptible modifications which it exhibits may serve to correct an exaggerated stress or distinctness of character. As the type of gradation it embodies and illustrates the principle that no creature, no form, no colour stands alone in nature; but that every such result is what it is by means of a chain of degrees attesting either its relative or absolute excellence. Light is, therefore, the abstract idea of that "greater and less" which has been before illustrated in reference to organic form. It is the antithesis to colour, though its source. Colours, unbroken by the varieties of light, differ in kind rather than in degree. They owe their harmony to gradation, and thus only become adapted to the completeness of nature. The effect of light on forms is the illustration and epitome of the same principle. The boundary is lost and found, and is commonly most relieved

where it is most significant. The acme of splendour is one, for if repeated in brilliancy it is smaller in mass. The general appearance teaches that unvaried sharpness or unvaried softness are alike untrue; that equal distinctness is, in its ultimate impression, indistinctness; and that where all is salient, the prominent fact is still wanting.

### Captain Baillie, the Eteher.

William Baillie, who was born in Kilbride, co. Carlow, in 1723, having served for some years in the wars of the time, was allowed by the Commander-in-Chief to sell his commission, as a reward for the long and severe service he had undergone. He had, after the engagement under Prince Ferdinand, amused himself with drawing the plan of the battle of Minden, which plan he gave to a brother officer, and by some means it found its way to Ferdinand, who sent him a present with his compliments, as a return for the pleasure which His Highness received from it. When Captain Baillie retired from the army he was made a commissioner of the stamp duties, in which situation he acted for twenty-five years, and retired with a pension from that board which he enjoyed until his death, which took place in December 1810, in the eighty-eighth year of his age. The productions of art by Captain Baillie partake of professional excellence. At what time he took up engraving is uncertain. The portrait "scraped" by himself after a picture by Hone is highly creditable to his talents; the figures supporting this portrait are by Caroline Watson. He has also engraved above one hundred plates after various masters, fifty of which were published about the year 1774, in one volume, by Walter Shropshire, in Bond Street. In 1804 he was engaged in another volume, part of which had already been before the public. It is said that his productions have fetched much higher prices at Dutch auctions than they ever did in England. In some of his works he has blended mezzotinto and etching with great success, as may be seen in his portrait of Vitenbogaard, the goldweigher, after Rembrandt. He was much employed in forming collections of art for several of the nobility, among whom were those of Lord Bute and Lord Liverpool's at Addiscombe Park; and he patronised Richard Wilson, the landscape-painter. Captain Baillie married between seventy and eighty, and had several children; these he has made the subjects of his pencil, as a study of naked cherubims, in the style of Rubens. In granulating his plates he used turkey stone, a medium resorted to by the celebrated Meilan. In the study and prosecution of the arts, Captain Baillie was heard to say he passed the happiest hours of his life. "Pursue the arts," said he once to a young friend, "with the satisfaction and avidity which I have, and they will prove a source of comfort and pleasure to you when you are old." Among the works of Captain Baillie is an etching by Rembrandt, restored by the captain, who found the plate among some old copper. He died in 1810.

### GENERAL.

**M. Detaillé's** water-colour drawing of the review at Chalons, which was executed on a commission from the French Press, has been sent to the Emperor of Russia. It is considered to be a successful work.

**The Committee** of the Society of French Artists for the years 1897, 1898 and 1899 will consist for the section of architecture of MM. Loviot, Garnier, Daumet, Laloux, A. Normand, Pascal, Raulin, Ginain, Coquart, Redon.

**Mr. W. Burton, F.C.S.**, will on Monday next commence a series of four Cantor lectures at the Society of Arts, on "Material and Design in Pottery," and which will treat of simple earthenwares, faience and fine earthenwares, stonewares and porcelains.

**Mr. W. Galt Millar, F.S.I.**, architect and surveyor, Reading, has taken into partnership Mr. W. J. Nasmyth, member of the Society of Architects, London, who will carry on business with him under the style of Millar & Nasmyth, at Reading, and at 43 Cornmarket Street, Oxford, Mr. Nasmyth devoting his time exclusively to the interests of the Oxford branch.

**Mr. John A. Gill Knight, A.R.I.B.A.**, architect, has removed to 21 Godliman Street, Doctors' Commons, London, E.C.

**The Society of Engineers** will hold one ordinary meeting a month from February until June, and also during October, November and December next, at the Royal United Service Institution, Whitehall.

**Mr. W. T. Robson**, architect, of Newcastle-on-Tyne, died rather suddenly in the local infirmary on the 11th inst.

**The House** where Keats died, in the Piazza di Spagna at Rome, is not at present being used for purposes which are worthy of the memories which enshrine the name of this English poet. The fact that Keats died in the house in question on February 24, 1821, is recorded on a white marble tablet affixed to the wall, and that is all.



# The Architect.

## THE WEEK.

AN example of what can be done in the pursuit of science and with success under adverse circumstances was brought before the meeting of the Geological Society of Glasgow on the 14th inst. Mr. J. S. M'LENNAN read a paper on "Eolithic Flint Finds near Ightham, Kent," and in the course of it he referred to the investigations by a local student of prehistoric archæology, Mr. BENJAMIN HARRISON, "grocer and geologist." Led on to the study of natural history as a boy by the perusal of WHITE's "Selborne," Mr. HARRISON afterwards took up the kindred sciences of geology and archæology. The discovery in France of flint implements in the valley of the Somme induced him to examine the valley of the Shode near his native village, and afterwards the Holmesdale valley. In the gravels of these he found numbers of palæolithic flints. In 1885 he turned his attention to the surface of the chalk plateau, about 700 feet above sea level. Further investigations have pretty clearly shown that the plateau flints are of a ruder and older type than those of the river gravels in the valleys, and they are therefore now classed as eolithic, as distinguished from the later neolithic and palæolithic types. The late Sir JOSEPH PRESTWICH took a deep interest in Mr. HARRISON's work, and did much by his writings laid before London scientific societies to settle the debated questions of the human workmanship of these prehistoric flints and to bring the work of the grocer-geologist into the notice it deserved. It has been Mr. HARRISON's habit to keep a correct list of and to make a sketch of every specimen he has found, also to mark the place where it was discovered on a 6-inch survey map of the district. Most of his flint-hunting has been done after early dawn, so that he might get home in time to open his shop. Mr. M'LENNAN described his visit last year to Ightham, where he met Mr. HARRISON, after an inspection of whose collection he began to hunt for himself, and was successful in obtaining quite a number of undoubted implements. An account of these, and of the various localities where they were found, concluded the paper. In illustration the author exhibited his collection of flint implements, which was supplemented by another series from Scotch and Irish localities.

THE overflowing bog near Killarney was an unfortunate phenomenon for the people of the district, but it has given occasion to some of the students of science in Dublin for the display of their ability in drawing conclusions. It is needless to say there is no agreement about the cause of the flow, which has displaced about one million cubic yards of bog stuff. It was stated by Professor SOLLAS, at a meeting of the Royal Dublin Society this week, that there are records of eighteen similar occurrences in Ireland in the last century, while outside Ireland only four were known. It appears that the bog, immediately before the overflowing, was a viscous fluid enclosed within a peaty envelope. It is said of similar occurrences that they were caused by the pressure or onrush of subterranean water, and the structure of the country would lead geologists to suspect the existence of springs in connection with the bog in Kerry, and hence the eruption of water from below might very probably have played a chief part in producing the occurrence. The earthquake ten days previously may also have been a factor, as it was felt as far west as Miltown Malbay. Probably both of these causes contributed to the flow. Views and sections of the valley showing the effects of the flow were shown by Professor DELUP, Professor LLOYD PRAEGER and Professor GRENVILLE COLE, who were associated with Professor SOLLAS in preparing the report. Professor JOLY invited the submission of hypotheses to account for the occurrence, and said he thought the severe easterly gale that had prevailed on the previous night had been overlooked. Professor SOLLAS said that though he welcomed any hypothesis on the subject, still he did not think it necessary or correct to adduce the gale as a contributory cause. The committee were all of one mind in attributing the occurrence primarily to the influence of subterranean springs. It is to be regretted that in

Ireland, which is *par excellence* the land of bogs, they should not be in the very forefront in discovery regarding the effective treatment of them.

A MEETING has been held in Berlin to consider what course of action should be adopted in relation to the Paris International Exhibition of 1900 by the representatives of the German art industries. Delegates from the various districts attended. The first resolution arrived at was that there should be no representation of the works of particular states, districts, cities or towns. In the exhibition there will be no need to ask the old question, "Was ist des Deutschen Vaterland?" for all the objects in the German section will be evidence of unity. The whole arrangements will be entrusted to a commissioner who will represent the Imperial Government. Although the local character of the productions may not be manifested it is accepted as an obligation by manufacturers that they are to spare no trouble in order to ensure a display that will be worthy of Germany. It is also understood that the privilege of co-operating is to be regarded as a sufficient reward, for expectation of immediate profit is not to be calculated on.

IN the Prussian budget a sum of 500,000 marks is provided as an instalment towards the cost of erecting a new museum in Berlin, which is estimated at 5,850,000 marks. The site selected is the northern part of the island on which the royal palace, the National Gallery, the old museum and various other buildings now stand. The need of an additional museum is manifest to every stranger who visits Berlin. The accumulation of works of art has long outgrown the accommodation provided in the two museums which were completed in 1840. In consequence of the limited space the sculpture from Pergamus cannot be properly exhibited. Many other examples of ancient art may also be said to be entombed, for they are deposited in places which are only dimly lighted. The quantity of Renaissance sculpture is likewise an embarrassment to the curators. As in no other city are so many earnest students of art to be found, it is time some facilities should be allowed to them in their pursuit of knowledge.

MANY of the enactments of the French Code are enforced in Switzerland as well as in France. Among others is one fixing the responsibility of architects for defects in any structures they have designed. The term is ten years. The French architects have vainly endeavoured to obtain a discharge from their guarantees at an earlier period, but monarchical, imperialist and republican Governments are equally inexorable. In Switzerland the law appears to be more severe as it is of foreign origin. A committee of the Central Society of Architects and Engineers are endeavouring to get up a petition to the Department of Justice and Police praying for some relaxation of the obnoxious responsibility. Several of the cantonal societies have co-operated in the effort. But there are many objections to a change, and it is imagined that if the architects have many responsibilities, they have also many privileges.

THE third series of examples of "French Wood Carving from the National Museums" (B. T. BATSFORD) has appeared, and many will consider the plates as the most interesting of all. They bring before us examples of the seventeenth and eighteenth centuries. It was a time when old limitations were treated lightly, and the artists gradually obeyed no law but their own ability. Some panels are accordingly as freely treated as if they were copied from painted ornament. It is difficult to refrain from admiring them, and we need have no fear that English carvers will be tempted to stray so far from precedent. The carver of the subject shown on the last plate, a panel from the Musée des Arts Décoratifs, Paris, must have been an artist who was not bound to follow a pattern on paper, perhaps could not do so, but was able to create as he went on. A Gothic carver would be shocked at the indifference to the architect-uresque, but however heretical may be the composition it is gratifying to find that so much could be done by a man's hand. The other plates are of subjects which come nearer the possibility of imitation. The series should be possessed by every carver, and the plates can afford more pleasure to amateurs than those in the majority of technical books.



## FLORENCE AND TUSCANY.\*

IN one of the few written passages by Dr. JOHNSON, which the world is likely to remember as long as the reported fragments of his conversation, he said:—"Far from me and from my friends be such frigid philosophy as may conduct us indifferent and unmoved over any ground which has been dignified by wisdom, bravery, or virtue. That man is little to be envied whose patriotism would not gain force upon the plain of Marathon, or whose piety would not grow warm among the ruins of Iona." We need not say it is possible to be an excellent man and yet to remain unmoved by the power of association, which is supposed to be inherent in historic sites. COLERIDGE was one example. Although he was as sensitive to all refining influences as an Æolian harp to imperceptible currents of air, yet he acknowledged he could walk over the plain of Marathon without taking any more interest in it than in any other plain of similar features. In that obtuseness he was, as he pointed out, the opposite of Sir WALTER SCOTT, for whom every old ruin, hill, river or tree called up a host of historical or biographical associations. But as a rule healthy and instructed minds will be affected as JOHNSON desired, and as SCOTT was during every day of his life in Scotland. There are, of course, many degrees in the susceptibility to associations. But the humblest tourist who visits the North, although he may have the most elementary notions about Scottish history, sees enough to open his mind, and he generally returns with some respect for the ancient relations of feudalism. In the same way, after taking part in a cheap tour in Italy the most self-satisfied of cockneys will find he has enriched himself with ideas about art which are not obtainable by numerous visits to the metropolitan museums. He acquires much else which increases his knowledge about life in a former time which is sure to affect his native prejudices, and if he is not a wiser man on his return, at least he will be henceforth less conceited.

The educational effect which a short sojourn in Italy can produce is exemplified very clearly in the articles by that genuine representative of cockneydom, CHARLES DICKENS. When he arrived in Italy he judged everything by the London standard, and, of course, all seemed inferior in his eyes to what was to be found at home. But he discovered that Italy grew upon him as he became better acquainted with it, and, moreover, when he had acquired some acquaintance with the history of its artists and their works, there were fewer puzzles presented to his eyes. The man to whom noble figures on canvas or in marble were only coal-heavers or jolly young watermen was subdued by art, and in his last chapter we find him acknowledging its supremacy. "What light is shed upon the world at this day," he exclaims, "from amidst these rugged palaces of Florence! Here, open to all comers, in their beautiful and calm retreats, the ancient sculptors are immortal, side by side with MICHEL ANGELO, CANOVA, TITIAN, REMBRANDT, RAPHAEL, poets, historians, philosophers—those illustrious men of history beside whom its crowned heads and harnessed warriors show so poor and small and are so soon forgotten. Thousands upon thousands of faces, rigid with the strife and passion of the hour, have faded out of the old squares and public haunts, while the nameless Florentine Lady, preserved from oblivion by a painter's hand, yet lives on, in enduring grace and youth." And he closes his excursions by expressing the belief that "the wheel of Time is rolling for an end, and that the world is, in all great essentials, better, gentler, more forbearing and more hopeful as it rolls." DICKENS, who at first considered Italy was a country for which there could be no elevation, was unable to depart from it without expressing faith in its future happiness.

DICKENS represents one class of travellers who are deprived of the education or the sympathy which appears to create pleasurable feelings at almost every step in Italy. All they see suggests decay or death, and they are glad to escape from sights which they consider painful. Sometimes they try to conceal their own defects by proposing reforms

regardless of their unsuitability. There are, however, men belonging to another class to whom the country becomes, as it were, eloquent, and who can find more interest in ruins than in rows of modern factories. M. EUGÈNE MÜNTZ, the erudite conservator of the Ecole des Beaux-Arts, is one of the best types of them. From disposition, as much as from office, his thoughts are mainly occupied with the past, and his three large volumes on the "History of the Renaissance in Italy," his "Life of Raphael," and his numerous essays reveal that in considering the past he gives preference to the life of Italy. The splendid quarto he has completed, and which MM. HACHETTE ET CIE. have produced in a manner which suggests the esteem they have for the author, is a further revelation of the fascination which Italy exercises over M. MÜNTZ. People generally suppose that books of the size, being monumental, are bound to be oppressively serious and to be adapted only for occasional reference. In this case there is no heaviness or dullness. The author has delight in his subject and he endeavours to communicate what he feels. Italy is to him not merely a country abounding in beautiful scenes which can never pall upon the sight, but one which has become still more interesting through the efforts of its sons. Nature and art have combined to make Italy what it is, but while nature's works may be apparent to all, the majority of people are likely to be unable to appreciate art in any form unless they are guided, and as a cicerone M. EUGÈNE MÜNTZ is not easily surpassed. He has in his "Florence et la Toscane" described one part of Italy in a manner which hitherto was not attempted, and so many engravings have been introduced that a reader at his fireside can almost realise what is most interesting in the cities and country districts of which the author treats. Tuscany might not recall to Dr. JOHNSON heroism like Marathon, nor piety like Iona, although both qualities were often exhibited in its towns and fields; but for art it has only one rival, viz. a part of Attica. Rome itself was not so efficient an agent in the Renaissance as Florence. Acquaintance with such a representation of that city and its rivals as is possible in the book of M. MÜNTZ cannot therefore fail to be beneficial to all who believe that art should depend on realisation rather than on theory.

M. MÜNTZ begins with Pisa, the monotony of which he ascribes to the MEDICIS. He describes Florence as serving as the cradle of the Renaissance, Siena as personifying Gothic style, and Pisa as an incarnation of the Romanesque style in all its purity and grandeur. TAINE's description of Pisan work as "une renaissance avant la Renaissance" is adopted. To the President DE BROSSES there was nowhere "quatre plus jolies choses" than the cathedral, baptistery, tower, and Campo Santo of Pisa. DICKENS was afraid to do justice to them; but the play of lights and shadows through the tracery of the Campo Santo he considered could not be forgotten by the dullest mind. M. MÜNTZ considers the cathedral to be more interesting in itself than in its pictures or statues, "le contenant l'emporte ici sur le contenu," but as becomes the historian of the Renaissance he is not satisfied with so much unity. It does not offer us, he says, like other Tuscan monuments, the résumé of styles which succeeded each other since the Middle Ages, the picturesque mélange of productions of various epochs; the fourteenth, fifteenth and sixteenth centuries are only represented by isolated works; the archaeologists may be gratified by so much unity, the artist deplures it. DICKENS was much struck by ANDREA DEL SARTO'S *S. Catherine* in the cathedral. M. MÜNTZ also mentions it, but he prefers the *Sacrifice of Isaac* by SODOMA, which he considers worthy to hold a place between pictures by CORREGGIO and TITIAN. M. MÜNTZ is evidently wearied of the Leaning Tower from seeing so many reproductions of it, but he admits that Pisa lives on the *tour de force* of which accident rather than intention was the origin. It is impossible to study the baptistery without reflecting on the phenomenal success of NICOLAS of Pisa, whose sculpture was undoubtedly adapted from pagan examples in some cases, and possibly was never original. It is remarkable that the indebtedness was not detected by contemporaries, owing, we suppose, to the prejudice against antique examples which made simple folks afraid to look on them. Excellent as are the transformed gods and goddesses, M. MÜNTZ is right when he says they are not

\* *Florence et la Toscane, Paysages et Monuments, Mœurs et Souvenirs Historiques.* Par Eugène Müntz, Membre de l'Institut, Paris. Librairie Hachette et Cie.



comparable in nobleness of composition or gravity of style with the saints in stone carved by the French "ymagiers" about the same time in Paris, Rheims, Chartres, &c. JOHN of Pisa possessed some of his father's ability, but M. MÜNTZ is careful to point out his indifference to architectural lines in his pulpits and to scale in his reliefs. In the Campo Santo the two principal wall-paintings are *The Last Judgment* and *Triumph of Death*, which are commonly said to be the work of ORCAGNA, but all M. MÜNTZ can say is they are conceived in his style and are worthy of his pencil.

Mr. RUSKIN has remarked that the destiny of Pisa was probably changed by the Maremma, the dreary marsh which lies between the old city and the seashore. Power was in the people, but it could never be fully exercised. There is less chance of activity than ever, for Pisa is now overwhelmed by officialdom. M. MÜNTZ tells us of the hangers on in the prefecture, the nine judges, the chancellor, the sixty-three advocates, the sixty-four procuratori, the six causidici, the fifteen notaries, the departments of public property, registration, hypothecs, cadastral survey, contributions. In the university there are sixty professors, besides fifteen officials. There is a battalion of clergy, and since the suppression of convents the number of religions has increased. It is difficult to resist the conclusion that Pisa suffers from being under an excess of control, and probably the same cause has been at work for centuries.

Lucca is also rich in Romanesque examples, although few Italian cities have suffered so much from destructive powers in Mediæval times. It was a tempting prize to adventurers, but afterwards it was compensated by a long period of prosperity. For a time it was, at least, equal in power to Florence. The city was never, however, productive of great artists, MATTEO CIVITALE is perhaps the best representative, and in consequence patronage was liberally bestowed on Lombards and Florentines. Among the churches, M. MÜNTZ gives preference to S. Frediano, S. Michele and S. Martino. As a rule, the Luchese basilicas have more ornamental exteriors than those in Ravenna. Of Gothic and early Renaissance architecture there are few examples. But there are several fine paintings in the city, one being FRA BARTOLOMEO'S *Madonna with St. Stephen and St. John Baptist*, and with the famous singing angel which many artists consider to be the painter's masterpiece.

Empoli contains only 6,000 inhabitants, and as a railway junction it is better known than as a historic place. It is up to date, for M. MÜNTZ was greeted at the station with cries of "Vuole rostbiffe?" and among the first objects that met his eye was a bazaar in which any article was obtainable for 44 centimes. The public buildings were also disfigured with remains of electioneering placards like those in Paris. According to FRANCIS WEY, there are dramatic souvenirs of the contests in Florence to be found in Empoli, and masters of the Renaissance have embellished it. The principal building is the cathedral, which dates from the eleventh or twelfth century. The exterior recalls Pisa and St. Miniato, but the interior has been modernised. A *Pieta* is supposed to be the work of MASACCIO, and a font is attributed to DONATELLO. One of the chapels was converted into a sort of musée, and contained from sixty to eighty works by some of the Primitifs, probably pupils of Giotto; but since M. MÜNTZ visited Empoli the collection has been transferred to the town hall. There are some remarkable examples of sculpture, among them being a *St. Sebastian* by A. ROSSELLINO. Altogether, Empoli is a town which deserves the attention of amateurs.

M. MÜNTZ says that only about twenty-five years have passed since the marvels of Siena were revealed to Frenchmen by Dr. CONSTANTINE in the publication "Tour du Monde." In those days only a few cities in Italy were known to them, but now French visitors are not strange in the city which the Florentines feared and despised. The inhabitants may still continue to be as they were described by FORSYTH, viz. "vain, flighty, fanciful and wanting the judgment of their Florentine neighbours, who call a nail without a head *chiodo Sanese*." But how prized by the rest of the world should be a city in which, as M. MÜNTZ says, "sixty churches, some of them in the front rank, an equal number of palaces, besides statues, paintings, ornaments, in fact a school of art, it might be said a civilisation, are

crowded into an area of a square league." Siena was faithful to Mediævalism when most other parts of Italy had gone over to the Renaissance. In no other city of Italy is fourteenth-century architecture so abundant. The pictures of the Sienese school are supposed by some enthusiasts to be unsurpassable. Even BURCHARDT pays a tribute to the religious fervour, the flow and symmetry of line, the richness of colour and the delicate ornamentation on the dresses of the figures in the altar-pieces and frescoes. But the only department in which the modern inhabitants have approached their predecessors is in such humble work as marquetry, ironwork and wood-carving. M. MÜNTZ is glad to be able to record that higher prices are paid for such work to the Sienese than to the Florentines. The engravings in the volume do justice to the buildings, sculpture and paintings which belong to the times when art flourished in the city. What is said by M. MÜNTZ about the characteristics of Siena expresses the conclusions of every intelligent visitor:—"There exist in Italy, France and Germany cities which are as well conserved; it is not, therefore, from being an unique vision of the past that the infinite charm of the Tuscan city is derived, but rather from the variety and the refinement of its civilisation, and from the fertile mysticism which for more than three centuries has penetrated and animated all the forms of its intellectual activity. Among the cities of Tuscany Siena alone could measure itself with Florence; it incarnated the triumphs of the Middle Ages with as much *éclat* as its rival incarnated the spirit of the Renaissance, the modern spirit."

The account which M. MÜNTZ gives of his visit to the disused Benedictine monastery of Monte Oliveto is most interesting. It was founded in 1313 by BERNARD TOLOMEI, professor of law in the University of Siena, who, with two of his friends, retired to the Mount in order to live like the old hermits. Since 1866 the convent buildings are national property. The stalls which belonged to the chapel, and were the work of the famous marquetriss FRA GIOVANNI, of Verona, were sent in 1813 to the cathedral of Siena, and were replaced by other stalls from the cathedral by the same artist. But what gives most interest to the convent are the noble paintings by LUCA SIGNORELLA and GIOVANNA RAZZI, called "Il Sodoma." Both artists have depicted scenes from the life of St. BENEDICT. Those of the younger artist, "Il Sodoma," now find more admiration, and are suggestive of the influence of LEONARDO DA VINCI.

M. MÜNTZ next visited Pienza, where stands the neglected Piccolomini Palace, which was erected from the instructions of Pope PIUS II. by BERNARD ROSSELLINO about 1462. It consists of an elevated ground floor, with two storeys above. The masonry is polished ashlar, and the windows are separated by shallow pilasters. If compared with the works of PIUS II. in Rome the palace appears very severe, owing to the absence of marble and decorative elements. Another small but interesting town described is Montepulciano, where there is a picturesque town-hall.

(To be continued.)

## ROYAL INSTITUTE OF BRITISH ARCHITECTS

ON Monday last the prizes awarded in the annual competition of the Institute were presented to the winners, Professor Aitchison, A.R.A., presided.

The proceedings commenced with a short address by Mr. F. Warren, announcing that the late Mr. David Brandon had bequeathed a sum of 1,000*l.*, free of legacy duty, to the Institute for the promotion of architecture. Mr. Warren said he need not give a detailed account of Mr. Brandon's life and works. He was born in 1813. In his fifteenth year he was articled to George Smith. In 1832 he obtained the medal from the Royal Academy for a drawing of the Bank of England. Mr. Brandon entered into partnership with the late T. H. Wyatt. He was elected an associate of the Institute in 1839, and at the time of his death was the senior among the fellows.

A vote of thanks to the representatives of Mr. Brandon was carried with acclamation.

Afterwards a silver bowl was presented to Mr. Arthur Cates, who held the office of chairman of the Board of Examiners during the long period of fourteen years. Mr. Waterhouse, R.A., on behalf of the Board of Examiners, said:—"The work in connection with examinations was serious and full of anxiety. 758 students had passed, and upwards of 1,000 others were



engaged in preparing for the three progressive stages. The students come from all parts of the country. The great task of the examinations undoubtedly was borne by Mr. Cates, who in 1882 was appointed chairman. The scheme for the progressive examinations was elaborated during 1889. It was doubtful whether this work would have met with such success without Mr. Cates's influence. The silver bowl presented was intended as a slight token of sincere regard for their retiring Chairman; the testimonial was made on behalf of the past and present members of the Board of Examiners. The object of the examination was to discover in the candidates, apart from draughtsmanship, some appreciation of what makes a good design, some idea of the fitness of things and a desire to keep the chief end of architecture in view—that of promoting the amenities of human life. In conclusion, he congratulated Mr. Cates on the happy relations that had existed between him and the Board during the years he was with them.

Mr. Cates thanked his colleagues very cordially. The reception they had given to Mr. Waterhouse's remarks would, he said, greatly enhance the value of the testimonial. Students did not fully appreciate the individual labour of the examiners, and the care and time that were given for the advancement of this good work. But the examiners had their reward in the general improvement of architectural education. There was a very great danger in all these education schemes, and other countries had suffered by them, but he hoped England would be free from any bad results. They did not pretend that their examinations would make an architect, but the candidate was enabled to acquire the power to study, and the knowledge obtained in preparing for the examination would become the basis of future studies. Those who were naturally gifted with architectural skill would be greatly aided by them. The great good of the examinations was that of raising the standard of work all over the country.

The inscription on the bowl was, "To Arthur Cates, Esq., for fourteen years Chairman of the Board of Examiners (Architecture) of the Royal Institute of British Architects; from his colleagues, as a mark of their esteem, and in recognition of his untiring zeal in organising and successfully working the examinations, November 1896."

Professor Aitchison then delivered

#### The President's Address to Students.

It has been the custom for the President to say a few words to the students on these occasions. You have had from Mr. MacVicar Anderson, when he was president, some admirable remarks on planning, besides those on professional brotherhood, and most excellent advice from my learned predecessor Mr. Penrose, who found out for us all and the world the optical refinements of Greek architecture. He was trained in the reverent study of the antique from the actual remains of Greek and Roman structures, and is not less learned in those of the middle Italian Renaissance, which he has also measured, and we have heard from him that Palladio alone of the Renaissance architects had learned the secret of the grand Roman style.

However much I may be inferior to my predecessors in weight and eloquence, I think I may say that I cannot yield to them in my ardent desire for the improvement of our English architecture, nor for giving all the advice and all the knowledge that can be imparted in a short speech to the students, in whom we see the future architects of our country.

No teaching will give genius or parts to learners; but I think I may say, without fear of contradiction, that untiring diligence is an absolutely necessary qualification. And this has been so evident to those who possess genius, that Buffon defined it "as the art of taking trouble"—which we all know it is not. But diligence is so absolutely necessary for the development of genius, that it is excusable to confuse the necessary servant with the master.

I would call your attention to the works of Lord Leighton now being exhibited at the Royal Academy, and also to the large collection of his studies at the Gallery of Fine Art, in Bond Street. The studies there are but a portion of the innumerable ones he made, and you will see by these that the exquisite perfection he attained in his finished pictures and statuary resulted from the most careful and accurate study of nature; that there is not a form, an extremity or a piece of drapery that was not perfectly studied before it was painted or modelled.

Necessary as indefatigable diligence is, the longest life is only too short for the attainment of even a competent knowledge in the master art we profess, which embraces so many various arts and requires a knowledge so wide and so various, and qualities of mind that are rarely found in one person. It is a great saving of time to have a map, a compass and a knowledge of the streams and currents of the reefs and sandbanks before we embark; not only to prevent shipwreck, but also to avoid great deviation from our course, so that there may be no waste of labour, however strong and indefatigable we may be. Some of the wisecracks of the last century during a dearth employed labourers to dig holes in the ground and fill

them up again, and although this kept the labourers' muscles in training and prevented the loss of habits of diligence, the crop that should have resulted and rewarded the labourers for their exertions was non-existent; nothing is more disheartening than useless labour. Many of my own early years were wasted in inking-in drawings, and I could not help wishing at the time that I had been a shoemaker, for stitching shoes could not be more irksome and would have prevented some people from getting their feet wet or worn. The creation of something useful would have mentally compensated me for the irksome labour, while no one was benefited by my inking-in drawings.

The wisest saying of the Delphic oracle was, "Know thyself," and it can be as usefully applied to themselves by those who study architecture as by others in the various exigencies of human life. It is obvious that if one knows oneself one can best choose the part of architecture most fitted to one's aptitudes, and one can map out those parts that are essential to be learnt; by this means not only is much useless labour saved, but that worst of all shipwrecks is averted, the having embraced a profession that is not congenial and for which one finds one's capacities are not fitted, and this, too, when it seems too late to throw up the profession. I recollect hearing of a pupil of Laing's—the Laing who built the Custom House—who found architecture so uncongenial that he embraced the law, and became a vice-chancellor; as Alfieri the barrister became a celebrated architect. It is within the knowledge of most men that many of those who have become distinguished have changed their profession, but these men have mostly had a natural aptitude for the subject they eventually embraced and excelled in.

To those unfortunates who have embraced architecture but have no aptitude for it—nor, as far as they know, for anything else—I can only recommend the behaviour of Scotchmen under the circumstances. I think I may say that Scotchmen are the only people of the United Kingdom who have a good education, and by this I mean a moral education. Each man who finds himself in this position says to himself, "This is my only chance in life; I have no natural aptitude for it, but I must try by application and striving in season and out of season to make up for my lack of aptitude," and you rarely find that they fail in whatever walk of life they have embraced, for they mostly gain a good position.

Youth is naturally enthusiastic and ambitious, and would fain know everything connected with its occupation. Most students have probably read Bacon's programme of mastering all human knowledge; but we are not all Bacons, and had Bacon lived now, when the memory wanted for one small branch of science is greater than that given to most men, he would never have set out on so impossible a quest.

A student, for example, has to see what a column or stanchion will safely bear, and so he wants to know the laws of flexure, and finds himself referred to Poisson. He gets Poisson's book, but finds that to understand it he must master the differential calculus; he gets a treatise on that, but finds it would take him his whole life, if he could learn it then. Yet as the multiplication table is to arithmetic, so is the differential calculus to the higher branches of mathematics; he therefore comes to the old conclusion "that everybody cannot do everything."

It is, perhaps, a laudable ambition to take one of the great architectural geniuses as a pattern, but you should have common sense enough to calmly and dispassionately review your own powers and capacities before entering on a serious attempt at imitating his achievements. There is only one genius in several millions of people who is blessed with the capacities of the great architects, who has the making of a Brunellesco, an Alberti, a Peruzzi, a Bramante, a Lionardo, or a Wren, and I only wish more of those who find themselves incompetent would abandon the profession. The average capacity of mankind is not great, and yet each one wishes to be the bright particular star of the world. Each unit of mankind cannot endure the idea that his capacity is not equal to that of the greatest genius; but he will admit that he is deficient in industry, and in that judgment which guides a man to concentrate himself on the principal aim of his life. This shows us one of the weaknesses of humanity, to be ashamed of admitting that which is a pure accident, over which we have no control; and to admit, without blushing, our neglect of those things that are in our power. It is the fashion to encourage the belief that all men are born with equal capacities, as it is to suppose that every epoch is equal in mental and moral power, and that the difference depends on teaching, as if cutting and polishing a flint stone would turn it into a diamond. I recollect Roebuck talking this sort of nonsense at Sheffield, and after pointing out what John Stuart Mill could do at thirteen years of age, who had then mastered Greek, Latin and mathematics, he says, "But if John Mill could do what he described, why may not John Brown do as much, or nearly as much?"

The subjects that seem to me of the utmost importance are—firstly, the recognition by students and their teachers that architecture is a structural art, and that until this is realised



and acted on no great improvement is likely to take place. All the materials we use have weight, and in their ultimate position have size too, and in the positions they are placed have, as well as downright pressure, cross and diagonal strains. All these strains occur in almost every building, and must balance one another, or else the building becomes deformed or ruined, or tumbles down. The theory of the strains that produce equilibrium is called statics. The architect with the keenest observation, the strongest memory, and the greatest experience is a mere child compared with one who is a master of statics and the strength of materials; secondly, we all admit that without proportion buildings and their parts are unsightly, and we endeavour to train the eye to good proportions by studying classical buildings; their proportions, however, mainly give the statical results gained by experience at the time the buildings were erected; if these studies are pursued too long they are apt to make us fall in love with a state of knowledge inferior to that which we now possess.

That friend of our youth, Mr. Ruskin, partially enlightened us on this subject by pointing out the infinite variety of proportions in nature, most of which we find agreeable to the eye, and we now know that what may be called the fundamental proportions depend on the weight to be carried, the strength of the material and its height and size. Statics allow us to go further, for knowing the strains to be borne and where they come, and the strength and peculiarities of the material, we may mould it into various forms, either by cutting away useless parts or by adding to the bulk in certain directions. By statics we know where there is a change of function, and where various strains are concentrated, and these parts call for some expression, and the only way of expressing them architecturally is by moulding.

The proper arrangement of each chamber for the duties it has to perform, the collocation of the different chambers, and the access to them by means of halls or passages without unnecessary waste of room, is commonly denoted by the word "planning," and in reality it includes much more, as, for instance, their proper lighting, aëration, ventilation and warming; in fact, the enabling us to make the different portions fulfil their ends is the foundation of all good architecture. But man wants more than this; he wants not only certain parts to be more striking than others, but to make the whole have such an external appearance that it tells us the use of the building and evokes the emotions proper to its use. All we have to deal with outside are walls and roofs, but we may want porticoes and porches, towers, lanterns, spires and domes for certain uses and under certain circumstances.

Inside we have much the same elements, but we have as well floors, ceilings and staircases, and although we always want floors to be flat, there are circumstances where steps are required to give elevation and dignity to certain parts, and there are also certain shapes which add beauty or dignity to the rooms, and if the ceiling is vaulted or domed we may want it made striking or beautiful.

One particular point is usually missed in speaking of architecture—the skill in combining the junctions between forms of diverse or opposed shapes and of marking the different changes of function where they occur, or of marking the concentration of strains. These, as I have mentioned before, are accomplished by moulding, and these mouldings are to give us varieties of light and shade and to have a sort of logical sequence in their forms. The Greeks were the first and the greatest masters of mouldings, which were, of course, shaped to be played on by brilliant sunshine and in a clear air. The Roman mouldings were only badly-designed Greek ones with infinitely less variation. The second masters of moulding were the Gothic architects, who designed them for the misty climates and feeble sunshine of the countries they lived in. They were as logical as the Greeks, though destitute of their refined artistic sensibilities, and since then the study of profiling has been abandoned.

I say nothing of sculpture, in which I included naturalistic as well as vegetable and animal forms, for this is another art; but it must be exercised with due regard to the architecture, and must neither be incongruous nor destroy the scale of the part, the chamber nor the building. You cannot expect sculpture from architects, as it takes the life study of an artist, and architecture alone may be said to embrace the life studies of many men—men of science, men of ingenuity and men of art. When, however, the architect is so transcendent a genius that he can master his own art and that of another artist, he excites our wonder and our admiration; but to be a bad architect and an execrable sculptor too is not a combination to be admired, and still less to be proud of. It merely entitles the possessor to Martial's compliment, who called the amateur who did so many things nicely a great meddler.

There are one or two more points that I must mention, but perhaps the influence of the age is the most important; this in one direction is what we call the taste of the nation, and it inevitably modifies the individual taste of the artist. The old proverb says, "The mind of man is greedy of novelty," and novelty in itself has, no doubt, a certain charm, but it should

only be that difference from what has gone before which must inevitably follow from those thousands of things, circumstances and temperaments that distinguish one age from another. It shows us, too, how ridiculous antiquarianism is when it takes the place of architecture. We are not Greeks, Romans or Byzantines; our age is not Romanesque, nor Gothic, nor Renaissance, and if the architecture of the day is to charm the age it must discover and embody the desires of the age. The paraphrasing of deceased styles only charms us in so far as our civilisation approaches that of the date of the building paraphrased, and the building wants novelty too. We naturally do not admire Gothic paraphrases, as the desires of those times are so far removed from our own inclinations. The Gothic architect's passion for geometry is very far from being ours.

The nation, too, has lost all desire for art which is the embodiment of ideas by which alone the bulk of the people can be taught; now a little scientific jargon, embodied in a newspaper paragraph, or an Act of Parliament, is expected to fulfil the function of art, but any person of observation can see it does not. Art, which should proclaim to the most uneducated the various inestimable advantages obtained by being free, by having a voice in the election of its representatives, by belonging to a great nation with colonies, by free teaching, by free surgery and doctoring, by free lunatic asylums, by the free housing, clothing and feeding of aged paupers, by free libraries, by public parks, gardens and baths, by free museums and free picture galleries, knows nothing of it, because it is not brought to their eyes by art; in fact, so far is this from being the case that all these benefits, if not unknown, are unnoticed, because art is suppressed in all the buildings which minister to the people's wants. Such buildings should be of the most impressive appearance and adorned with sculpture, expressive of their use. Splendid tombs and monuments in public places should perpetuate the memory of the great warriors and statesmen, the great inventors and industrial leaders, the great poets, the great writers, musical composers, painters, sculptors and architects, whose works will make the nation live in the memory of the world when its greatness and glory have departed.

Architects can but slightly modify the desires of an age, as there are so many thousand things, conditions and influences that combine to mould public taste. All they can do is to have the attainable knowledge and skill required for their art, and if invention in architecture is extinct we must try to recreate it. I hope it is not extinct, but if it be we still have the mountains, rocks and peaks, the caverns and grottoes, the woods, the trees and the plains, the rivers and seas, the clouds and the heavens, to stimulate us to embody the lessons we can learn from these natural effects; not to speak of the lessons we can learn from the past architectures of the world. I cannot help thinking that if the born architect should arise and be single-eyed in his devotion to this grand art, we might hope to see it again flourishing, as in the grand epochs of the past. Antiquarianism is not content with gnawing out the vitals of architecture, but is destroying our faith in its being still alive.

Another of the points that wants attending to is the study of the means employed by the great architects of the world to evoke the emotions proper to the use of buildings, and particularly to those dedicated to the adoration of the Almighty. Students are naturally apt to seize upon features that they admire and use them in the most incongruous way, as if the adornment of a temple or a palace were appropriate to a labourer's cottage, a coal store, or to a tailor's shop, whose owner makes the human form divine, ludicrous and ignoble. Elegant simplicity of appearance should be the architect's aim for most of his buildings, as his aim should be to produce horror and repulsion in a prison.

Our great object now is to be sure that we have done our best to learn all that we ought to learn. How delightful would it be if we were as sure of our progress as were the Gothic architects, and instead of being as careful of every scrap left by a semi-barbarous age as if it had come from heaven and were sacred, we could use with a light heart a good stone as they did for our own work and build in their worked part we have surpassed. I may say this was not confined to Gothic days; the Greeks used the sculpture they had surpassed for filling in holes and trenches, and Mr. Purdon Clarke showed me a Saracen wood block that had once formed a door-head in a destroyed mosque, the back of which had been used for the work of the day, while the carved part, worked in a former age, had been built in.

If the Institute wants to start this work of fundamental improvement it will see that its examinations are not confined to students alone, but are to be passed by every one who joins it, and that everything that is not architectural is excluded from the examinations, and that those things alone are included that every architect ought to know to be worthy of the name. No one can say that the arts of surgery and medicine have not enormously advanced since the surgeons and doctors had to pass a strict examination in the subjects of these arts. No sane person can suppose that if architects were required to show



that their knowledge rested on a solid foundation of science and æsthetics that architecture would not rapidly progress.

**Review of the Designs and Drawings submitted for Prizes and Studentships 1897.**

By WILLIAM MILNER FAWCETT, M.A. Cantab., Vice-President.

It was with no small surprise that I was asked by the Council to speak to you about the drawings submitted in competition for the various prizes offered by the Institute. In some respects I must differ with the Council as to my being a very fit person for the office, as I have never had any experience in former years. Though I may have seen the drawings occasionally, I have never taken any part in awarding prizes, so that I can offer no criticism on the comparative excellence of those I have seen and those of former years. So long, however, as I give you fair and just criticism on these now submitted we can perhaps all allow those of past years for once to remain in oblivion.

The Council in awarding prizes do not enter into the question of the good qualities or faults of any beyond the simple award of prizes to those they think to be the best. This award is almost necessarily given without assigning reasons, and therefore it is found better for some other hand to give praise or blame as he may think either deserved.

There are many drawings here which show great care and much labour, and I trust that wherever I may find fault, as I must do where I see fault, the stricture will be taken in the spirit in which I give it, and that my desire to make the work the more full of profit to the worker may result in the more careful consideration of the principles of construction, arrangement, or design when future attempts are made, whether they be merely in running for a prize, or in the harder race of life, when the work has to be put to the more serious test of being carried out in actual bricks and mortar.

Without further preface I will now make my review of the drawings submitted.

The chief prize for which competition is asked is undoubtedly the Soane Medallion, and the roof which accompanies it. Soane was chiefly interested in Classic work, and I believe that the Council have nearly always been particular to give subjects which could well be worked out on Classic lines. The "Market Hall," given this time, has met with but little Classic response; but as no rule is laid down on the subject, and students are left to their own feelings, it is not surprising that the numerous examples of quaint old Medieval and later work have brought ideas to the mind, and dispelled the visions of really early Classic work.

In the design "Li-Lu" we have an open market on the ground floor, with assembly-room above. This is the arrangement that has found favour almost without exception.

The competitor here has put a house for the hall-keeper partly below ground, which is certainly not an ideal arrangement, even though under stern necessity such things have to be done sometimes. In design the "Clock Tower" is poor, and the turrets are non-effective, but there is a fair mass which ought to come out well in execution.

The design under motto "L'Eléphant d'Argent" has a good feature in the raised platform with four steps, and the inclined roadways will take light carts. The staircase implies that the open market-place has more room than is wanted for the size of the town. The entrance to the assembly-room is close to the platform, which is a fatal arrangement as far as filling the room is concerned. The elevation is very simple, and made under the evident intention of having a mass of plane surface to give greater value to the band of figures in relief. The idea is carried rather far. The spirited drawing brings them out, but the figures might hardly hold their own in execution.

In the design "Artifex" the assembly-room finds no favour, but there are two markets. An arrangement quite as legitimate as the more usual one, but sanitary arrangements are forgotten altogether. The elevations have a certain delicacy, but the towers crowd up the end elevations. The flèche is too fussy to be happy, and the section shows no construction for it.

It may be well to mention that the competitor under the motto "Neath Southern Skies" is an Australian, who, I am told, has lived all his life in Australia, and thus has had no advantages in the way of seeing ancient buildings and feeling the poetry with which they abound. The design submitted is very bold and has great merit. It is certainly hard to say what style it is supposed to be in, but that is a feature one would naturally expect under the circumstances, and I trust we are not so tied to precedent that we need condemn it as a fault. The bold arches on the ground floor are certainly effective. The corbelled corridor wall with its coving is somewhat heavy, and I fear the provincial market town that adopts the design will feel the increased rates for some time.

The design "Labor ipse Voluptas" has a well-arranged plan. The principal staircase is the chief blot, as it is far too small and steep for such a room as is provided. The piers between the windows have all they can do to resist the thrust of the open timber roof. The elevations are quiet and have

good feeling, and the design gives promise that the author may be able to execute really good work.

The device "Shell and Ribbon" is given to a very Dutch design. Everything seems sacrificed to a turret far out of proportion. When one sees four posts in the middle of the assembly-room, with numerous braces, all big enough to be very inconvenient but hardly sufficient to carry the turret, one feels that it is a design for a turret with a market hall attached to it, and the author evidently thinks that a turret with its clock and bell requires but little sanitary arrangement. In spite of all these faults there is a very good feeling in some parts of the design.

In the design with motto "Russet" the plan is well arranged, and details have been carefully thought out. The elevation has considerable dignity, and it is quiet and simple, but the heavy key-stones and projecting voisseurs to the windows, &c., are somewhat overdone. Taken as a whole, it shows that the author has considerable power, which I hope the studentship will help to enable him to bring to good effect.

"Charley's Aunt" is, I suppose, a joke in design as well as in motto.

The design "Oxonian" has managed a market clear of columns, and his plans are well thought out. He has probably altered as he went on, as section and plan do not quite agree. He could not manage the window shown in section as the plan is now arranged, and the door is needed. The piers between the windows are not too strong for the open timber roof. The elevations are simple and effective, but the entasis of the pilasters are a little overdone.

"Briton" makes a variety in treatment, as he devotes his ground floor to shops, none of which have any retiring-room or other conveniences, and he places his market above. There are many disadvantages in such an arrangement, which a lift for heavy goods does not by any means remove. There is some thought in his elevations, which are decidedly severe.

The design with motto "North Wind" has many good points. The elevations are perhaps too much cut up, but the whole is fairly grouped. It cannot compare though, as a whole, with several others.

The design "Bon Espoir" has a well-thought-out plan in many respects. The half-timbered walling has good effect, but is drawn without fully thinking of sizes of timber. The wall in plan is evidently solid brick or stone, so the half-timber is somewhat of a sham. The design, though, in many points shows that it has had considerable thought.

The design "Bumble" is somewhat overweighted by the towers at the angles. The two small staircases to the upper room can hardly be considered of the same value as one double the size of either. All dignity of approach is lost, and there is double attendance required, not to mention other inconveniences. However desirable a second entrance may be, there should at least be one good one.

The design "St. Clements" is well thought out, and has many good points. It is the only one which has carried out a really dignified entrance to the hall on the first floor. The details of plan are well thought out, and the elevations are simple and well designed, and have a very pleasing quaintness about them. I trust he will venture to try his fortune another year.

*The Tite Prize.*

The Tite Prize has this year drawn but few competitors. The two who have sent in cannot be said to have shown all the care that is necessary. The design with a ☉ can hardly be called a villa, it is a large mansion; and the designer of "Gondola" has not thought it necessary to provide for some of the main essentials of every house.

*The Grissell Competition.*

The Grissell Competition has drawn seven designs. The subject is a bay of a church. It is a subject which requires any one who attempts it really to have made a study from many churches before he can hope to design anything of value, and this can hardly be said to be the case with either "Equilibrium" or "Zeal." "Goth" has more good points, but it is too florid, and the construction is weak.

The design with "Heart and Shield" device is decidedly original, and is very delicately drawn. Personally, I should have preferred it if set out in a bolder manner. It would undoubtedly make a very striking building. The side shrine chapels are perhaps a little low, but they are well sheltered, so that devotion need be but little disturbed. The foliage to capitals is original and somewhat eccentric. The building would be a very striking one if of sufficient length, which we are entitled to presume it would be.

There is great merit in the design , but it has

the fault that the flying buttress is placed too high to be of full value. There is a great deal of very careful work.



The same may also be said for "Pheon," which is also well worked out, and in an earlier style. The flying buttress has the same fault, but there is great merit in both these sets of drawings.

It is hard to say much more about the remaining design, "Middle Ages." It is, perhaps, hardly equal to the last two, but has so much merit and so much careful thought that it is invidious to say anything that might be interpreted with mere fault-finding.

All the prizes and studentships which I have spoken of above are for original design, and although I may have let my criticisms, perhaps, fall a little into fault-finding, I cannot pass to other work without supplementing these detailed remarks with the more general statement of my pleasure at seeing such a vast amount of really good work submitted for the prizes. There is a great deal of good design well thought out and well expressed. It is my duty to turn to another class of work, namely, that showing the study of old work. I need not dilate here on the necessity for this study—we are all agreed on it.

#### *Owen Jones Studentship.*

The Owen Jones Studentship, founded particularly for the study of "Ornament and Coloured Decoration," is, perhaps, the most advanced of these. Only two sets of work have been submitted, and both these show an amount of study and application which well deserve the encouragement of a prize.

Mr. Henderson has been fortunate enough to carry off the studentship. His sketches of detailed ornament, as well as those of more general interior work, show great care. He has been to the sunny south for his examples, and has made good use of his time. The prize will, I hope, enable him to strengthen himself in the work of colour, in which he seems to delight.

Mr. Griffith has also sent in good work. Much of this is home work, and students should not forget the treasures of colour that are to be found throughout our own native land. We are all much behind our fathers in our knowledge of power in the application of colour, and home examples are more likely to prove of real value for use in our own work.

It is a matter on which we must all be glad to congratulate him, that the Council have seen their way to award him the Aldwinckle Prize. Mr. Griffith will now have good opportunity of comparing the tone of colour under the brilliant skies of Spain with those under the quiet grey skies we commonly find at home.

#### *Measured Drawing Competition.*

The competition for the prize for measured drawings has produced three sets of drawings. Two of these competitors have taken St. Mary-le-Strand and the third Melrose Abbey. The two first have chosen a subject that appeals to nearly every one as one of the most beautiful of the churches in London, and both students will have gained a good deal by their work, though they have not gained the prize. The drawing with motto "St. Mary" I should take to be the more accurate of the two, but both are well drawn, not only with care and delicacy, but also with great spirit.

The Melrose Abbey is a fine piece of work, and the larger scale drawing of the south transept is done with a strength of line and vigour of execution that shows the energy of the draughtsman. The larger scale foliage is also given with remarkable vigour. If I may make a deprecatory remark on such a set of drawings, it is with regard to a not uncommon fault in the smaller scale drawings of young draughtsmen. In setting out tracery, &c., the fact has not been calculated that the thickness of the outline counts to the tracery while all is clear, but it counts to the shaded part when the spaces are darkened, so that the tracery is made to appear thinner and weaker than it is. This, however, is a minor fault which does not lead to any great misapprehension, and I mention it as one on which young men are often tripped up on setting out work of this kind.

#### *Pugin Studentship.*

There are eight sets of very good drawings for this prize, and it is somewhat hard to make invidious comparisons among them.

Mr. Dobson has made careful studies at Lincoln and Beverley and Ely, besides minor sketches in other places.

Mr. Hoare has spent more time abroad, but has wandered over England from Hexham to Canterbury, and his work will leave many pleasant impressions on his mind; but he is more sketchy than the last named.

Mr. Sheppard has worked chiefly at Worcester, and his work takes more of the careful study of measured work. His pencil is not nearly so free, but freedom of hand is only gained by practice.

Mr. Swan's work is of great merit. He has not only some good measured work at Ypres and Ghent, which are particularly worthy of attention, but shows a fair facility with his pencil.

Mr. Collins's work is also remarkably good. His examples are chiefly taken from the South of England, and his sketches of churches are full of vigour.

Mr. Gruchy has worked chiefly in Yorkshire—at Beverley, Howden, Hedon and York, and he has also ventured south to St. Albans. The measured work is decidedly good. His sketches also show a great delicacy of touch; but they show signs of not having being done in the field, but touched up when he got home, or perhaps drawn out afresh. The effect is that of having drawn more than could really be seen, and it is work of the class that caused the remark—I believe of Mr. Ruskin—that architects could not draw architecture, as they invariably put in detail they know to be there, but which could not be clear to the non-professional eye. The St. Albans work has been a work certainly of labour, and I trust of love also.

Mr. Brooks has worked chiefly on sketches, and has given us some fairly good drawing, but his powers will develop with more practice.

Mr. Haywood's set of drawings is really charming. The care in setting out measured work is only equalled by the power of delineating it. There is little of field sketching, but it is the real accuracy of work which is the most necessary thing to study. His power of drawing is shown in his figure work. May he not only enjoy but profit by his well-earned studentship.

In looking over the large amount of work which has been undertaken for the chance of the prizes, most of which involve an undertaking to prosecute studies still further, one cannot help feeling for the disappointment of the many who receive here nothing but a word or two of praise, or perhaps of blame. To them there may be the feeling of inquiry as to what good they have got for their labours. I trust that they have had sufficient interest in their work not to feel depressed because others have taken the prizes. Though I do not consider myself an old man, I am old enough to have noticed that the men who succeed best in their professions, whether lawyers, doctors, chemists or men of other classes of science or literature, are those who take a real pleasure in their work, who seem never to find it irksome, but seem often to do it for the fascination they find in it. I feel sure it is more so with those who take up art as a profession, whether it be painting, sculpture or the branch we are practising ourselves.

The thought and study which you have given to your work has, I feel sure, been of great benefit to you, and I hope it has been a pleasure also, and that you can all join one of your brother competitors in his motto and say from your heart, "Labor ipse Voluptas."

## LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

AT a meeting of the members of this Society held on Monday evening, Mr. Arthur Stratton read an interesting paper on "Sir Christopher Wren and his Work." Born in 1630, Christopher Wren lived during the turbulent period of the Commonwealth. After taking full University degrees, he was induced, as the result chiefly of the great London fire of 1666, to turn his attention to architecture, though his studies had been arranged to fit him as an astronomer. How this diversion of his talents into the channel of architecture resulted is recorded in the annals of fame. The task that was early placed in his hands was a gigantic one; it was to rebuild St. Paul's Cathedral and about fifty London churches. For the performance of his huge work he received the stipend—a mere pittance—of 200*l.* per annum. The rebuilding of St. Paul's occupied nearly fifty years, the foundation-stone being laid in 1675 and the structure completed in 1723. Though his work was largely modelled on the Italian masters, yet, strange to say, Sir Christopher Wren never visited Italy. He worked with the highest motives with which an architect can be imbued; the ennoblement of the art to which he contributed so much was the object of his aspirations and the aim of his labours. His career closed in 1723, when he died at the age of ninety-five years. The lecture was illustrated by a number of excellent slides. Mr. W. Watson (president of the Society) occupied the chair.

The Palace Yard, Earl Street, Coventry, has been purchased by Alderman Singer and other gentlemen, and is believed to be destined ultimately to be converted to some public object. The site, which is partially covered by quaint old timbered buildings, comprises about 2,800 square yards. It has been the hostelry of several royal visitors, particularly in the seventeenth century. In September 1687 James II. was entertained there by Richard Hopkins, a citizen. In December 1688 Princess Ann of Denmark lodged there. In 1689 Mr. Hopkins was elected a member for the city, and in the following year Prince George of Denmark was his guest. The buildings have of recent years been used as builders' premises and as offices and warehouses. They adjoin the Technical Institute and front the site of the proposed new municipal buildings.



## NOTES AND COMMENTS.

WE lately described the imbroglio at Lille which is caused by the defects of the new Palais des Beaux-Arts. The pictures and drawings, which are about the most valuable of all those in the French provincial *musées*, have become deteriorated, partly owing to the humidity of the building and partly to the excessive heat employed as a remedy for the evil. A contest arose between the Municipal Council, the committee of the Musée and the Administration of Fine Arts, each body endeavouring to cast the responsibility on the others. Eventually the Administration menaced Lille with a resolution to remove all the works of art from it to some other town where more care would be taken of them. The effect is that specifications have been prepared for alterations in the buildings by which the interior will become less subjected to atmospheric influences. The estimated cost is 122,271 francs, or nearly 5,000*l.*, which is a large sum to pay to remedy the defects of a building which had to be closed to the public almost as soon as it was opened.

ONCE more there is a rumour that Signor GIANTURCO, the Italian Minister of Education and the Arts, has been able to negotiate with Prince PAUL BORGHESE for the acquisition of the pictures in the Palazzo Borghese by the Italian Government. The Borghese family, it is said, were induced to expend enormous sums in building speculations which were not profitable, and it is necessary to find an equivalent for them. Some of the famous pictures had to be sold and others were destined to follow them out of Italy when the law against the exportation of such property was enforced. In Rome there is no collection that is comparable with the contents of the eleven galleries of the Borghese Palace, and the wealthiest connoisseurs of Europe and America would be glad to compete for pictures one of which would be enough to gain position for its owner. To possess TITIAN'S *Amor sacro et Amor profano* or RAPHAEL'S *Deposition*, CORREGGIO'S *Danae* or DOMENICHINO'S *Nymphs* would be almost equal to gaining a knighthood, while Rome itself would be poorer if they were dispersed.

FEW men were more deserving of the gratitude of painters—if such a virtue can exist—than the late M. BORNICHE, the Paris wood merchant. "Little Blue Mantle" was an agent of a charity organisation society in comparison with him. For M. BORNICHE was for years the chief consolation of the numerous artists who have failed to persuade Salon juries to grant admission to their works. When he departed to a world where so much generosity was, we trust, rewarded, he possessed about 24,000 examples of the nineteenth-century art of France. They had not grown more valuable by his ownership. Four thousand which appeared most promising were valued at 120,000 francs, or 30 francs apiece, and found purchasers on still lower terms. The 20,000 forming the residuum can, it is said, be secured by any one who is willing to invest 36,000 francs, or less than 2 francs per picture. Whatever may be their artistic or financial value, the paintings were like a Mascotte—they brought wealth. M. BORNICHE'S daughter, although eccentric, was able to leave 5,000,000 francs for the erection of a woman's hospital on her estate.

APPARENTLY it is more difficult to accomplish an impartial selection of competitive designs in America than in England, although the aid of a professional assessor is invoked. This conclusion can be drawn from the competition for the Passaic Courthouse in Paterson, New Jersey, which recalls the competition for the Belfast Municipal Buildings in some of the circumstances. The terms offered were unusual. The author of the best design was to be entrusted with the work, and the authors of the five next best designs were to receive 300 dollars each. Professor WARE, of Columbia, was selected as professional adviser, the drawings were to be sent to him, and he was to select twelve, leaving the final choice to the commission. Forty-eight sets were sent in. Professor WARE, after a fortnight's examination, selected twelve, which he despatched to the commission, with a detailed report on each of them. Three were specially commended by him. After

a few days, Professor WARE was asked to forward the remaining plans also, on the ground that as some of them were by local architects it would be advantageous to be able to say they were examined by the commission. After three months' consideration it was announced that among the twelve plans selected by Professor WARE there was not one which was considered suitable by the commission. Out of the remaining thirty-six the commission selected six, and prizes were awarded to the authors of them. Professor WARE'S chosen architects are naturally indignant at the loss of the anticipated rewards. But it appears to us that when twelve designs were to be recommended, the final choice was to be left to the commission. When latitude of that kind is permitted, there is a difficulty in fixing limits to the extension, and the assessor ceases to be a safeguard. An action against the commission is threatened, and it would be an advantage to have a judicial statement of the law on a subject which is likely to have interest for many American architects.

THE state of the French finances is indicated by the scaffolding which has been so many years allowed to remain around public buildings because no money is available to carry out the works which were contemplated. The Sainte Chapelle was so long concealed that many Parisians could not realise the appearance of the exterior of the building. Some years ago it was discovered that the statues which adorned the upper part of the second court of the Palais-Royal were in danger of falling, and it was decided to repair them, for as the works of PAGOU and GÉRARD they are worth preservation. Apparently there is no money to pay for cement, and in consequence the timbers are decaying. The part remaining of the old Sorbonne was only enclosed by scaffolding a year ago, and therefore it is perhaps unreasonable to expect the restoration should be commenced, and we suppose timber is so cheap there is not much advantage in expedition. Moreover, by delay the work required for restoration is increased in quantity, and the Paris workman will be less discontented. How the public must wish for a visit to the betimbered buildings by some foreign potentate. The Czar caused the removal of the scaffolding from the Arc de Triomphe, and it may be the fate of the Kaiser to free the Sorbonne from its encumbrances.

ALTHOUGH Geneva was for many a year a sanctuary of freedom and sometimes the only one available in Europe, the authorities of the city can occasionally be rather arbitrary in their operations. The proposal to use one of the open spaces—la Plaine de Plainpalais—as a site for a new musée is one instance which does not show much respect for the rights of the present or future citizens. The subject was brought before a meeting of the Society of Arts of Geneva by Mr. LAWRENCE HARVEY, architect. He explained how in England a similar proposal could not be carried out without the authority of a special Act of Parliament, and that among us it was more common to increase the number of open spaces than to diminish them. There is no doubt a new musée is needed in Geneva. But Mr. HARVEY demonstrated the possibility of obtaining the required accommodation by a transformation of the Bâtiment Electoral, and he presented plans which he had prepared showing the proposed alterations. The work upon the building he estimated would cost 780,000 francs, exclusive of decoration. Mr. HARVEY considered it would be preferable to allow a period of half a century for the decoration in order that several eminent artists might share in the work. There was a long discussion and it was finally suggested that the Bâtiment Electoral should be demolished and replaced by a musée. Mr. HARVEY'S interference is therefore like to save "la Plaine" for the people of Geneva.

## ILLUSTRATIONS.

LINCOLN CATHEDRAL—CHOIR AND NAVE, LOOKING WEST.

LINCOLN CATHEDRAL—GENERAL VIEW.

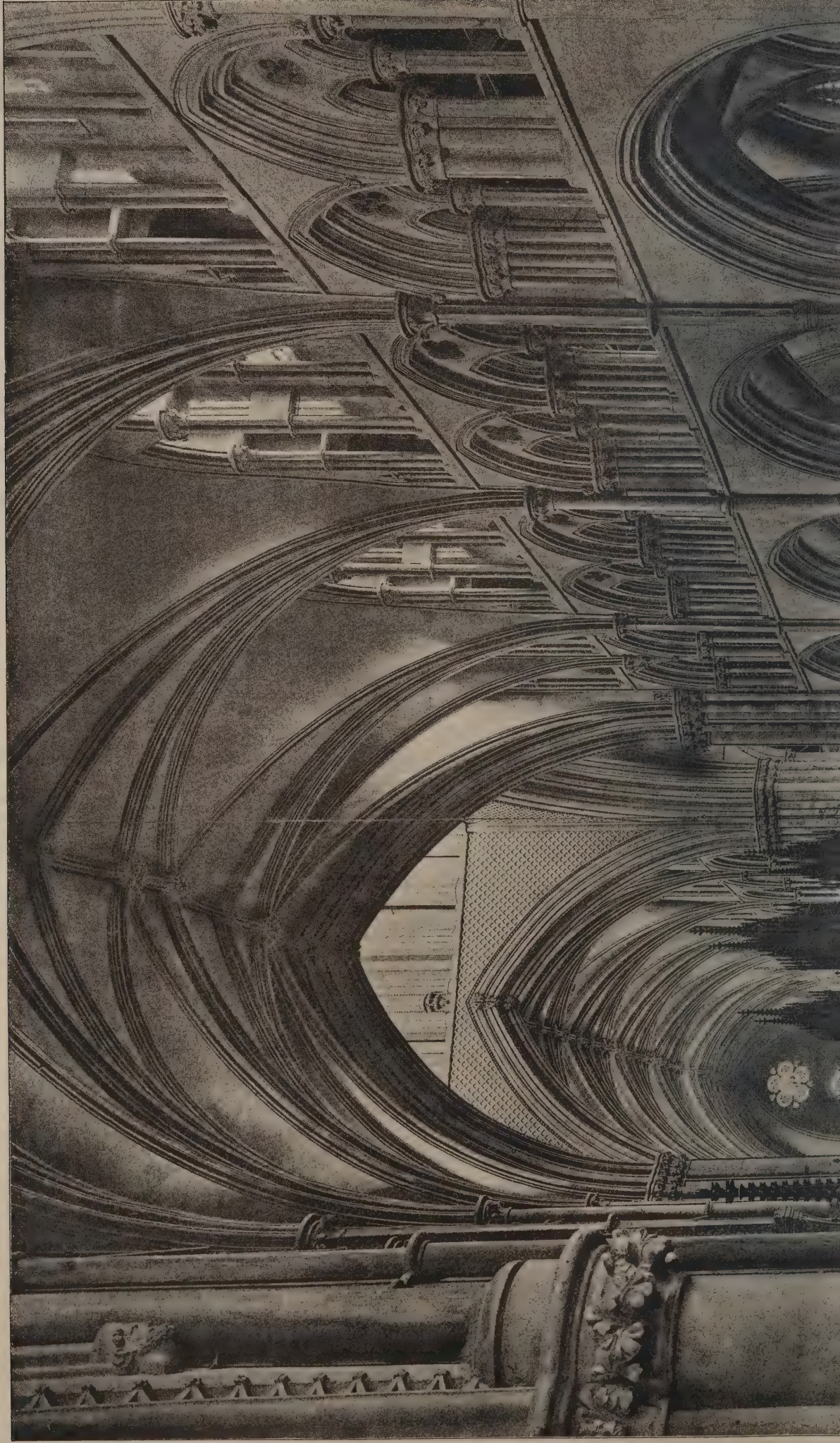
"THE LEICESTER," LEICESTER SQUARE, W.C.

"THE LEICESTER" SALOON, LEICESTER SQUARE, W.C.













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INK PHOTO SPRAGUE & CO 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

CATHEDRAL SERIES, No. 6.—LINCOLN: CHOIR AND NAVE, LOOKING WEST.

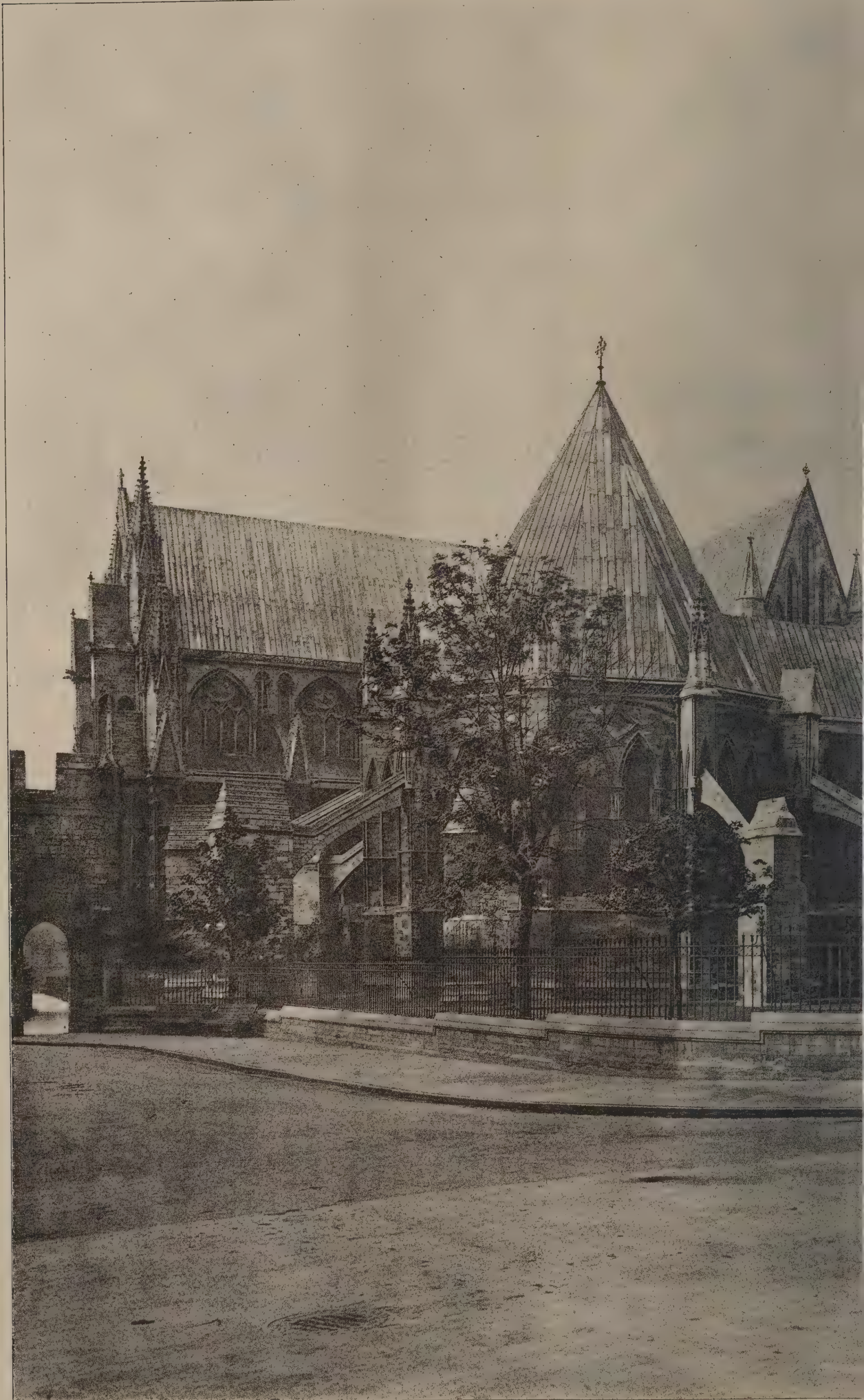












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LINCOLN: GENERAL VIEW.

















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"THE LEICESTER," LEICESTER SQUARE, W.C.  
Messrs. TREADWELL & MARTIN, Architects.

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## LINCOLN CATHEDRAL.—IV.

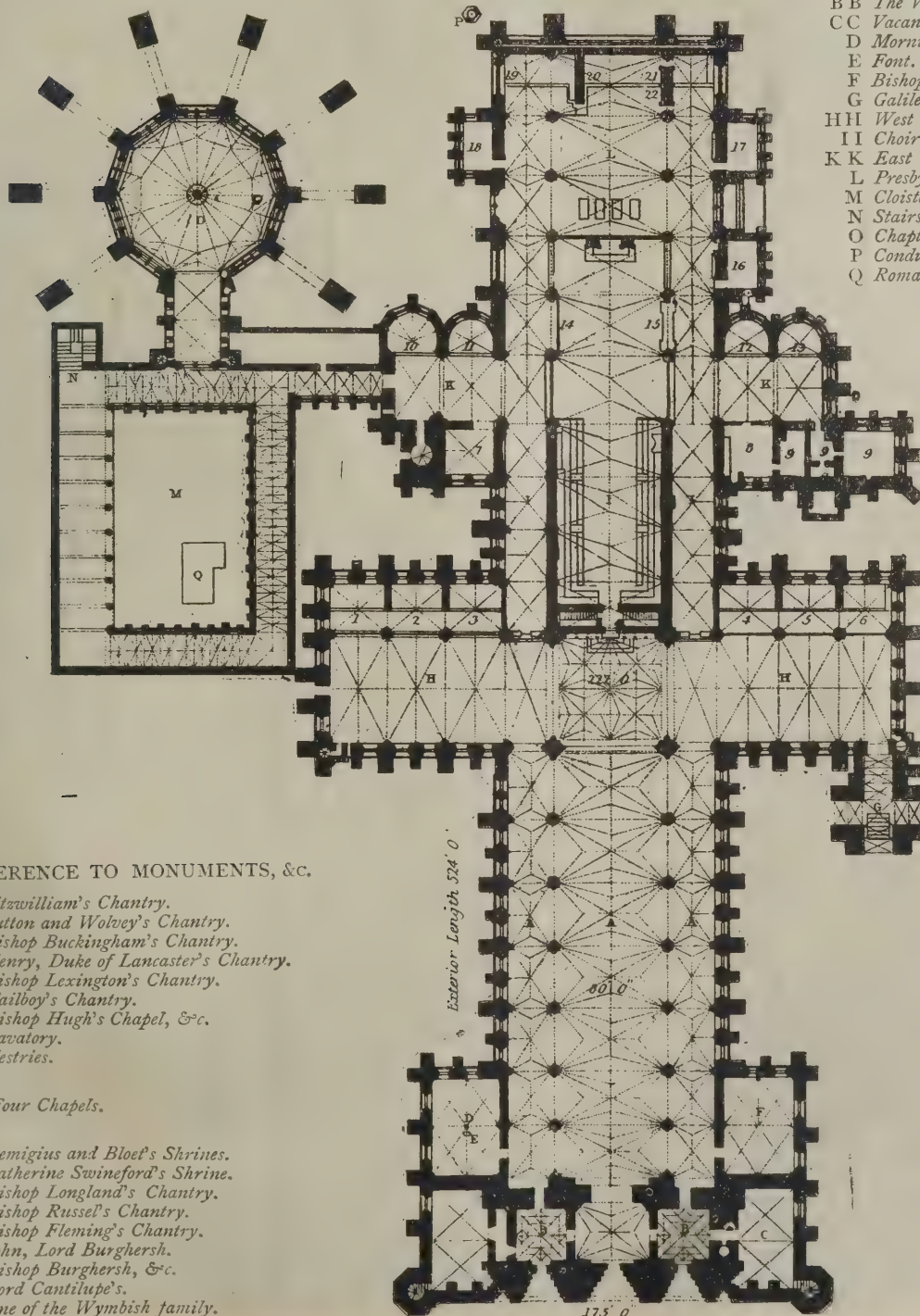
WE publish this week a plan and other illustrations of Lincoln Cathedral. The plan, it will be observed, is somewhat unusual, and was a departure from that of the Cathedral of Remigius. The double transepts have their advantages, but do not seem to have any special symbolism. A few years ago Mr. A. B. Pite, the president of the Architectural Association, read a paper on the subject of "Cathedral Planning," in which he contrasted the arrangements at Lincoln with those of some other English cathedrals. We reprint the following extract from it:—

English architects seem to have grasped with a firm hand the artistic qualities of the cruciform plan. Lincoln Cathedral is an example, and perhaps it might be difficult to find one more complete in itself or more typical of our national peculiarities. As a mere ground-plan it is a work of fine art, well-proportioned and interesting, with beautiful forms employed about it. The foot of the cross is sufficiently deep to balance its great length, being formed by the two western towers and transepts. These latter are of little or no use to the

nave as transepts; both are closely screened off, and used for the independent purposes of a morning chapel and a consistory court. They have still less to do with the elevation, being only of the same height as the side aisles; but they have a distinct architectural value on plan. The nave has seven bays, the two westernmost being narrower than the others, originally without doubt because it was built from the choir to meet the older Norman work of the front. The Norman nave, as seen between the towers, was narrower than the present one. But these two narrower western bays bring the transept vaults, of equivalent width, into harmony and connection with the side aisles, and are beautiful specimens of groining. The dimension of these two nave bays governs the projection of the transepts, which we feel to be the just one, as it has base enough to balance without rivalling the great crossing. If we were dealing with a cross in upright elevation, the base would bring the cross on to the ground-line, which carries the eye away beyond the projection of the arms. The screens which divide the nave from the chapel and consistory court are original work, not later additions. Notice their value to the whole plan. They carry the nave at its normal width past the transept, till it butts against

## REFERENCE TO PLAN.

- AA Nave and Aisles.
- BB The West Towers.
- CC Vacant Places.
- D Morning Service Chapel.
- E Font.
- F Bishop Hugh's Chapel.
- G Galilee Porch.
- HH West Transept.
- II Choir and Aisles.
- KK East Transept.
- L Presbytery.
- M Cloister Yard.
- N Stairs to Library.
- O Chapter-house.
- P Conduit.
- Q Roman Pavement.



## REFERENCE TO MONUMENTS, &amp;c.

- 1 Fitzwilliam's Chantry.
- 2 Sutton and Wolvey's Chantry.
- 3 Bishop Buckingham's Chantry.
- 4 Henry, Duke of Lancaster's Chantry.
- 5 Bishop Lexington's Chantry.
- 6 Tailboy's Chantry.
- 7 Bishop Hugh's Chapel, &c.
- 8 Lavatory.
- 9 Vestries.
- 10
- 11 Four Chapels.
- 12
- 13
- 14 Remigius and Bloet's Shrines.
- 15 Catherine Swineford's Shrine.
- 16 Bishop Longland's Chantry.
- 17 Bishop Russel's Chantry.
- 18 Bishop Fleming's Chantry.
- 19 John, Lord Burghersh.
- 20 Bishop Burghersh, &c.
- 21 Lord Cantilupe's.
- 22 One of the Wymbish family.



the towers. Though the transepts only effect a junction with the side-aisle vaults, and do not pass the main arcade, the nave would have been shortened and its proportion to the whole lost, besides the creation of a western rival to the great transepts, had these low stone screen walls been omitted from the plan. For the sake, therefore, of its hidden beauty, and also for that of the architect, who brought the older building into union with his with such consummate skill as to make a perfectly-pro-

portioned plan out of two incongruous parts, we trust that these screens may yet long escape the hands of the "unbroken vista" lovers. Before leaving the west end, observe how artistically the octagonal turrets turn the corners of the front. They are poised in an unusual way, having but little projection on the front and considerable at the sides and back. This may be merely because the front pre-existed of a fixed width, which did not agree with the dimension that governs the western transepts.

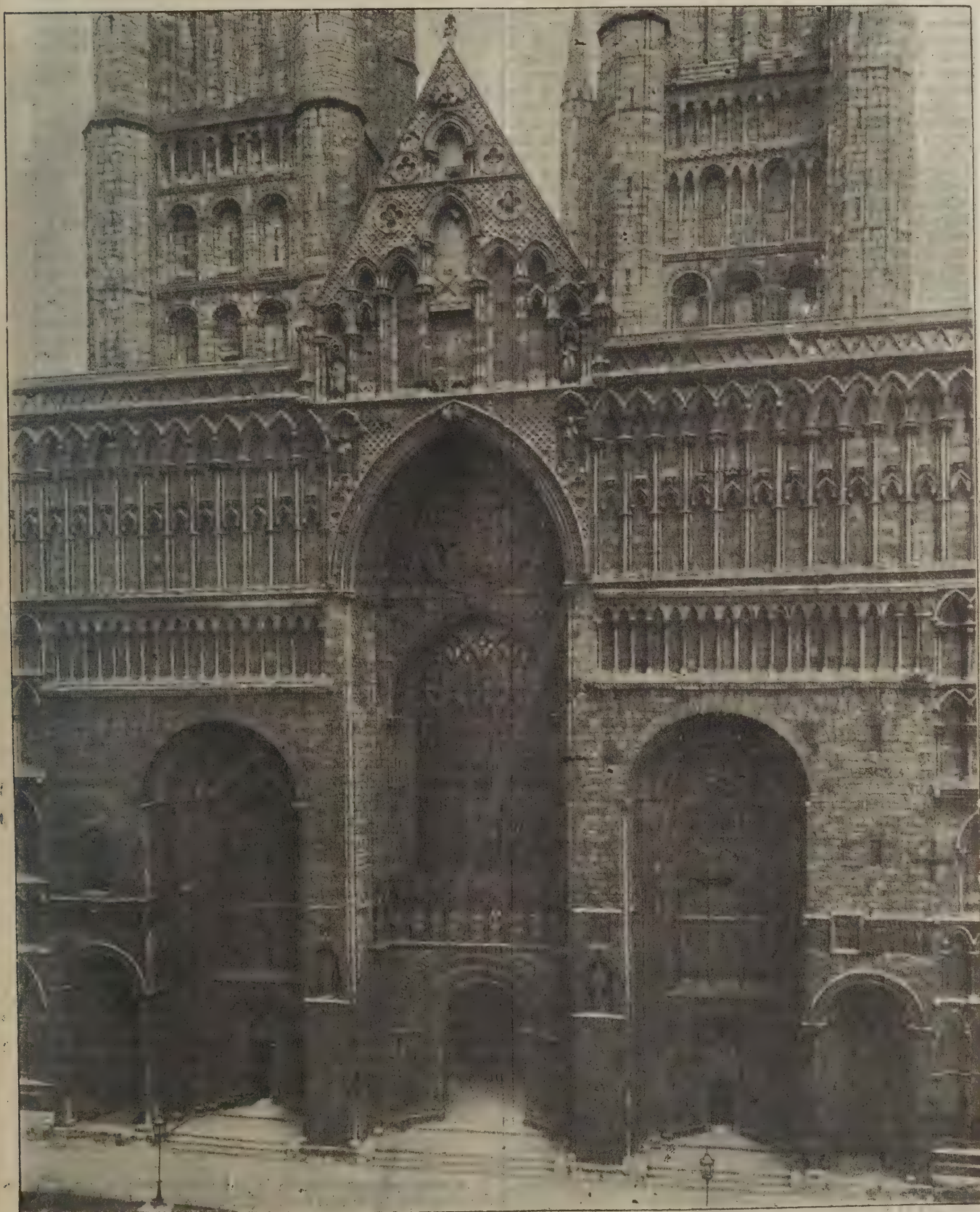




In all probability, one of ourselves—a modern architect—would have made our transepts extend just a trifle more, so that the pinnacles should stand at the exact angle of the building, but then the valuable “claw” they exercise on the plan would have been lost. As they stand they furnish fixed points from which we can comprehend the scheme of the base.

Peterborough has a small plan with a simple outline, as there is distinctly no feature to interrupt the cross. It is in this

simple completeness unique, and contrasts remarkably with the plan of Lincoln. Its proportion as a whole is good. If there is a fault, it is that the upper part of the cross is a trifle too long. Half the width of a bay of the lady chapel might be spared. In nearly all English plans, whatever may have been the original length determined on, subsequent alterations have pushed the building eastwards, generally with the happiest effects, as this otherwise inordinate extension of the upper part



Photographed by S. B. Bolas & Co.

LINCOLN CATHEDRAL, WEST FRONT.



was made proportionate by such successful expedients as choir transepts, or by a diminution of width in the presbytery, or by a more considerable one in the lady chapel beyond; also by the accentuation of the main crossing, with the same purpose in view as at Ely and Winchester. The western transepts, which form the *raison d'être* of the Peterborough façade, are like those of Lincoln in one respect, being of little projection in proportion to their depth, their dimensions being the width of the side aisles. They are divided from north to south by the wall which gives recess to the front, and produces a marked effect on plan. It reduces the western transepts to a width which makes them a base or plinth to the cross. At Lincoln the base to the cross is formed by the square subdivided masses of the towers; the western transepts counterpoising the greater transepts with the entire length of the church, the screen walls purposely preventing the foot or plinth of the cross from being realised in order to preserve the effect of the nave. The Peterborough nave is long enough, and the transepts consequently can become not merely an external counterpoise to the other masses of the building, and be partly absorbed by the nave, but have a definite relation to the idea of the cross at its foot. The total depth is just as necessary to the whole, and what is superfluous to the plinth is cut off by the cross wall, and becomes the glorious recessing to the arches of the façade. This is the secret of the mystery of the front. Anything but a hollow sham having no relation to the whole, it is, in fact, the result of a masterly and beautiful plan. The towers which bound the front are delicately and subtly stepped forward with almost the effect of a curve, and form the lower feet from which the cross rises firmly and gracefully, the broad splaying of the arches and the recesses behind aiding this impression. The later porch which projects beyond is fortunately cut off on plan by the recesses. Peterborough is the only cathedral plan I know that can be looked at in upright elevation with entirely satisfactory results.

Salisbury, though on a smaller scale, is a plan of similar proportions and scheme to Lincoln, but without the western transepts. It was built a short time after the nave of Lincoln, in 1220. It is a double cross having transepts of the same relative projection, and there is but little difference in the proportionate lengths of the choir and presbytery. The scheme of the cloister and chapter-house is also similar, but they are in a position which the exigencies of the site did not permit at Lincoln on the south side of the nave, the more usual position. To a certain extent perhaps this position may give a finish or balance to the western end of the cathedral on the south side, but something seems needed on the north. The porch would scarcely supply the need or be important enough for the position. The length of the nave without being interrupted needs the balance and base that the western transepts give to Lincoln. A comparison between the two cathedrals in these particulars is the more justifiable, as both the west fronts are designed on the same principle, being façades, distinct architectural compositions complete in themselves, with corresponding turrets at the ends. These turrets are not pitched on the intersection of the front and side on the "correct angle," but are placed as terminations to the front, though they have not enough projection in spite of this on the plan to furnish us with the points that the Lincoln turrets give, and we consequently miss its completeness and beauty in this respect. A visitor to Salisbury feels there is a lack of interest at the further end of the nave, especially after turning from the choir; it seems too long a walk. It cannot be that the architect was unwise enough to design that this impression should be produced to increase the effect of his west front *tour de force* awaiting one beyond the welcome door. It must be remembered in criticising Salisbury that it is practically the work of a single mind and generation, being one complete erection, at all events as far as the plan goes. This is scarcely the case with any other of our Mediæval cathedrals.

Winchester has a small lady chapel terminating the east end, like Salisbury, but has only one grand transept and no projections at the west end. It does not seem to feel the lack appreciably, as one fears, that the interesting proportions of the chancel should be damaged. At Salisbury the double transepts brought the projection along the body of the plan in a swelling gradation. The east end of Winchester is sufficiently removed from the great transepts to be independent of them and complete in itself, and in its relation to the entire length of the plan.

Durham has a burly massiveness in plan, true to the character of other aspects of the building. The so-called chapel of the nine altars (I cannot but think it should be seven) crowns the cruciform, as one did once at Lincoln and Fountains, in a complete and final manner, but subservient to the central transepts. The nave is finished by the slight projection of the western towers, that seems the exact amount required to balance the whole without disturbing the mass of the east end.

Ely as a whole is simpler in outline than any we have been considering, though we bear in mind the extraordinary feats of constructive skill and beautiful design wrapped up in it. The nave, choir and presbytery are unusually long and wide, but

well balanced by the great transepts, comparatively short in projection. The design of the west end is unique—narrow but massive transepts, with a small apsidal chapel nestling against the south side of the nave. I am inclined to think that the design contemplated a corresponding chapel on the northern side. This little chapel gives the transept depth enough to balance the plan, and, being low, plays no prominent part externally. The chapel has here exactly the same object to attain as the screen walls at Lincoln. Though the two plans are different in almost every particular of design, we see that the architect had the same result to attain and succeeded by a different method in each case. Five turrets nearly circular on plan complete in a magnificent manner the design of the transepts and make Ely an interesting example of western transept planning. The Galilee porch interferes slightly with the happy result, owing to the great thickness of its walls necessitated for abutments to the arches that carry the central western tower. This was not the case with the Galilee at Durham, as the walls were not too thick to look delicate on plan.

Leaving strictly English examples, Westminster, in spite of its general tendency to depart from national types, is English in having a plan that is complete and beautiful as a whole, the base of the western towers having enough projection to make a satisfactory termination to the nave. Sir Christopher Wren's plan of St. Paul's has western transepts which are not quite happy in proportion. They seem either too large or too small, too large and deep for the length of the nave, and not far enough for the great transepts to aid their proportion. The nave could not well have been lengthened, as its huge arches would lose scale by further repetition. The western transepts seem too small when we realise that if they had been equal in size to the great arms of the cross the nave would have been perfectly balanced, though this would have been a departure from the proper cruciform plan. We find this carried out in the plan of Minster Cathedral, a building, though small in comparison with St. Paul's, more huge in scale. The nave consists of two spans. The eastern and western transepts are the same in size, have but little projection, and are of the same width as the nave. Their size, however, does not interfere with the latter, which passes through the eastern crossing into the chevet and through the western for an equal distance to a porch. In the examples as yet referred to the western transepts have been connected with the façade, but at Minster they have no relation to such, the front being a gable between two simple square towers.

The cruciform plan produced long churches, as the crossing arms divided the length and gave interest to points in what, without them, would have been a mere corridor. Our architects who were content to trust themselves to the cruciform plan for a supply of sufficient interest and beauty, naturally found at the crossing the centre and most important part of the design. This is why they concentrated their powers on the design of those lantern towers which are the glory of our cities and ours alone. Their thoroughness in adhering to a definite scheme of plan has been amply rewarded. The continental architects, who either did not perceive the vantage point they possessed at the crossing or were careless of it, produced no cathedrals which can rival the English in beauty and dignity of grouping. The fact that the square east end was the rule of our English practice has not a little to do with the emphasis given to the crossing; being conscious that the building could be terminated at any point to meet whatever proportion already existed, the transepts were lengthened and widened to group externally with the lofty tower and give space and effect to the interior. The transepts, as a consequence, are much more important and valuable here than abroad, their repetition beyond the choir being most fruitful of artistic results. Both at Lincoln and Salisbury the choir transepts are of beautiful proportions, narrower and of less projection than the great transepts, and seem based on a cross of which the choir forms the stem and the sacrum the head, their point of crossing being the top of the main cross, of which the other transepts are the arms, forming a cross within a cross, and yet maintaining their share in the whole plan. They effect a junction with the main vault, unlike their western brethren, the continuity of which is, however, undisturbed. Having been brought by their means now to the east end, we cannot but feel that there is no other possibly successful termination for the cathedral but a square wall, the rectangle having been the foundation of all the beauties we have been enjoying. And we have reason to be proud of the self-restraint our architects displayed in their way, and wonder what posterity will find of that quality in our own work.

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**A Monumental Column** is to be erected in Tournay to the French soldiers who were slain at the siege of Antwerp in 1832. Out of the fourteen designs sent in for competition, one by M. Sonnevile, architect, Tournay, was accepted. The sculpture, which comprises a statue of Belgium, will be the work of M. Debort.



## PATHOLOGICAL AND PHYSIOLOGICAL LABORATORIES, BELFAST.

**T**HE building containing the new pathological and physiological laboratories, Queen's College, Belfast, just finished, and which is complete in itself, is devoted entirely to the purposes of research and teaching.

The chemical section is in another block, and consists of two floors or storeys, the ground floor being devoted to qualitative and quantitative laboratories, private laboratory, professor's-room and balance-room. On the upper floor are the practice classrooms, cloak-rooms, combustion chamber and room for gas and water analysis.

The laboratories are fully equipped with water-supply and waste, gas for lighting and experimental purposes; sink chamber and fume closets are connected with extract flues leading to the exhaust tower at the rear of the building. The various rooms are ventilated independently through the roof and walls and thoroughly heated by hot-water pipes from boilers in the basement.

The space at present intervening between the chemical laboratories and the recently-erected physiological laboratories will, in the near future, be occupied by the chemical lecture theatre, occupying the full height of the building, with professor's retiring-room, stores, &c. This will complete the whole range of buildings, and form a handsome and effective group.

*The Physiological Laboratories.*—The recently completed physiological department comprises (1) a large practical classroom, size 47 feet by 37 feet, which for the present is also used as a lecture-room. This room is provided with six work-benches, each capable of accommodating eight workers. Additional space is also provided in the shape of a side bench capable of seating eight additional students. This also serves as a demonstration bench for the exhibition of typical histological slides under the microscope and for other purposes. All the benches are supplied with water, gas, and sinks placed between each pair of workers. A lecturer's bench, elevated 18 inches, is placed at one end of the room, also fitted with water and gas. Three of the front students' benches have been fitted with shafting. Each shaft carries four pulleys for driving students' recording drums. Twelve of these drums are in use. The bench shafts are driven from a shaft beneath the flooring by means of half-twist belts. This latter shaft runs along at the ends of the benches, and is driven by a Thirlmere water-motor placed beneath the side bench.

From the same underground shaft, by means of a guide-pulley, a small shaft on the lecturer's bench is also driven, giving the same motions as those on the students' benches, and in addition a slower rate of motion, which by means of a crank at one end of the shaft is used to work the bellows of an artificial respirator.

Behind the lecturer's bench are placed diagram screens capable of being lowered by cords running over pulleys, and also a ground-glass blackboard. This latter is inclined forwards at the upper part to the extent of 4 inches out of the perpendicular, an arrangement which is found very convenient both for the lecturer as well as for the students in the matter of greater ease with which diagrams can be seen from the seats, which are placed at a lower level than the board.

Two small draught closets, one on each side, are found very convenient. A frog tank and large sink are placed one at either end of the room. A lantern screen is also provided at the right end of the professor's bench. The room is well lighted by three large windows on either side provided with dark blinds for use when the lantern is employed. The heating and ventilation has been fully provided for; both have been found most satisfactory.

2. A small laboratory for physiological chemistry, which is also used at present as a preparation-room. This is fitted with chemical benches for the accommodation of eight senior or sixteen junior students. A side bench covered with a slate slab is supplied with (1) a Soxhlet's fat extraction apparatus capable of doing eight extractions simultaneously; (2) two Kjeldahl distilling apparatus, each for four distillations; (3) a paraffin bath is also placed temporarily in this room. In addition a large stink-chamber is placed at one corner, provided amongst other things with a stand capable of boiling eight Kjeldahl destruction-flasks at one time. A Watson and Laidlaw's centrifuge, supported on a stout stand, is also fitted up in this room.

3. A professor's private room and apparatus-room containing wall-cases for storing physiological apparatus, diagram cases, and also fitted with two work-benches, one for histological and the other for chemical work.

In addition to the above rooms, which constitute the ground floor, the following rooms are provided in the top storey:—(4) a dark room for photographic, polarimetric, and optical work is provided; (5) a private experimental-room, which is also to be used as a gas analysis room; (6) an animal room.

*The Pathological Laboratories.*—The pathological depart-

ment occupies the upper floor of the building. It consists of a lecture-room, a professor's private laboratory, a bacteriological room, an incubating-room and a store.

The lecture-room is used for practical class work as well as an auditorium. The benches are provided with gas and water fittings for each student, each bench accommodating eight workers. Special attention has been paid to the demands of microscopical work, and light has been supplied by windows and roof lights in such a way as to make it easy to use the microscope in any part of the room. A lecture platform with a bench has been placed at the end of the room, and behind this there is a large blackboard fixed in a recess in the wall. The height of this platform is such as to make general supervision of practical classes very easy.

Adjoining this room is the professor's private laboratory. Here there are two benches, one along the north wall, which is fitted up for microscopical research, and another one parallel to it in the centre of the room fitted up for chemical and experimental research. The latter bench is double the ordinary width, and has a central trough sink which extends from one end to the other. The water supply is both from the cistern and from the main, the latter being specially used for negative pressures in filtration and for aspirating air currents in respiration work. A water motor has also been fitted up at the end of this bench.

The south wall has been utilised for shelving. At the end of the room there is a large sink and a slate table for a paraffin bath.

The bacteriological research-room is situated on the southern side of the building. There is a window bench with sufficient space for two workers, a slate table for an incubator, a large draught chamber, supplied with gas and water, for the purpose of sterilising and distilling.

Opening out of this room is the incubating-room. This apartment has its own heating apparatus, which is controlled by a regulator. The walls of it have been rendered heat-proof by a thick layer of slag wool, so that the temperature can easily be maintained at the high level requisite for the cultivation of microbes.

A small store-room, with sink and commodious shelving, completes the department specially set apart for pathology.

The architectural style adopted in these buildings is a plain type of Tudor Gothic throughout, somewhat in keeping with the Medical Schools and surrounding buildings, the façades being broken up by gables, dormers, ornamental ventilating turrets on roofs, and exhaust tower, the lighting of all rooms being by mullioned windows. The materials used in these buildings are, as far as possible, of local production, all cut stone, such as strings, sills, cornices, gable barges, eaves course, chimney caps, &c., being in finely chiselled Dungannon sandstone, all external brickwork being the manufacture of the Annadale Brick and Tile Company, Belfast.

The whole of the fittings, many of which are of very complex detail, are of the latest and most improved forms, and give entire satisfaction in use, and render the laboratory as completely equipped as any in the kingdom.

The contractors for the buildings are Messrs. Fitzpatrick Brothers, Limited, of Belfast; the heating was done by Messrs. Musgrave. The whole, including fittings, was designed and carried out under the supervision of Mr. Robert Cochrane, F.S.A., F.R.I.B.A., Board of Works, Dublin.

## THE CASE AGAINST THE ECOLE DES BEAUX-ARTS.\*

(Concluded from last week.)

**H**ERE is another criticism on a different line. In nearly all the schools which ape the Ecole, a vast amount of time is given to the matter of academic rendering. I wish I knew just what this training is supposed to accomplish. We live in a period when an architect who knows how to render his drawings is pulled back to the level of those who do not, and he must sacrifice his ability for the good of a less competent man. Therefore a competition perspective is "rendered in line only, without shadows or accessories, and with one figure intended to give scale." Under the circumstances the old fetish of academic rendering would seem to be no longer potent, but it is dominant just the same, and hundreds of valuable hours are wasted by misled students in making wonderful drawings that are without the least practical use whatever. Neither are they beautiful. They are wonderful as examples of manual dexterity, but for the life of me I cannot see that they are anything more, and the time lavished on them might, I think, be at least equally well employed in learning that there are in

\* A paper read by Mr. Ralph Adams Cram before the Boston Society of Architects and published in the *American Architect*.



existence buildings in Chartres and Amiens and Gloucester and Durham which may possibly be worth looking at.

I have already referred to the defects in the boasted academic system of planning. Let me specify them a little more carefully. They appear to me to be very serious. I have studied academic plans a good deal, and it seems to me that the majority of them show signs of having been studied out as problems in decoration, not in building. That is, the student has had in mind the making of a decorative design which should be pleasing to the eye, not necessarily compact in arrangement, convenient in composition, or indicative of fine effects in actual construction. Looked at as an ornamental figure, the typical academic plan is very successful. In a competition it would receive no consideration. If used as a working plan the resulting structure would be a failure.

Again, in the Ecole at least, I know it to be a fact that the only drawings that are considered as important are the first-floor plan and the front elevation. The former must be powerful and imposing—on paper; the second-floor plan may come anyway, and as for the section, it is worked out on the last day, principally by “niggers.” I believe the general experience is that it never comes out right, but this does not matter, for constantly designs are placed first, the sections of which show that they could not be constructed, while the second-floor plans show chimneys starting from the ceilings of *salles des fêtes*, or anywhere else, and partitions without any support whatever. And there, also, is a point to be severely criticised, the undeniable fact that in spite of the apparently severe first year's training in construction, this item is not at all considered in the design, and it does not militate in the least against the success of a plan that the partitions and chimneys on the second floor depend for their support on the same miraculous agency that held Mohammed's coffin suspended in mid air.

It is the same in the matter of lighting and ventilation. So far as studies are concerned, students are taught enough about these things theoretically, but are they induced to apply their knowledge in actual design? I am told not, and I have known of innumerable cases where much-praised designs have had as features important rooms with a single window in one corner, and school buildings with no provision for ventilation whatever. In the first case, the rooms had to be where they could not be lighted, for the balance of the plan demanded it; in the second, heating and ventilating shafts were omitted, because they were ugly and injured the unity of the plan.

It may be said that the idea of the system is not to teach practical design, but to create in a student's mind an ideal to which he will afterwards always endeavour to approximate. This may be, but if an ideal is utterly impractical, it is not much use as an ideal.

Then there is another criticism, the last I shall inflict on you. I know for a fact that in certain schools types of architecture which are inherently and damnably bad are held up to honour over types which are eternally good. Here is an example which came under my notice. The *projet* was a doorway. Among the designs was one, rococo to a degree, the columns on either side being drums, alternating square and round—you know the style. With it was handed in a drawing equally well rendered, but in a pure and delicate version of the early Italian Renaissance. The first represented a style debased and corrupted, the second that style while it was pure and admirable. The rococo design was placed first in the award.

Now this is a small matter, but it is significant, for if it is possible for the academic system to become an agency for the debasing of a student's taste instead of cultivating it, it is a legitimate subject for savage criticism.

These are some of the reasons a certain class of men have for distrusting the system at present in vogue in architectural schools, and the prejudice is growing, not lessening. Recently we have seen an honest and a courageous attempt made by various men who have studied in the Ecole to exalt its name and influence. But does their method do away with the distrust of those who cannot accept the teachings of the academic system? On the contrary, it intensifies them. Unless I am mistaken, these zealous upholders of the Ecole, nearly all of them masterly architects to whose work one must look up with honest admiration, inaugurated their movement with a competition drawn on the most approved lines of the Ecole des Beaux-Arts. I read the programme with delight. Anglomania was not in it. This was Gallomania raised to the *n<sup>th</sup>* degree. Once more our immortal old friend put in appearance, the “wealthy amateur” with the precious columns and amazing tastes, and, to prolong the influence of the academic system, draughtsmen were urged to yield to the blandishments of the aforesaid wealthy amateur, and assist him to dispose of his white-*elephantine* columns to academic advantage and the glory of the system.

I am sure I was not the only one who wondered where was the use of all this, of what possible benefit could it be to young fellows who are trying to make a living out of architecture? Where was the good? I confess I could only think of the lamented Mr. Pecksniff, who was such a shining light in the

profession, “Well, you might design a pump: now a pump is very chaste practice.”

I am told that the problem this year is on the face of it a very complete surrender to Americanism and modernity, being, nothing more nor less than a harmless, necessary tavern. This is excellent. Visions rise up at once of a lot of drawings wrought out in varying styles. One, perhaps, with the dignified walls and delicate details, the magnificent chimneys and fine verandahs of colonial Maryland. Or it may be one that brings back the memory of jolly days in little English country towns, with the amiable bar just behind us and a “pint of bitter” at one's elbow. With this subject the chance for young architects to do work that should be charming and in every way appropriate is infinite. But will any design on English or American lines find favour? Hardly. One would risk little in wagering that the prize design would be laid out on a unit of eight, that its roof would be low and covered with red tiles, and that it would bask in the glare of a Connecticut sun in the midst of colonnades and pergolas and fountains and statues, shown by little vermilion squares.

Well, here is where I stop what you will think a very unbridled tirade, but I assure you that I mean no harm by it. If anything can curb the ardour of our untamed American spirit as it expresses itself in architecture, it is the influence of academic training. But just because it may do this, it does not follow that the system is impeccable. For my own part, I still think it is peccable and I don't know why I should not say so. If, instead of exalting the Ecole and all its works to the skies, its advocates would try to see whether or no the local and contemporary conditions in America might not modify it to advantage, we might obtain a system which would be above criticism—even of architects who never had any academic training, whereas now we have one which knocks the nonsense out of students, but does not put much sense in its place. A system which strives to destroy, but does not succeed in building up—in which respect it resembles this dissertation.

## THE KAISER AS ARCHITECT.

A CORRESPONDENT of the *Daily Graphic* writes:—For some years past the Germans have been busy with the plans of a Protestant church for Jerusalem, to be erected on the piece of land presented by the Sultan to the father of the Kaiser. The original plans of the building were drawn out by a Government architect, Professor Adler, who reckoned the cost at about 26,000*l*. The Kaiser, however, wished to have his finger in the pie, or, as the French Press puts it, “his nose in the church.” Anxious that the building should have the benefit of his genius and become historic in more ways than one, the Kaiser took the plans of the Professor and altered and amended prodigiously. The result is that a tower is added to the original plans and this has been designed by the Kaiser himself. The additional expense of about 16,000*l*. is a detail compared with the glory of having the Kaiser as architect of the Protestant church in the ancient city of Solomon.

## PETERBOROUGH CATHEDRAL.

THE work of demolition of the north gable of the west front of Peterborough Cathedral is proceeding rapidly, and despite the fact that only one week has elapsed since it commenced it has progressed so far that the rose window and the surrounding masonry has been removed. About sixteen skilled workmen are employed on the demolition. Each stone of the gable is marked on a plan beforehand and measured, and its size is recorded. When dislodged it is taken down in a lift to the grass below, where the stones are laid in courses. These great stones are readily taken out. The mortar in which they lie is like dust and not so good as the “road mortar” of later generations. The huge floriated Latin cross on the summit was removed with a derrick.

Considerable interest has been aroused by the discovery of a shift to which the earlier restorers had recourse, and which clearly shows that the tilting forward of the west front began at a period many years after its completion. When the point of the gable had been removed several courses the span roof at the back was revealed, and it was evident that the face of the gable had left the roofing a considerable distance, and two new rafters (one of them a split scaffold pole) had been put in, and the slating once more brought up to the gable. In 1820 extensive operations were carried out upon the front, and the cracks then apparent between the front and the western wall “grouted” and filled in. There is now a modern crack of several inches between that filling-in and the wall of the front. Again, a test plaster was placed six months ago on a rib of the gironing over the south-west pier. This has now cracked. The core of the wall of the front has just been tested, and has been found to be



filled with a dusty mixture so loose that, when the opening is not blocked up, it runs through it like the sand of an hour-glass. Seven feet of this would have to be penetrated if the "tunnelling scheme" were carried out before the back of the facing stones could be reached.

It is hoped that the inner moulding of the great northern arch may be saved. No very great quantity of stone will have to be renewed in the facings, and where such is necessary it will be taken from the ample store of Barnack rag which the Dean and Chapter secured four years ago when the Low Farm was destroyed. The Barnack quarries are said to have been exhausted with the completion of the cathedral. Subscriptions are coming in freely, although the total is at present quite inadequate. The Marquis of Exeter has contributed 50%.

## TESSERÆ.

### Early Water-Colours.

THE efforts which had been made in the water-colour department of landscape and topographical painting, before the appearance of William Mallard Turner and Thomas Girtin, amounted to little more than to produce correct views of abbeys, castles, ancient towns and noblemen's seats. These subjects, however, were handled with no mean skill by Paul Sandby, whose memory is to be regarded with veneration by the present school who have raised so fine a superstructure upon the foundation which he laid. Michael Angelo Rooker must also be named with respect, as having contributed to the improvement of this art. He had an excellent eye for the picturesque. Many of his representations of ancient remains are drawn with that truth and characteristic detail which, whatever might be wanting to complete his works, touching their general effect, are yet sufficiently interesting to hold a due rank in the portfolio of the connoisseur. The view of the colleges on the Oxford Almanac, which were drawn and engraved by this artist, alone would remain sufficient testimony of his abilities. He was the son of Edward Rooker, also an artist in the same line, who placed Michael Angelo under the tuition of Paul Sandby. Thomas Hearne, another artist whose talent in the topographical department fairly includes him amongst the founders of our school of water-colour painting, was much admired in his day. Nothing can be more faithful to their prototypes than some of the abbey gates and castellated towers—existing remains of ancient architecture—which he made the subjects for his pencil. The mouldering walls, the remnants of carved porches, the elegant windows with their mutilated columns are represented in his small drawings with pictorial charm. John Cozens also helped to found a British school for this modern art. His drawings, however, have a different and perhaps more original—at least a more poetic character—than any of the works of the preceding worthies. His compositions embraced the vastness of nature in her grand combinations of mountains, woods and lakes, and struck out a style of effect that has been said to be the precursor to the ultimate superiority of water-colour painting which was reserved for Turner and Girtin to attain. It should be observed that this is rather said in justice to the talent of Cozens than to lessen the merits of these two superior artists, to whose works Cozens's, as regards the term paintings, bear no comparison, his being at most little more than merely tinted chiaroscuro, similar to mezzotinto prints thinly washed with colours. All that had been done in this material by Pillement, Chatelain and others were principally pastiches, or compositions from Italian, Flemish and Dutch prints, hatched in black chalk and tinted, or drawings with pencilled outlines, shadowed with Indian ink, and washed with thin colour.

### E. H. Baily, R.A., and the Duke of Wellington.

I met Baily, the sculptor, writes Haydon in his "Diary," who told me his *rencontre* with the Duke of Wellington. The Duke had written Storr & Mortimer he would see Baily on Wednesday; they told him nothing of it till Wednesday afternoon. Off he set on Thursday, and came on the Duke when he was deeply studying some papers and details connected with India (I suspect the Afghanistan affair), and after keeping him waiting a whole day, which he had set aside. The Duke came down as soon as Baily was announced, and on entering flew at him in a fury. Baily told me he included in the most violent imprecations himself with all other artists for what he called "tormenting him," adding that his career was over at forty-seven, and asking why they could not be content with what they had done already. Baily said he bent his fist to knock the clay model to pieces; but the Duke got up on the horse, and Baily modelled away. When he had done sitting he withdrew, and Baily took his bag up to the steward, and was about to retire to the inn to dine. The steward said, "Sir, the Duke expects you at dinner, and to sleep here." "Tell the Duke," said Baily, "I'll be hanged if I dine at the table of any man who uses me as he has done." Baily went to the inn,

and was drinking his wine when he saw a groom galloping towards the house. He inquired for Mr. Baily. He was shown in. Baily said, "Tell the Duke I'll neither dine at his table nor sleep at his house." The next day he went again. The Duke came in in a very bad temper and said, "I suppose I may read my letters?" He sat and read and tore open his letters in a fury. Baily finished. The Duke began to melt and excuse himself, and offered to sit again, but Baily declined. Since then the Duke told Mortimer the silversmith he would sit again. I like this, as it is amiable; but Baily would not accept it.

### Coloured Sculpture.

Form gives expression, action, motive, grace. In short, the purpose is in form. We know what is meant by form, whether it be a man, a horse, or a dog; and we know what any of these mean particularly by the particular form or arrangement of their general form when we see them. A man when about to strike presents to our view one arrangement of his form, when about to leap another, when about to ward a blow another, and so on. His face presents one form when he smiles and another when he weeps. Anger effects a new combination or form of the features of his face; and this, as far as it can be, is the case with the animals generally. Rocks, trees, edifices, &c., cannot be said, properly, to have any other expression than that which is peculiar to inanimate things; but they may have expression by resemblance to animated beings. A rock may look like the head of a man, and thus have a borrowed expression; and so with the others. I have seen clouds look "very like a camel," and even "like a whale." Thus it would seem that the spirit, or what is vital, reveals itself and its purposes through form, and as the form is so will be the revelation. The form enacts what the spirit dictates. It is the telegraph, so to speak, of the soul which moves it. There can be no change of expression or character without motion, and no motion without a something which moves. This something, whatever it be, is a form, or part of a form of forms. It follows that form is the vehicle of expression. Having attempted to show what is the office of form in art, fewer words are needed in defining that of colour. We may mistake for the moment a well-executed wax figure for a living human being, but we never mistake a statue of whatever excellence. And why? The first presents to our senses not only the form of a man, but also his very flesh, eyes and hair. The second gives us his form only, and therefore, however expressive it may be, and however like to some individual, it is not illusive. The one appears to have a fleshly body; the other, as it were, a spiritual body. The one appears to have a soul in the flesh, the other appears to be an abstract soul. Form shows how a thing is made, colour shows of what it is made; but the latter has no expression, and sometimes fails to show us of what a thing is made. A board painted flesh-colour would not look like a piece of flesh, nor would a similarly coloured piece of wax, if flat, square, or round, but mould it into the form of an arm, a hand, or a face, and instantly you suggest the thought of flesh. Giving it form has given it expression, to which the colouring has become a suitable accompaniment. Colour, then, produces illusion, and is suggestive of matter or substance, and is beautiful and attractive, or otherwise, according to its arrangement or purity. The painter can do nothing without form; the sculptor can do everything in his legitimate art without colour. The painter, then, needs form; but does the sculptor need colour? Colour the Apollo Belvidere and he ceases to be a god, a spiritual embodiment; he steps down from his throne on high, and becomes man among men; we touch him, talk to him, and handle him with familiarity. And if this is so with one statue, it would be so with all, if all were equally perfect. When Sculpture calls upon her sister Painting for aid, she acknowledges her weakness, drops her chisel, takes up the palette, and pursues a mongrel art, half sculpture, half painting—the one confessedly imperfect, or it would not have required the other, and both together a decided failure, since without glass eyes and natural hair even illusion is wanting.

### Mediæval Mosaics.

There are three great divisions of Italian Mediæval mosaics, viz. :—1. The Opus Alexandrinum, made of hard marbles and used for floors; sometimes, but very rarely, small portions of Opus Vermiculatum appear in conjunction with it. 2. The Opus Grecanicum, which is little more than No. 1, only the tesserae are made of glass, and it is occasionally found as in Sicily, with a mixture of hard precious stones, such as porphyry jasper, &c. It is used to decorate church furnishings and the lower parts of walls. The term Opus Grecanicum is sometimes applied to the Opus Alexandrinum, but it is perhaps as well, for the sake of clearness, to confine it to geometrical glass mosaics, set in marble. The base of St. Edward's shrine and the tomb of Henry III. at Westminster Abbey are examples of this sort of work, while the pavements before the high altar of the same building and in St. Edward's Chapel are excellent illustrations of Opus Alexandrinum. 3. Opus Musivum, or



figure mosaic proper, where animals, foliage and figures are executed by means of tesserae made of opaque coloured glass. Very many of the Roman churches possess apses decorated in this work, and it is used to cover the whole of the interiors of St. Mark at Venice, the cathedral at Monreale in Sicily, and the Capella Reale at Palermo.

#### Mosaic Glass Windows.

There are three distinct systems of glass-painting which for convenience sake may be termed the mosaic method, the enamel method, and the mosaic enamel method. Of these the most simple is the mosaic method. Under this system glass-paintings are composed of white glass, if they are meant to be white, or only coloured with yellow, brown and black, or else they are composed of different pieces of white and coloured glass arranged like a mosaic, in case they are intended to display a greater variety of colours. The pieces of white glass are cut to correspond with such parts of the design as are white or white and yellow, and the coloured pieces with those parts of the design which are otherwise coloured. The glass-painter in the mosaic style uses but two pigments, a stain which produces a yellow tint and a brown enamel called enamel brown. The main outlines of the design are formed, when the painting is finished, by the leads which surround and connect the various pieces of glass together, and the subordinate outlines and all the shadows, as well as all the brown and black parts, are executed by means of the enamel brown, with which colour alone a work done according to the mosaic system can be said to be painted. The yellow stain is merely used as a colour. It therefore appears that under the mosaic method each colour of the design, except yellow, brown and black, must be represented by a separate piece of glass. A limited number of colours may, however, be exhibited on the same piece of glass by the following processes:—Part of a piece of blue glass may be changed to green by means of the yellow stain. The coloured surface of coated glass may be destroyed by attrition or the application of fluoric acid, and the white glass beneath it exposed to view. This may of course be wholly or in part stained yellow, like any other white glass. Two shades of yellow may also be produced on the same piece of glass by staining some parts twice over. But unless he adopt one or other of the above-mentioned processes the glass-painter under the mosaic system cannot have more than one colour on the same piece of glass. A variety of tint or depth may often be observed in the same piece of coloured glass, arising from some accident in its manufacture. Of this a skilful glass-painter will always avail himself to correct as much as possible the stiffness of colouring necessarily belonging to this system of glass-painting. Under the enamel method, which is the most difficult of accomplishment, coloured glass is not used under any circumstances, the picture being painted on white glass with enamel colours and stains. The mosaic enamel method consists in a combination of the two former processes, white and coloured glass, as well as every variety of enamel colour and stain, being employed in it. The practical course of proceeding under each of these three methods is nearly alike. A cartoon of the design is made, upon which are also marked the shapes and sizes of the various pieces of glass. The glass is cut to these forms, and is afterwards painted and burnt, *i.e.* heated to redness in a furnace or kiln, which fixes the enamel colours and causes the stains to operate. The number of burnings to which the glass is subjected varies according to circumstances. It is in general sufficient to burn glass painted with only one enamel colour once or twice, the self-same operation sufficing also to give effect to the stain, if any is used. Where several enamel colours are employed it is necessary to burn the glass more frequently, each colour, in general, requiring to be fixed by a separate burning. It only then remains to lead the glass together and to put it up in its place.

#### Chiaroscuro in Painting.

Chiaroscuro is an Italian compound, simply signifying light and shade, but is used in a more extended sense to denote the artificial distribution of light and dark in a picture, so as to produce the best effect of the whole together, whether the light be incidental and such as the objects naturally receive or caused by local colours that are bright and luminous in themselves, in opposition to the browns and other dark colours, whether local or representing shadow, the opposition being not only of light and shadow, but also that of light-coloured objects contrasted with dark ones, by an arrangement of such local colours as will extend the breadth of light or keep down those parts of the picture that require to be obscured. The works of Rubens, Rembrandt, Sir Joshua Reynolds, with those of many other Flemish and English artists, abound in excellent examples of chiaroscuro which are preserved in the prints from them. This is not the case with regard to many of those from the old masters, the early engravers having given the light and dark of nearly the same tone, whatever the local colour of the object may be. The modern engravers have greatly improved this

part of their art, by expressing in their prints the relative strength of the light and shadow, according to the brightness or obscurity of the local tints, so as to produce the general tone of the picture. It may be proper to remark that very little of the principle of the chiaroscuro can be found in any work of art produced before the time when Giorgione, Titian and Correggio flourished. From the Venetian it descended to the Flemish school by Rubens, Vandyke, &c., and in this country Sir Joshua Reynolds, Wilson, Barrett and Gainsborough, with many others, have, like the Flemings, carried the principle and practice to a greater degree of perfection than was ever attained by the Venetian painters. It is therefore needless to seek abroad or in the works of the old masters for information in chiaroscuro, which may be better obtained from the moderns and at home.

#### Theories of the Beautiful.

Aristotle's theory of the beautiful is often referred to; his two constituents are "order and size." By size he means what is not insignificantly small, nor yet so large as to be more than the apprehension can well take in at once. This brings us near to his doctrine that virtue consists in the mean, which doctrine again has an affinity with certain views taken by Goethe, Wordsworth, George Eliot and others. They teach that it is mostly in common things that art must find its materials, especially in middle-class life, which escapes the sordidness of poverty at one extreme and the affectations of luxury on the other. A kindred notion again is that of Sir Joshua Reynolds with regard to the ideal average type. "Most people err," he says in his "Discourses," "not so much from want of capacity to find their object as from not knowing what object to pursue. This great ideal perfection and beauty are not to be sought in the heavens but upon the earth. They are about us and upon every side of us. But the power of discovering what is deformed in nature, or, in other words, what is particular and uncommon, can be acquired only by experience; and the whole beauty and grandeur of art consists in being able to get above all singular forms, local customs, particularities and details of every kind." The theory is supplemented by what Reynolds writes in his letters to the *Idler*:—"I suppose it will easily be granted that no man can judge whether any animal be beautiful of its kind or deformed who has seen only one of that species. The works of nature, if we compare one species with another, are all equally beautiful, and the preference is given from custom or some association of ideas. In creatures of the same species beauty is the medium or centre of the various forms." Mr. Ruskin's variation upon this doctrine is, that what nature does rarely will be either very beautiful or very ugly; thus he allows that a very wide departure from average type may be very beautiful, on which supposition beauty cannot be defined as average type.

#### GENERAL.

**Mr. Charles Barry** has taken his eldest son into partnership, the title of the firm being Messrs. Charles Barry & Son. From Lady Day next the offices of the firm will be in Parliament Mansions, Victoria Street, Westminster, instead of at No. 1 Westminster Chambers.

**Mr. W. H. St. John Hope, M.A.**, will on Tuesday read a paper before the applied art section of the Society of Arts on "The Artistic Treatment of Heraldry."

**A General Assembly** of Academicians and Associates was held on the 14th inst., when Mr. John Singer Sargent was elected an Academician, and Mr. Alfred Parsons and Mr. J. J. Shannon, painters, Associates.

**A Memorial** of Elie Delaunay, the painter, who was one of the last representatives of "High Art" in France, has been inaugurated in the Musée of Feltre, Nantes. It was designed by M. Montfort, architect, M. Gaucher being the sculptor.

**The Bishop of Ely** has contributed 500*l.* towards the erection of a new church in the parish of St. Saviour's, Luton.

**The French Committee** for selection of drawings for the French International Exhibition will consist of MM. Bonnier, Bouvard, Courtois-Suffit, Girault, Pascal, Pierron, Paul Sédille, Emile Trélat.

**The Building Fund** of the University Extension College, Reading, has been increased by subscriptions from Lord Wantage, Mr. Richard Benyon and Mr. Herbert Sutton, who have each given 1,000*l.* Mr. G. Palmer, Mr. G. W. Palmer, Mr. W. Palmer and Mr. A. Palmer have each contributed 500*l.* for the same object, and the Drapers' Company have promised 1,000*l.* on condition that a sum of 12,000*l.* is raised without delay. The Hampshire County Council have voted 1,000*l.* out of accumulated surplus for the foundation of exhibitions in connection with the college.

**Mr. Alexander Drew** has arranged to give six lectures before the Edinburgh Architectural Association upon "The Practical Designing of Iron and Steel Roofing."



# The Architect.

## THE WEEK.

THE action before the French Tribunal Civil, in which the Ducs of ANJOU and ORLEANS and Don CARLOS are the litigants, may seem amusing to the multitude, but it is one in which every lover of heraldry must take interest. "He that filches from me my good name," says IAGO, "robs me of that which not enriches him, and makes me poor indeed;" but as the appropriation of an escutcheon not only impoverishes the loser but enriches the spoiler it is harder to endure than any calumny. The arms of France, three fleurs-de-lys d'or "sans brisure" on an azure field, are the privilege of the eldest sons in the most direct line of descent from LOUIS XIII. If the laws of primogeniture and heraldry are to be respected, the representative of the House of BOURBON is to-day either the Duc d'ANJOU or Don CARLOS. It is true the former belongs to a family that renounced all claim to the throne of France; but it is a doubtful question whether political considerations should be allowed to override family privileges which it is the purpose of heraldry to sustain. Moreover, questions of the kind are beyond the purview of ordinary diplomatists, and were not included among the conditions of the Treaty of Utrecht. If it could be supposed heraldic rights were renounced with as much ease as claims on a throne, then DON CARLOS would possess the monopoly of the fleurs-de-lys; but we maintain that heraldry is not to be confounded with politics. The Duc d'ORLEANS represents only a younger branch, and by established laws cannot possess the escutcheon belonging to the direct line of descent. Moreover, if an act of renunciation has any value, he can only claim to be the heir of LOUIS PHILIPPE, who by his own act professed to be no more than king of the French, a position for which especial emblazonry should have been created. The existing Republic has no claim to arms, as was demonstrated during the visit of the CZAR; but that could also be asserted during LOUIS PHILIPPE's reign. The judges of the Tribunal Civil apparently are unable to comprehend the action they are trying, for they assume that as there is no king of France there are no arms for the representatives of LOUIS XIII. The truth is, there are no arms belonging to France as now constituted, while they belong to some man who has not the right to vote as a French citizen.

IN common with most of the trades, occupations and professions in Paris, the industrial designers have a syndicaté. A meeting of the members was held a week ago to discuss the important question whether women should be allowed to work in the *ateliers*. Both the State and the Municipality expend large sums on the instruction of women in art, and it would be strange if all the money was to be wasted. There was no question of competency raised; indeed, one of the master designers, who employs no less than ninety assistants, said he found that for some kinds of work women were better adapted than men. There was a stormy debate, and eventually a majority decided that every "patron" should continue to have absolute freedom to employ or not to employ women in his *atelier*. One of the grounds of opposition to the arrangement was the insalubrity of the rooms. "It is out of humanity," said one employer, "that I do not wish to have female assistants. In our *ateliers* there is neither air nor light. Men alone are able to withstand the existing conditions, and why should women be condemned to endure them?" It is evident that sanitary inspectors would find many offences in *ateliers*, but probably under no known law could such places be recognised as workshops.

THE purchase of SHAKESPEARE's house in Stratford-on-Avon was at one time contemplated by an American speculator. He intended to transport it in its entirety to the States and to exhibit it in the different towns. It would have been a profitable venture. But a house that would be likely to appeal more strongly to American sightseers was sold last week in the "Cross Keys," Washington, co. Durham, for the sum of 405*l*. It was probably never

occupied by one of the WASHINGTONS, but it was known as the Old Hall, Washington, and had a stronger claim on attention than the ancient negress who was produced by BARNUM as GEORGE WASHINGTON's nurse. The genealogy of the great President's family has been traced from WILLIAM DE HERTEBURN, who in the twelfth century obtained Washington by surrendering a township known as Hertburn or Hartburn, and paying 4*l*. to the Bishop of Durham. Apparently his family were called after the new property, for there is evidence of a WILLIAM DE WESSINGTON in 1260. GEORGE WASHINGTON was descended from a branch of that family, and the "stars and stripes" are said to be no more than an adaptation of their escutcheon, which bore "Argent, two bars gules, in chief three mullets," while the American eagle was derived from their crest, "a raven with wings indorsed proper." In 1614 the existing hall was erected by WILLIAM JAMES, Bishop of Durham, and may have replaced a building in which many WASHINGTONS were born and died. It is constructed of stone, and has two wings which project beyond the face. The windows are square and mullioned. The present state of the building would not be gratifying to any of the WASHINGTON family or to American visitors. The building is let out in tenements, and everyone knows what that signifies. The adjoining land is needed for a new cemetery, but about an acre and a half were included with the house.

At a general meeting of the Society of English Artists, held at the Regent Gallery, Regent Street, the following resolution was passed respecting the title of the Society, to which the Royal Society of British Artists had raised an objection:—"That there is no legal obligation on the part of the Society of English Artists to change the name as suggested in the letter received from the Secretary of the Royal Society of British Artists, as there is no infringement of title, as alleged; at the same time there is a feeling that the similarity of names is objectionable, and therefore we, as a young society, are desirous of meeting the wishes of the older body, and with this view it be resolved to alter the name to the Society of English Painters."

ON Monday last one of the most useful auxiliaries of the arts of construction ceased from his labours. DAVID KIRKALDY was entitled to that designation. Forty years ago he commenced practice in testing materials, and his services since that time have been invaluable to mechanical and naval engineers, as well as to architects and manufacturers. For work of that kind he seemed to be created. He was thoroughly independent, and held aloof from all societies and cliques as well as from speculators. He was cautious in all his observations, and permitted no statement of the results of tests to leave his premises without repeated scrutiny. Mr. KIRKALDY was the inventor of his testing machine, but, although he had for it almost an affection, he was always watchful of its action, as if he were afraid it would become fallible. His work was generally appreciated, and it can be said that he was allowed far more opportunities of acquiring a knowledge of the peculiarities of materials than any other experimenter in the world. Mr. KIRKALDY was born in Dundee in 1820. He was apprenticed to the late ROBERT NAPIER, of Glasgow, who was the foremost naval constructor of his time. After passing through the workshops he was engaged as designer by the firm. He was an admirable draughtsman, and he used to boast with honest pride that his section of the *Persia* (s.s.) was the only example of its class which was allowed admission to the Royal Academy. While associated with the NAPIERS he commenced his experiments on materials, and being dissatisfied with the appliances which were in use and which were rather uncertain in their results he applied his inventive power to the preparation of a new machine which should be free from defects. The outcome was such a machine as is to be seen at Southwark, and to its efficiency countless testimonies could be produced. Mr. KIRKALDY's museum contains collections of specimens which manifest its power. Until a few months back Mr. KIRKALDY was able to attend to his duties, and his death, which many will sincerely regret, was caused by failure of the heart's action.



## PLANS AND DRAWINGS.

BY A BARRISTER.

**P**RELIMINARY plans are either made subject to a special contract for that purpose, or usually, in the case of public competitions, to the terms of the advertisement; the latter mode will, therefore, require no further consideration beyond stating that, where plans are sent in for competition, the employer cannot make use of them if the competition is not proceeded with. In a Scotch case an architect prepared detailed plans. The buildings were not proceeded with, but the proprietor used the plans to his advantage in dealing with a purchaser of the ground. The proprietor denied liability on the ground that the plans had been furnished upon the footing of there being a competition. The Court considered that it lay upon the employer to prove that the employment was gratuitous, which he had failed to do.

If an architect agree to prepare such probationary plans and drawings as the employer should approve of and he fail to obtain such approval, he will have no cause of action; and if no time is fixed within which the plans are to be finished, the presumption will be that a reasonable time was intended, and the question whether a reasonable time has elapsed will be for the jury. In an action by an architect whose plans, after having been accepted, are rejected on the ground that the work cannot be done for the amount of his estimate, it seems that it is a question for the jury whether it is an express or implied condition of the contract that the estimates shall be reasonably near the actual cost. All agreements should, therefore, clearly set out the terms upon which probationary drawings, &c., are to be provided; and if it is intended that the architect should make a charge for such preliminary work under any circumstances, or in any event for work actually done, a special clause should be inserted to that effect.

The architect or engineer is the general agent of the building-owner in making drawings. But he has no authority to warrant to the builder that they are correct or that the work can be executed according to them. Nor where there are omissions from them to order those omissions as extras under a power to order extras, if they are works indispensably necessary to complete the contract. Nor where the drawings are impracticable has he any authority to order as an extra work necessary to make them practicable. If a party contracts to erect a building according to plans and specifications, under the supervision of an architect, the architect cannot change the terms without special authority. Approval of a plan by the employer will not release the architect from liability for structural defects or defects in the plans, as to which the employer is personally incompetent to decide upon mere inspection. A contractor who builds on plans made by himself assumes the responsibility of an architect, and is under the same liabilities. Speaking generally, an architect is liable for preparing improper plans which are constructionally defective, and for specifying useless and unnecessary labour and work, and for omitting proper and necessary work and labour. And should omissions have been made in the drawings or specifications by the negligence of the architect, so that if executed they would be the subject of an extra order or of a new contract, the architect will be liable; but the measure of damages could in no case be the cost of the extra works, because had the works been specified at the time the builder made his estimate, his estimate would have been by that amount higher. The basis of assessment is the damage which the building-owner has sustained by having been induced, by the negligence of the architect, to enter into a more expensive work than he would have done. And, further, inasmuch as the builder is liable for the non-performance of the work undertaken, however impracticable the plans, no liability can accrue to the engineer or architect, unless he orders alterations to rectify his own mistakes.

When there is no contract for a specific price, the architect's demanding more than a reasonable price and refusing to deliver his plan except upon payment of such larger price does not preclude him from suing for and recovering a reasonable price. He may maintain an action and retain his lien notwithstanding. Upon payment of the balance of the architect's charges he must deliver up his

plans, unless it has been stipulated that they are not to become the property of the employer.

The architect must know and comply with all general or local Acts of Parliament and all by-laws or regulations lawfully made relating to buildings on the site selected, and of the class which he undertakes to plan. Ignorance of law may make his plans defective or impossible, and expose the employer to fine or to have his building pulled down, or abated as a public nuisance. The obligation to know the law binds him to inquire as to the particular regulations applying to the place where the building is to be erected, for if an architect is employed to prepare plans for building in a defined place, there would, it seems, be an implied contract on his part with the building-owner to make the plans in accordance with the Act or by-laws relating to buildings in that place. To rebut this, it must be shown either

(a) That the building-owner wanted plans for a building which could not be built, or

(b) That the building-owner intended to do that which was illegal.

But if the contract is rendered illegal by the passing of a law or by-law after the architect has done his part in preparing the plans, he is, of course, under no liability to the employer. The architect must know to what public authorities plans are to be submitted, and must see that regulations as to inspection by the local authorities during the progress of the works are properly complied with, and the surveyor's certificate obtained. When any alterations are made on the plans as deposited, it is generally necessary to deposit the plans again and get the sanction of the local authority afresh, even where the alterations violate no statute or by-law.

If the building-owner suffers any loss from the negligence of his architect in preparing the plans and specifications, the architect is liable to the employer for such damages as he may have suffered in consequence, but not for damages which the employer has paid, but which he was not legally compellable to pay on the ground that there was no warranty, nor it would seem for loss which he has incurred by not insisting upon a contract which a builder had foolishly bound himself to perform.

## FLORENCE AND TUSCANY.—II.\*

**F**LORENCE as a city does not please me so well as Bologna," wrote JOSEPH WOODS some eighty years ago; "the streets are narrow, and the palaces are like prisons. These streets are paved with flagstones of irregular forms, variously fitted to each other. They have the appearance of wide foot-alleys; so that while at Paris everybody has to walk on the carriage-road, at Florence all the carriages seem to be on the footpath." Several changes have occurred in Florence since the "Letters of an Architect" were composed, but many of the defects which were noted in them still remain, and are likely to continue unchanged. Florence owes its peculiarities to the character of its inhabitants. The portraits and terra-cotta busts which have survived, as well as the histories, are evidence of their determination, and suggest unpleasantness. There was more individuality among them than was common in other Italian towns, and it had defects along with advantages. The right to differ was fostered and punished. The citizens formed themselves into bodies (of which there were twenty-one), that were not unlike our vestries (but with more opportunities to do evil deeds), for the purpose of gaining a share in the exercise of power over their fellow-citizens, and when any failed they were made to suffer. DANTE's fate was endured by hundreds who were unable to leave any record of their woes, and are therefore forgotten. He struggled for place, was not successful, and was banished. If he had gained the upper hand, his competitors would have met a similar or perhaps a worse doom. As DANTE was henceforth impotent, he consoled himself by imagining all he would inflict if he possessed the power of the Deity. The morose White Vestryman gratified his spite by dooming the Black Vestrymen to endless tortures. While

\* *Florence et la Toscane, Paysages et Monuments, Mœurs et Souvenirs Historiques.* Par Eugène Müntz, Membre de l'Institut, Paris. Librairie Hachette et Cie.



enjoying himself in that sort of malediction he believed he was a model Christian, worthy to hold discourse with dwellers in Paradise. His opponents were no less strong in their faith, patriotism and hatred. They were prepared to burn DANTE if they could catch him; through their influence he was compelled to run away from a refuge when he found one, and not until seventy-five years had elapsed after his death did they offer a grave for his remains. When we read of the inhuman delight in the misery of others which filled DANTE, and to which he prostituted the most noble genius, we can understand why the streets of Florence were alleys, why the great houses were a combination of forts and prisons, and why in Florentine art there is much which is not to be enjoyed. It would seem as if the Etruscan power, which revelled in hideous demons, was not conquered when the country was subjected to Rome.

In the race cruelty was inherent, and it was developed by an influence which can always be potent for evil. Commerce was powerful in Florence. It was not exercised in the modern spirit, with a breadth of view which, embracing the world, passes over tricks and stratagems as unworthy of notice. Such "royal merchants" as SHAKESPEARE imagined were derived from English originals, although they might be called by Italian names. The petty scale on which the traffic of the nobles was conducted is suggested by a few words of M. MÜNTZ, in which he explains an arrangement which is not always understood by visitors. "There is rarely an ancient Florentine palace," he says, "which has not beside the entrance a little window (*lucarne*) closed by a shutter, which served formerly for the sale of wine, oil and provisions. . . . Some fifteen years ago I used to observe people quietly going to historic dwellings with the jar for oil or wine concealed under their mantles. They were ancient clients who were in the habit of patronising the patrician families. This spectacle recalled to my mind the letters of ALESSANDRA STROZZI, the mother of the builder of the Strozzi Palace, in whose letters are mixed up details relating to housekeeping, gardening and agriculture, with others about transcendental preoccupations. While occupied with the drying of figs she was arranging for upholding the grandeur of her family." Business was mingled with every sort of affair, and to anyone who has tried to understand the anomalies of the Florentines there appears nothing extraordinary in the counsel which MICHEL ANGELO gave to his nephew, which was to marry a poor maiden, for by so doing he was, as it were, bestowing alms without abstracting money from his purse. Not even from love or devotion was the notion of profit and loss excluded.

The peculiar qualities of the Florentines were favourable to art, for it became, to some extent, independent of the patronage of individuals. A citizen found it was not wise to stand alone, and for safety's sake he joined a guild, company or society of some sort. There he found opportunities for his aversion to other men, which in fact was intensified, although it was supposed to be unselfish and under the guise of corporate emulation. If men were prevented from contests in the streets they could at least set artist's work against artist's work and abide the issue. It was as exciting a game as cock-fighting among the Athenians of the age of PERICLES. The history of Florentine art is mainly a history of competitions between artists and their backers. The citizens did not consider it was necessary to understand the conditions; they were quite as ready to take sides when the subject was beyond their comprehension. One example was seen in the competition for erecting a dome over the cathedral. After local and international competitions the work was entrusted to BRUNELLESCHI. When the commission given to FILIPPO, says VASARI, became known to the artists and citizens, some thought well of it and others ill, as always is the case with a matter which calls forth the opinions of the populace, the thoughtless and the envious. As a concession to opponents a share in the work was given to Ghiberti, to the disgust of BRUNELLESCHI, who was driven almost to madness by the arrangement. Ghiberti himself was acquainted with the competition system as it was then understood, and he appeared to be surprised when a work was entrusted to him without other conditions than the expectation that he would surpass his previous efforts.

The rivalry between corporations and individuals un-

doubtedly enriched Florence with countless works of art, for which visitors have reason to be thankful. As far as was possible, writers and scholars were also used as pawns in the game. Arts and literature were, in fact, patronised not merely for the enjoyment which they could produce, but because a claim on the services of a painter or a poet was evidence of wealth and power. The old spirit still survives. It was enough for Florence to be temporarily recognised as the capital of the new Italy to overcome the grumbling at the ruinous expenditure required to transform the city, by creating additions that would be in keeping with Paris rather than with Florence. The privilege was of short duration, which was fortunate, for otherwise the city was certain to become so new it would not be worth a visit. M. MÜNTZ, however, is an optimist, and believes the new work to be superb, and not to be surpassed in any modern city.

In his peregrination of the city the first ancient building encountered by M. MÜNTZ is the Baptistery. He is discriminating in his criticism on the portals, and points out that Ghiberti's success in the second of them is in a great measure to be attributed to his application of the laws of perspective, which his rival BRUNELLESCHI had mastered. The old system of one plane was abandoned and the panels assumed a pictorial aspect. The Bigallo, near the Baptistery, is not often noticed by modern writers. M. MÜNTZ sees in the architecture a fine example of the transition between Gothic and Renaissance. The paintings by ROSELLO and VENTURA DI MORO belong to the same period, but the sculpture is not worth praise. M. MÜNTZ admires some of the early panels in the Campanile, others he considers too trivial in subject, but the statues by DONATELLO, the *David*, *Jeremiah*, *John the Baptist*, *Abraham* and *Habakkuk* form in his opinion the glory of the structure. The sculptor was playing to the gallery when producing them, and they look as if they were modelled from well-known and undignified people in the streets, but rightly or wrongly they make a more lasting impression on the memory than more ideal figures.

There is generally some hesitation in criticising the Duomo of Florence. It has so much historic interest, a visitor wishes he could admire it with enthusiasm. The plan is excellent for a church, but the fewness of the parts does not contribute to the effect, and it cannot be conceded that Italian Gothic should so much differ from its northern relative as to be prized for bareness. M. MÜNTZ adopts the views of the late ALFRED DARCEL, who considered that the circumstances of the competition for the dome are evidence that the art of building had degenerated in Italy in the beginning of the fifteenth century; and, indeed, he considers that at an early time ARNOLPHO, although he borrowed northern ideas, was incompetent to appreciate them. M. PAUL JOANNE says the interior does not affect the imagination. If ARNOLPHO had completed his work, or had left models to guide his successors, the result might be impressive. Although the sculpture is not adequate to compensate for so much vacant space, M. MÜNTZ considers there is enough to glorify ten cathedrals and ten cities.

M. MÜNTZ, it should be mentioned, is no idolater of BRUNELLESCHI. When describing the church of St. Laurence, the parish church of the MEDICIS, which is still without a façade—although MICHEL ANGELO might have constructed one—he says that architect, with his implacable logic, sacrificed all the national souvenirs and traditions in order to revive a civilisation which was dead for a thousand years. In the ornament, the *motifs* which gave life to buildings, such as indigenous plants, family emblems and the like, were superseded by the essentially abstract forms of Classic art. The motto for a modern artist, says M. MÜNTZ, should be, "We consent to be the disciples of antiquity; we object to be its slaves." In the church of St. Laurence, MICHEL ANGELO's memorial figures of the MEDICIS rather than BRUNELLESCHI's architecture absorb the attention of visitors. It is supposed the sculptor was a disciple of the new-Platonism, and M. MÜNTZ points out that the well-known quatrain upon the *Notte*, in which the figure begs to be allowed to continue to sleep in such unhappy times, was imitated from an epigram by PLATO upon a silver vase which DIODORUS wrought. "This satyr was not sculptured by DIODORUS but entranced by him; if you touch it you will awaken it." The Princes' Chapel in the church of St.



Laurence should receive as much attention from marble-workers as the Medicean Chapel from sculptors. According to the Marquis DE SEIGNELAI, no ordinary marble was allowed to be used, but the most precious jasper. The capitals are of gilt copper, and below the bases of the pilasters were the arms of the cities or towns in the States of the Grand Duke of TUSCANY. They are emblazoned with jasper or agate, and the letters are formed of the same stones or of lapis-lazuli. One of the letters sometimes took four months to form. The cartouches which surround the arms are adorned with lapis-lazuli, mother-of-pearl and several varieties of different stones. The dome of the chapel was never completed, and only one of the tombs. The Princes' Chapel was commenced in 1604, after the plans of MATTEO NIGETTI.

In describing the Palazzo Strozzi, M. MÜNTZ refers to a doubt which has lately arisen. According to VASARI the new work was commenced by BENEDETTO DA MAJANO, and after his death was continued by SIMONE DEL POLLAJUOLO, called "il Cronaca;" but a learned Florentine, Signor DEL BADIA, has discovered that GIULIANO DA SAN GALLO received in 1489-90 the sum of 115 livres for the model of the palace. M. MÜNTZ, however, accepts the old tradition, especially as he believes there is more of a Mediaeval character in the building than is to be found in SAN GALLO'S works.

The Franciscan church of Santa Croce is another of the buildings which remained long incomplete in Florence. It was commenced in 1294 and the façade was not completed until 1863. Without the munificence of an Englishman, named SLOANE, who gave half a million of francs for the purpose, the façade would not have been attempted. The panelling is by some preferred to the later work on the outside of the cathedral. In the church are buried GALILEO, MACHIAVELLI, BOCCACCIO, Ghiberti, VASARI and others. The tomb of MICHEL ANGELO was erected from the designs of VASARI.

The faithful GIORGIO deserves to be remembered not only for his services to MICHEL ANGELO. By his "Lives of the most eminent Painters, Sculptors and Architects," the human race will be ever his debtor, for without his information little would be known about the Italian artists. VASARI was an architect as well as a painter. He was born in Arezzo, and his first attempt in painting was the copying of all the good pictures to be found in its churches. From time to time he visited his native place; he became one of the Signori priors, and obtained gratuitously from the Pope a bull to erect a chapel in its church as an expression of his gratitude to heaven. His name will always be associated with Arezzo, and when M. MÜNTZ visited the town, it was only proper that he should give a description of the house belonging to the most distinguished of the inhabitants.

It is found in the Via San Vito and is No. 27. VASARI purchased it in 1540, when he was in his twenty-eighth year, and it was there he died. M. MÜNTZ fears the house has been often altered, and is now deprived of some of its architectural ornaments. If judged by the wall-paintings in their present state, VASARI was not a marvellous decorator. There are views of Rome in the dining-room, and on the ceiling is an allegoric picture which may be interpreted as Virtue overcoming Envy, or Envy overcoming Virtue, according to the fancy of the spectator. There is an immense chimney-piece with the following inscriptions, "Ignem gladio ne fodito," and "Homo vapor est"; on the vault of another room, a small salon, are figures of Painting, Architecture and Sculpture; and in the lunettes portraits of MICHEL ANGELO, ANDREA DEL SARTO, L. VASARI, GIORGIO VASARI, LUCA SIGNORELLI, SPINELLO, ARETINO, and the Abbot B. DELLA GATTA; in a third room the figure of APOLLO, and in the pendentives are the nine Muses. The paintings appear to have been touched up by later hands.

M. MÜNTZ also describes Fiesole. In the convent FRA ANGELICO resided for several years. Some other convents in the environs of Florence are noticed and the country villas of the MEDICIS. Altogether the work forms one of the most interesting books on Italy which have ever appeared, and, as an illustrated description of the present state of many Renaissance buildings, it is invaluable. We hope the author and publishers will be persuaded to prepare companion volumes on other districts in Italy.

## THE ADVANCEMENT OF ARCHITECTURE, WITH SOME REMARKS ON THE STUDY OF GOTHIC.\*

IT is now 129 years ago since the Royal Academy of Arts was founded by His Majesty George III. It was founded at the request of Sir W. Chambers, his architect, and in the charter granted by His Majesty, and dated December 10, 1768, it was provided that there shall be "A professor of architecture who shall read annually six public lectures, calculated to form the taste of the students, to instruct them in the laws and principles of composition, to point out to them the beauties or faults of celebrated productions, to fit them for an unprejudiced study of books, and for a critical examination of structures."

At that time the tide of the Italian Renaissance was still flowing, although there were slight signs of reflux in the growing admiration for Gothic. Horace Walpole altered Strawberry Hill in the Gothic taste in 1750, while in the very year of the Royal Academy's foundation Milizia published his "Lives of the Architects," in which the works of Palladio were held up as the standard of taste. The Dilettanti Society in 1762 published the first volume of Stuart's "Antiquities of Athens," and subsequently the antiquities of Attica and Ionia, and is, I believe, still publishing works on Greek architecture. At any rate, the researches of Pullan on the Temples of Apollo Smintheus, of Bacchus at Teos, and Minerva Polias at Priene—or one, at least—was published in the year 1881.

Wilkins published his "Antiquities of Magna Græcia" in 1807, Inwood the "Erechtheum at Athens" in 1827, Penrose the "Parthenon" in 1847, 1851, 1888. Sir C. Fellowes published his works on Lycia, Caria and Lydia in 1839-47; J. Penne-thorne, "The Geometry and Optics of Ancient Architecture" in 1878, Sir C. Newton and Pullan on the "Discoveries at Halicarnassus, Cnidus and Branchidae" in 1862-63; Cockerell and Donaldson their supplements to "Stuart's Athens" in 1830, and Cockerell his "Temple of Jupiter Panhellenius and Apollo Epicurus" in 1860, and in the same year Falkener published his "Classical Museum," not to speak of foreign publications. I need hardly speak of Hittorff's "Restoration of the Temple of Empedocles at Selinus" 1851, nor of Abel Blouet's "Scientific Expedition to the Morea and to Macedonia," 1831-38.

There is no task more difficult than that of unravelling the causes of certain movements among mankind, and this is even more difficult when it is a purely intellectual movement. We speak of the Renaissance as if it were a change of taste that could be as precisely dated as a revolution or a battle, while it had been led up to for centuries, and we can only be certain of its existence and preponderance long after it had begun. In this case of a Greek movement, one prime factor in it was the enthusiasm of Winckelmann, who began to write on Greek sculpture when he was at Dresden, and afterwards published his history of ancient art about the middle of the last century, and he found sympathisers who had come to much the same conclusions before he wrote. From attention being called to the perfection of Greek architecture in 1762 and subsequently, a wave of Greek taste swept over most of the countries of Europe. The Elgin Marbles were purchased by the British Government and placed in the British Museum in 1816; even children who saw them were struck by the beauty of the Panathenaic frieze, and doubtless this revelation of beauty to the public prolonged the call for imitation Greek architecture.

The admiration, however, of Gothic increased in England, partly owing to Sir Walter Scott's novels, and partly to the efforts of such men as John Britton, Rickman, the second Pugin, the Ecclesiological Society and others. This admiration became so prevalent as to strongly influence public opinion, so that in 1840 it was determined that the Gothic style should be adopted in the new Houses of Parliament. Even before this the very champions of Classic architecture were so affected by the increasing admiration for Gothic that the great Wilkins himself dabbled in it, and Sir James Pennethorne and Professor Donaldson tried their hands at it. Decimus Burton, once a well-known Classic architect, who persisted in his creed, was so far forgotten that, when he died a few years ago, his name and works were almost unknown.

A passion for the study of Gothic spread largely in society; antiquaries, clergymen, undergraduates, heads of houses and other amateurs, as well as architects, employed their spare time and holidays in making notes on Gothic buildings in England and abroad, measured and drew out the mouldings of different dates, and a few of the more learned endeavoured to solve the mysteries of Gothic construction. In 1841 Professor Willis read an admirable paper at the Royal Institute of British Architects, called "The construction of the vaults of the Middle Ages," really a treatise on Gothic stone-cutting, greatly admired abroad and still studied by architects in this country, while the Gothic flame still burning was fanned by Mr. Ruskin.

\* An address delivered to the students of the Royal Academy on Monday last by Professor Aitchison, A.R.A.



In 1854-68 was published by that Cuvier of Gothic architecture, Viollet-le-Duc, his "Dictionary of Architecture," now of world-wide celebrity, which may be said to have completed the Gothic conquest. Casts of figures and foliage from the Gothic cathedrals and churches were collected at the Architectural Museum, and masons were encouraged to copy them; while during the professorships of Scott and Street at the Royal Academy Gothic was pronounced to be the only true architecture in the world, and that eccentric genius, W. Burges, was never tired of advocating its universal adoption. Casts of Gothic figures and foliage were collected at the South Kensington Museum, and even at the Royal Academy. There was a long struggle between those who were getting their living by paraphrasing Classic and Renaissance buildings, and by those paraphrasing Gothic buildings. Hard words were bandied about, and "Pagan" and "Papist" were affixed by their opponents to the rival practitioners.

A truce was at length concluded, and a practitioner was allowed to paraphrase Classic or Gothic, or both, without having an offensive epithet bestowed on him. Students were allowed to compete for prizes at the Royal Academy and at the R.I.B.A. in either style, much to the disgust of those brought up in the belief that Renaissance was the only admissible style.

Owing to the large increase of travelling, the publication of architectural works and the multiplication of photographs, the desire for novelty, and the absence of any proper teaching, all phases of architecture from Greek days downwards, if we except the Egyptian Hall and Angelo's School of Arms, were in turn adopted. This produced two results. The first was this—that the public looked on architects as persons keeping an architectural costumier's shop at which colourable imitations of every past style could be procured. The public still believes that Gothic has a stronger ecclesiastical flavour than any other style, and that Renaissance is more adapted for municipal buildings, so it has a Gothic architect for its churches and a Renaissance one for its other buildings. The wealthy occasionally desire the rooms of their mansions to form an architectural pattern-book, each room being of a different style or phase of a style—a Gothic chapel, a Græco-Roman hall, an Elizabethan dining-room, a Louis XIV. drawing-room, a Louis XV. boudoir, an early French Renaissance morning-room, a Roman library and a Moorish smoking-room, with perhaps a Chinese, Indian and Japanese room thrown in. The other result was, that thinking men, interested in architecture, began to ask themselves what architecture was, beyond designing habitations or shelters for men and animals, factories for making goods, warehouses for storing them and shops for selling them; why the buildings of certain countries and at certain epochs had always been admired; why the shapes and details of buildings at successive epochs were so different from one another; and why at so brilliant a period as this of the nineteenth century, when men's minds are so active and so restless, nothing but paraphrases of bygone styles were to be met with, even in important buildings? They soon saw that some of the differences in past styles were brought about by the greater number of men's wants, and by the greater complexity of society; that some were owing to an increased knowledge of materials and of their powers, and to advancement in the art of building. A good many thought that when every part of a building exactly answered its purpose, and when every redundancy had been pared away and each part took its shape according to the work it had to do, an architecture would arise of itself without further trouble—more wonderful, more perfect and one that caused more exalted emotions than any that the world had seen; but it became apparent that this was a wrong hypothesis. The wonderful iron structures of our engineers have surpassed all that was done before in the world in a scientific direction, without regard to anything but cheapness and utility, but nearly all their works are unsightly and many of them are hideous.

It is just possible that if this hypothesis could have been perfectly carried out it might have given the true solution, for we believe nature makes her organisms in the best way and with the least possible material, while most of her works are beautiful; but we have not got her materials, her knowledge nor her skill, and we are not sure either that she does not aim at beauty. Still I think that most of our minor problems point to a solution in this direction; but the major problem seems to me to wholly depend on man, for it is not the purely necessary problems that are alone to be solved, but the proper emotions that should be excited by the sight of the building. Solemnity, adoration and thankfulness should be evoked by a temple; by majesty by a building for legislation; by awe and apprehension by law courts; dignity by buildings for public offices, great officers of state and magistrates; magnificence in the mansions of merchant-princes and great manufacturers; grace and delightfulness in theatres, concert and fine-art exhibition rooms; comfort and comeliness in the houses for ordinary citizens; while the grimness of a prison should excite repulsion and terror. But, beyond these master emotions, we want each part to exhibit the

æsthetic cultivation of the day, and show not only the mastery of the architect, but the knowledge, the care and the skill of the workmen.

The lessons of how these various emotions are to be raised must be learnt from those buildings of former times which show how cognate emotions were excited. The rest depends on the genius of the architect, and the cultivation and aspirations of the best of the public. A perfect architectural monument has much more human interest given it by sculpture and by figure-painting than by pure architecture, while fine monumental colouring is another source of delight.

Sculpture and figure-painting have for their highest models the most physically perfect human beings; if the figures created by these artists will not harmonise with the architecture the architect must look to it, for his art is then below that of his brother artists, and the completed monument is patchwork. The serenity of high ideal sculpture or painting will not harmonise with coarse Romanesque nor with tormented Gothic, so you see that it does not depend on the will of the architect to adopt any past style he chooses, but the style is evolved from the necessities of the case. The rude figures of the Solomon islanders would be as much out of place in the pediment of the Parthenon as the Panathenaic frieze would be in a Norman cathedral.

I do not address you as persons anxious to get your living, and naturally the best one possible, by the exercise of a respectable calling, but as poets in structure, who not only hope but desire that the monuments you erect will call forth admiration and delight in the cultivated hundreds or thousands of years hence, and who spare no study and no pains to insure this result. What Milton says of fame is true, it is "that last infirmity of noble minds." If you feel the divine power within you that will enable you to delight millions yet unborn, you feel that fame is but an unimportant accident. You must, however, not only "scorn delights and live laborious days," but you must study as the poets have studied and see how your predecessors learned to evoke the emotions that now delight you.

As I have addressed you as poets in structure, it will not be amiss to see how the poets in words, inspired with the divine afflatus, have learned the elements of their art. Take Dante, or Milton, or Tennyson, and see how they studied all the best poetry of the past and of the present; how they mixed among mankind and studied the emotions of those around them; how they translated or paraphrased the poems of other times and of other tongues to get their hand in and to learn their art. Some of you may object that such transcendent poets as Shakespeare and Burns had but little learning; you may be sure that both of them deplored it, and endeavoured to make up for their deficiencies by learning all they could from ancient story, from ancient poetry, and from contemporary work, and by constant and piercing observation of the persons and things around them, and by repeated efforts to make their works immortal.

In our own art we see Brunelleschi, who was to become the great architect of his day, working as a journeyman goldsmith at Rome, so that he might measure and study the Roman ruins and obtain from them constructive and æsthetic knowledge. In our own day we have seen Alfred Stevens getting his living by designing grates, tiles and fire-irons, while he was learning to be a great sculptor, a painter and something of an architect.

Remember that, above all things, architecture is a constructive art, and that all that you can do is to build; by that you must show your knowledge, your skill and your aspirations, your manners and your morals, and as an architect by that alone. You can, of course, avoid the study of statics by getting examples of what has been done before, and keeping well within the old lines, but this is not what the Roman, the Byzantine or the Gothic architects did; their aim was to out-strip their predecessors.

It is not the method our engineers have adopted whose works are the wonder of the world; they learnt as much as was necessary for their purpose of that part of science that underlies their practical work, and, taking iron as their material, have immeasurably surpassed all that was done before them in construction. They never would have done this if they had merely feebly copied the engineering works of the Romans. All the sciences have so far progressed that the knowledge of them amongst the ancients is only mentioned in archæological treatises. The mechanicians who have perfected the steam-engine, invented the locomotive, the spinning Jenny, the power loom and the lace weaver laugh to scorn the childish machines of the ancients; the artillerists are not contented with balistæ and catapults; the astronomers are not humble students of the "Almagest" of Ptolemy, but have discovered that the earth is a small planet revolving round the sun, that the laws of gravity control all the celestial bodies in the visible universe, and have learnt that most of the substances found on earth exist in the sun. Nor do geographers speak much of the knowledge of the earth to be found in Homer and the Pentateuch, or in the works of Strabo and Pomponius Mela.



In art, however, there is a very different story to tell. The arts may be said to appeal to the emotions through the eye and the ear, and the accumulated knowledge of them does not help us beyond a very limited distance. When accurate modelling has been attained there is little more to be learnt except how to create ideals that are, in certain respects, more perfect than the average human being; in drawing, when form can be exactly copied, and when that knowledge of perspective called foreshortening is attained, there is but the composition of line and grouping to be added, the rest depends on the imagination of the artist, whether it be to create allegorical figures or scenes from the past.

In colour there is the harmonising and contrasting of the different tints and tones to be attained, and the choice of those most appropriate to the subject of the picture; and the imitation of such subtlety of mixed colouring as is found in the nude human form.

We have no reason to believe that after the Greeks had cultivated gymnastics the human form has improved. Landscape-painting may have improved as the forms and laws of inanimate nature are better known and observed, but we have no reason to believe that the beauty of inanimate nature has increased.

Ordinary emotions have become more complex, but this can hardly be the case with the grand ones, such as æsthetic joy, heartrending grief, terror and despair. Is eloquence, wit, humour or pathos more common or more forcible than in the best ages of Greece?

I almost think the emotions being now more complex than of yore have become more difficult to portray, so that if the modern artists portray them with an effect equal to that attained by the great Classic artists, they must be greater men.

Music is said to have progressed, and if so, it has a merit beyond the other fine arts, but not being musical I cannot judge. Some of the musical critics still hold that for evoking religious emotions the Gregorian chants are as yet unsurpassed. So it may be that Aristoxenus is as superior to the modern composers as the Classic artists are to those of modern times, supposing that he was a composer as well as a writer on music. Browning, Tennyson and Mr. Swinburne, though they studied the Greek and Latin poets; are not mere humble imitators, but have tried to embody the vicissitudes and emotions of the present day in their verse, in the hopes that their poems may hold their own in comparison with the masterpieces of the past, if not surpass them. We hope the assertion is no longer true that

Old poets outsing and outlove us,  
And Catullus makes mouths at our speech.

A poet only can give us a chance of testing the truth of this saying, he alone has that accurate knowledge of the value of his own tongue which we all try to attain, and the gift of harmony and rhythm. Few have that intimate knowledge of Greek and Latin that would enable them to judge of the relative excellence of Classic poetry. Mr. Swinburne would confer on us an inestimable boon if he would give us in his verse a few translations of the most beautiful passages of the Greek and Latin poets.

It would be amusing, if it were not so melancholy, to see with what a light heart the architectural students treat the master-art they follow, every one of whose three or four branches is transcendental, each one of which may take the whole life of a man to master, and which requires genius as well, to enable any one to surpass the ancient masterpieces—I mean planning, construction, proper emotional excellence and healthfulness; yet after three years passed in an architect's office each student feels himself competent to practise if his friends can get him work. Sir John Soane's retort to a young architect is apposite. The young architect said, "I ought to understand architecture, for I was articled to it for seven years." "The time it takes to make a cheesemonger," was the reply.

When I see the long hours and the long years devoted by an artist to drawing or modelling a human figure and to the study of anatomy, and know that even then he has but the elements of his art, and may want the divine gifts that are required to make an artist, I am almost in despair at the prospects of architecture. Still, there is hope for the future in the fact of architectural students having their eyes opened to their own ignorance, which, through the teaching at the Architectural Association, they are trying to dispel. I was pleased to see a young architect working out models of masonry at the schools of the Associated Guilds in Titchfield Street. I am doing my best to dispel from the students' minds the notion that the paraphrasing of dead styles is architecture, that it is more than the means of learning how to express themselves architecturally.

Sketching in perspective is no doubt a charming accomplishment, and the young men of the present day have progressed wonderfully in this art, and though it is not without its value as a means of cultivation, still it can never teach them architecture. When I look at the sketch-book of Willars de Honecourt, the French architect of the thirteenth century, I see

that he could sketch but poorly, at whose efforts an accomplished draughtsman of the present day would laugh; but Willars could design a cathedral and see it properly carried out, and he could do this so well that he was sent for to Hungary to build one there. The art of sketching is like making a coloured sketch of the painted decoration on the soffit of a vault, useful enough as a memorandum of the excellent effect produced, but affording no information as to how the effect is obtained; to get that information the student wants a scaffold to see the actual colours used, and the methods of using them to produce the desired effect one or two hundred feet from the eye.

Although Greek architecture is the most perfect the world has yet seen, in which everything is studied with endless labour and treated with supreme ability, so that a whole building and each part answers as perfectly to the intention of the architect as the strings of a fiddle respond to the hand of the musician, it is absolutely without effect in this dull and misty climate, at least for the greater part of the year, and our brightest sunshine never produces the results obtained in its native country. In Greece the sunshine plays endless symphonies on it from daylight to dark.

It is doubtful if we can ever again have such complete simplicity owing to the number of modern wants and the complexity of modern society; still let us study it deeply and take to heart the lessons it so strongly enforces of aiming at simplicity if we hope to attain the sublime. Every architect feels that he could design the Parthenon if it had not been done before, though in this respect he is absolutely mistaken, for to attain elegant simplicity is the most difficult as well as the highest achievement of art. To make architecture simple and expressive and lovely—when loveliness is wanted—is the aim of most architects, and should be the aim of all, but for the architect to find out how to attain this in his particular work is the greatest difficulty, involving as it does the greatest efforts as well as supreme genius. In comparing Greek with modern architecture it may be said:—

We shift, and bedeck and bedrape us,  
Thou art noble, and nude, and antique.

Some pessimists say we can do nothing but paraphrase until the present civilisation of the world is submerged by a flood of savages; yet surely this is not a necessary consequence. We see that the Romans, when almost effete, when cruelty and corruption seemed hardly able to go further, managed to develop a style that equalled, if it did not surpass, the best work done in the Gold and Silver Ages of the Empire. This fact alone ought to banish despair. Let us all combine our efforts to set architecture on its feet again, and, if we can do this, I think we may be sure that the new phase of architecture that results will be a credit to our age and to our country. We should recollect that we are still, in the main, a courageous, honest, industrious and enterprising people, and I hope we are also beginning to be a tasteful people, and may hereafter make the boast of Pericles that "we love the beautiful." Wealth is the result of the virtues I have enumerated, and we should neither decry nor abuse this wealth, but learn how to use it properly for the instruction and delight of the world, and for the honour of our country.

I have touched in former lectures on the merits and peculiarities of Greek, Roman, Byzantine, Saracenic and Romanesque architecture, and I now propose to give you some remarks on Gothic, not, as Mr. Ruskin once said, "to put into a storehouse for use, but into a gallery for study." I think it will not be amiss now to show you some masterpieces of Romanesque and Gothic after the Parthenon, for all subsequent architecture is a lineal descendant from the Greek.

I think nowadays few will deny that though Gothic is very far from having attained the perfection of Greek architecture, even if it attained to the dignity of Roman, it has been able to raise emotions of perhaps a loftier sort than those raised by any other monuments; it has given us lessons in composition that at least are different from those to be learnt from any other architecture, and has shown to what perfection construction in stone may be carried. One of the æsthetic triumphs of late Gothic is the effect produced by pierced-work in stone, which is certainly different from anything west of India, and it made another stride in the logic of building. The Greeks and the Greeks alone studied how to gain the utmost effect in their buildings from brilliant sunshine in a clear air; every moulding was adapted to that end with a perfection that indicates the most profound study, corrected by experience and failure. The Gothic architects had neither the clear air nor the brilliant sunshine; as a rule the atmosphere in which they built was always more or less misty, and their sunshine, where they had any, was feeble; so they set themselves to work in the most logical way to see how effects might be obtained in the mist, by deepening shade, by strongly accentuating the parts that took the light, and by perfecting outlines to be seen against the sky.

That severe restraint that the Greeks imposed upon them-



selves the Gothic architects were not cultivated enough to practise—even supposing that they were sensible of the matchless beauty of Greek architecture, which is most improbable, for, apart from their professional knowledge and skill, the bulk of them were probably ignorant and uncultivated men. As late as the fourteenth century the French architects, the Bons, the designers of the Porta della Carta and the Cà d'Oro at Venice, were merely designated as stone-cutters (*Tagliatori di pietra*). It is scarcely likely that these Gothic architects, who had at their fingers' ends a new development of architecture, who had surpassed the Romans in the height of their buildings, and had nearly equalled them in the spans of their vaults, and were revelling in intricate geometrical forms, should have been captivated by the massiveness and simplicity of Greek architecture; they probably despised the constructive ignorance of the Greeks and their lack of ornamental geometry, and what they looked on as the absence of interesting detail. The Gothic mouldings were in all probability the result of the architects' efforts to gain the effects they wanted in their own climate. If you exclude square mouldings, such as the fillet and fascia, the Greek mouldings were the bead and torus, the quarter round, the ogee and the hollow, and in late work the cyma recta; each one infinitely varied as the case required, but rarely departing from the generic form, and in their best Doric work a very few even of this restricted number of mouldings were used, while in Gothic there were hundreds if not thousands of mouldings used in a great abbey church or a cathedral; it was therefore impossible to bestow much time on their elaboration.

I may here say that I use the word Gothic in its common signification, as the laymen's art that sprung up at the end of the Romanesque period of clerical art about the middle of the twelfth century, which for easier recollection we call the art of the thirteenth century, to its extinction in the early part of the seventeenth century.

I may also say that I do not propose to investigate Gothic archaeologically or philosophically, though both sorts of investigations are profoundly interesting. I am going to treat it practically, that is, to see what lessons we may learn from it for present use.

Many get their living by being able to copy or paraphrase Gothic, and though the desire of getting one's living is very praiseworthy, it will scarcely help us directly in advancing the art of architecture, which is the one thing to be most earnestly desired and sought after. I hope I may enlist you in this quest, for surely nothing should be more desired by architects than to see architecture again a flourishing and progressive art, expressing all the main characteristics of the wonderful epoch in which we live, and meeting the desires and raising the admiration of the most cultivated people of this epoch.

When the public realises what architecture does for a nation, even for a town, it will be treated with greater respect, and the architects will be more cherished, admired and honoured, and will thus be stimulated to make greater exertions. It must be borne in mind that it is an obtrusive art. In a town it meets you at every step, and cannot be hid away like a book, a picture, a statue, or a musical instrument. If it be real architecture, and produces the right emotions that the building should excite, it makes that building at once deeply interesting. It proclaims even in an ordinary street the relative dignity and taste, the occupation or the liking of the owner, that is, supposing he had it built for himself, while if it be a public building it bespeaks a higher or more important office, and in both cases causes admiration for the care, thought and invention bestowed upon it. At the same time it shows the character and condition of the nation at the time it was erected, and is a permanent memorial of the cultivation of the people. No reflective person can see any kind of architectural monument without it giving him a notion of the people at the time it was built; its gables, pediments, domes, spires, towers, lanterns and pinnacles diversify the sky-line and give interest to it; it tells of an expenditure of wealth and labour, of skill and invention, and gives us a sort of epitome of what the people once admired. It is full of lessons of the most important sort that we can hardly miss, while many buildings fill us with delight from their beauty. We know little of Mediæval times, and we should know much less of them were it not that Mediæval buildings are dotted all over the country. Architectural monuments may be ruined or pulled down, but, except in the case of the very small ones, they cannot be moved, and if they are beautiful, lovely, sublime or frowning, they attract persons from all parts of the world to see them, or as students to study them, and when at last, in the vicissitudes of ages, the nation that built them becomes insignificant, or is swept away, they still remain as land-marks to show how rich, powerful, scientific and tasteful it once was. How little should we know of Egypt, of Babylon or Nineveh, of Mexico and Peru, and how much less should we think of their former power and greatness if all their colossal buildings had been destroyed? Should not this reflection appeal to the patriotism of nations, and induce them to foster architecture and to honour the archi-

tecs, and should not the same reflection stimulate the architects to hand down to remote posterity, in enduring monuments, the greatness and cultivation of their time?

### ST. CROSS HOSPITAL, WINCHESTER.

THE trustees of this ancient and interesting foundation are to be congratulated, writes a correspondent of the *Times*, on having come to a conclusion on their proposed new buildings, which will leave the present precinct intact and uninterfered with by any modern excrescences. They adhere to the proposal to increase the number of inmates in the hospital, and for that purpose to take the present master's house and build a new one; but after conference with the Charity Commissioners they have decided that the new master's house is to be built, not in the ancient precinct, but outside of it, on a site which will not bring it into conflict or contact with the unique Mediæval group of church and hall and chamber, of tree and stream and meadow, which have made St. Cross famous throughout the world.

This will be an extremely satisfactory termination to those of your readers who remember the much larger proposal originally made by the majority of the trustees which, but for the support accorded to the minority in these columns in April last, would probably have been pushed through, and would have thrust a great big new almshouse into the "Park," in glaring juxtaposition with Bishop Blois's twelfth-century church and Bishop Beaufort's fifteenth-century almshouses.

Of course, the decision to build at all, even near the precinct, and to turn the master out of the precinct, will be regretted by some both within and without the body of trustees. The extrusion of the master breaks up the old "family" and destroys the historical completeness of the institution. But it must be admitted that the idea of the family has for long been only an idea. It is centuries, I believe, since the master and the brethren dined together in the common hall and lived a common life. It is years since the brethren themselves resorted to the common hall for any other purpose than to receive their rations, which they take away to devour in the seclusion of their particular lairs. Moreover, since the mastership was converted by the Court of Chancery, now nearly half a century ago, from a delightfully fat sinecure into a not over well-paid but well-worked vicarage of a popular and growing suburb, there are practical advantages in the master's house being outside the precinct. It is not particularly convenient for a parish priest to be inaccessible to his parishioners after 9 o'clock P.M., at which canonical hour the gates of the hospital are still shut to the outer world; while, if the new house had been placed on the proposed site inside the precinct, new roads for coals and furniture and for visitors' carriages would inevitably have destroyed a large part of the ancient building and its antique seclusion.

The conclusion is a compromise, but a compromise which preserves intact that for the safety of which those who were opposed to the majority of the trustees were contending.

### GLASGOW ARCHITECTURAL SOCIETY.

AT a meeting of the Architectural Society of the Glasgow Philosophical Society held on the 18th inst. Mr. A. Lindsay Miller, architect, read a paper on the subject of "A Visit to the Cathedrals of Durham and York." The paper was illustrated by numerous limelight views taken by the lecturer. Regarding Durham, he noted the very fine situation of the cathedral, situated on rising ground above the river, the wooded bank and the clustering trees forming a very delightful picture. Beginning with the history, he gave an account of the earlier structures founded by the followers of St. Cuthbert, and remarked that owing to the careful preservation of the records there was no difficulty in fixing the periods at which the different portions of the present structure were erected, nor the name of the builder bishop. By means of plans and numerous views of the interior and exterior he gave an elaborate description of the whole structure. York was afterwards considered; the interesting features in the town, such as the old water bars, &c., were noticed, and finally the Minster was described by means of a plan and photographic views. The principal objection offered, and it applied to the interior and exterior alike, was the great poverty of the design. After the first general impression gives place to a more careful consideration of the parts we find repetition and repetition everywhere. Variety, the greatest charm of Gothic architecture, is totally absent, each capital resembling its neighbour, and the same tracery repeated with the same wearisome regularity. The cathedral is also so closely surrounded by houses that a complete view of any front is almost impossible. A vote of thanks was accorded to Mr. Miller for his paper.



## NOTES AND COMMENTS.

FROM time to time during the last twenty-six years we have had to record the developments of the history of the Albany Capitol, which were stranger than are usual with American buildings. The Capitol is still incomplete. It is now said that only another million of dollars are needed, and there will be no more demands for money, but the Legislature must be familiar with that statement. Up to the present 20,653,511 dols. were expended on the work, and the cry is still for more dollars. The Capitol has been an experimental building in various ways. The original plans were abandoned, new methods of construction have been tried, contractors have been dispensed with or employed only on risky undertakings, and day labour was favoured to an extent that would gratify the London County Council. All is of no avail. The building has apparently an unlimited capacity for wasting money. It resembles in its costliness the great Basilica of Montmartre, where it is almost impossible to deliver a sermon that will be heard. In spite of all the money laid out on the Albany Capitol, it will be necessary to abandon the construction of the library and Court of Appeal. Yet on referring to the description we published with the original design in January 1870, we find that the library was to be the chief feature of the design. It was said "the library will occupy the whole of the east front of two storeys and will be 283 feet long and 54 feet wide. This will be the most attractive room in the building, and, it is believed, in the world. Its large area and lofty proportions, its views towards the north-east and south, overlooking the city and bringing in the valley of the Hudson and its western slopes for miles in each direction, will make it a favourite place of resort at all seasons of the year." After an expenditure of more than four millions sterling the most attractive room in the world will apparently have to be left for a future generation to construct.

THE Special Exhibition in the rooms of the Royal Society of Water-Colours is well worth a visit. It contains examples by members who died lately. GEORGE ALFRED FRIPP has belonged to the Society since 1841, his brother ALFRED DOWNING FRIPP since 1844, ALFRED WILLIAM HUNT since 1862, EDWARD KILLINGWORTH JOHNSON since 1866, GEORGE DU MAURIER since 1881, RICHARD BEAVIS since 1882, and LORD LEIGHTON since 1888. There are over three hundred drawings. As for LORD LEIGHTON's, they are very few and slight, for he could not be reckoned as a working member. HUNT's show his remarkable painstaking efforts, which were enough to qualify him to be reckoned among the pre-Raphaelites if they possessed sufficient vitality and cohesion to endure as a band. Among his architectural drawings is one of the Parthenon. No less novel is his *Niagara* with a hazy effect. G. A. and A. D. FRIPP represent an older school, and produced effects with probably one-tenth the strokes which HUNT found necessary. Many old acquaintances are to be seen in the room, and should be welcomed by amateurs. It is remarkable how steadfast was the patronage of the two brothers. There are very few drawings by them which are not lent. JOHNSON and BEAVIS and, to some extent, HUNT found far less favour, and the majority of their drawings could be purchased. There is much that is pleasing in JOHNSON's drawings; but for vigour and versatility those by RICHARD BEAVIS are the most remarkable. He could not be said to have preferred any one class of work, and in the Pall Mall room that was not advantageous. In no other gallery is monotony so easily pardoned, and especially if it has once gained admiration. The quality appears to be taken as a compliment by the supporters of the Society. BEAVIS's drawings greatly contribute to the interest of the gallery, for without them the walls might seem to be over-quiet.

FOR a long time it is likely to be a much debated question whether form alone, regardless of the manner of production, is sufficient to impress us. Those who take the negative side will always maintain that what is most interesting is the success of men's hands in creating beauty. But we live under conditions which make hand-work too costly, except in rare cases, and we must either depend on the aid of machines, or dispense with beauty altogether.

Besides, we do not show much faith in the power of form, *per se* if we insist on supplementing it with a sort of testimony to the difficulties which were overcome in its creation. In architectural ornament there must also be continuous repetitions, and it is not a satisfactory sight to see a human being toiling at patterns which can have no interest for him. It is evident that in most cases where hand-work is still employed, simply because by doing so ancient precedents are adhered to, a sacrifice of time and money is made to consistency without gaining a corresponding advantage. We were led into these thoughts by seeing the collection of representations of "Architects' Joinery and its Ornamentation," by Mr. F. A. FAWKES, of Chelmsford, and published by B. T. BATSFORD. Among the immense number of sections of mouldings, both plain and enriched, doors, overdoors, mantels and overmantels, we see refined lines and ornamentation that must satisfy fastidious critics. The prices would amaze the woodworkers of the last century, who were about the last to produce contours and patterns that are comparable with those exemplified. Who can estimate the advantages which are to be derived from having so much refinement in woodwork on economical terms? Or, are we to turn from it because work equally good was not to be obtained in Athens, Venice, or Rouen, except by wearisome and monotonous labour? for, according to Mr. RUSKIN's dictum, "the worth of an ornament is the time it must take before it can be cut." Beauty is therefore to be disregarded. The numerous architects who have employed Mr. FAWKES's joinery and who have testified to its excellence prove that fine forms are worth appreciation for their own sake, and the anxious care he has taken to produce those alone which will bear scrutiny, however simple they may be, deserves general encouragement. If good taste were the test, he need not fear foreign competition.

THE following declaration has been sent to Mr. PEARSON, R.A.:—We, the undermentioned architects, desire to enter our protest against the attacks made upon you in a portion of the daily Press, and to assure you of our complete confidence in you as adviser to the Dean and Chapter of Peterborough. Pray make any use of this that you please. (Signed) J. M. BRYDON, G. AITCHISON, A.R.A., W. M. FAWCETT, C. F. HAYWARD, B. INGELOW, JOHN SLATER, ERNEST GEORGE, W. EMERSON, EDWARD W. MOUNTFORD, ALEXANDER GRAHAM, ASTON WEBB, JAMES BROOKS, HENRY L. FLORENCE, ED. A. GRUNING, J. ALFRED GOTCH, R. REYNOLDS ROWE, F. C. PENROSE, F.R.S."

LAXTON's Price Book has been produced by Messrs. KELLY & Co. this year with their customary attention to detail. The volume is now more than a comprehensive list of prices, it is a legal manual and embodies besides municipal regulations. "Laxton" has attained its eightieth year, but it never was so useful a help as it is now, owing to the care and outlay of its owners to make it a trustworthy guide.

THE importance of local government in this country is suggested by the size of the new edition of "The Local Government Directory Almanac and Guide," published by Messrs. KNIGHT & Co., which contains about 700 pages. It is not easy to arrange so vast an amount of information as has to be furnished, but we must say the directory comes near to perfection. Messrs. KNIGHT have a reputation for accuracy, and as far as we have tested the pages we have not been able to discern an error. The directory is indispensable for a great many people.

## ILLUSTRATIONS.

ELY CATHEDRAL.—THE WEST FRONT.

ELY CATHEDRAL.—THE OCTAGON.

26, CONDUIT STREET, W.

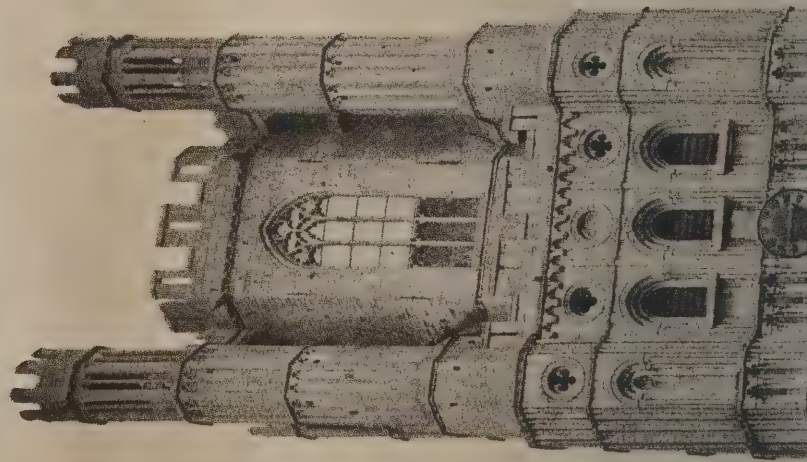
6 GOLDEN SQUARE, W.



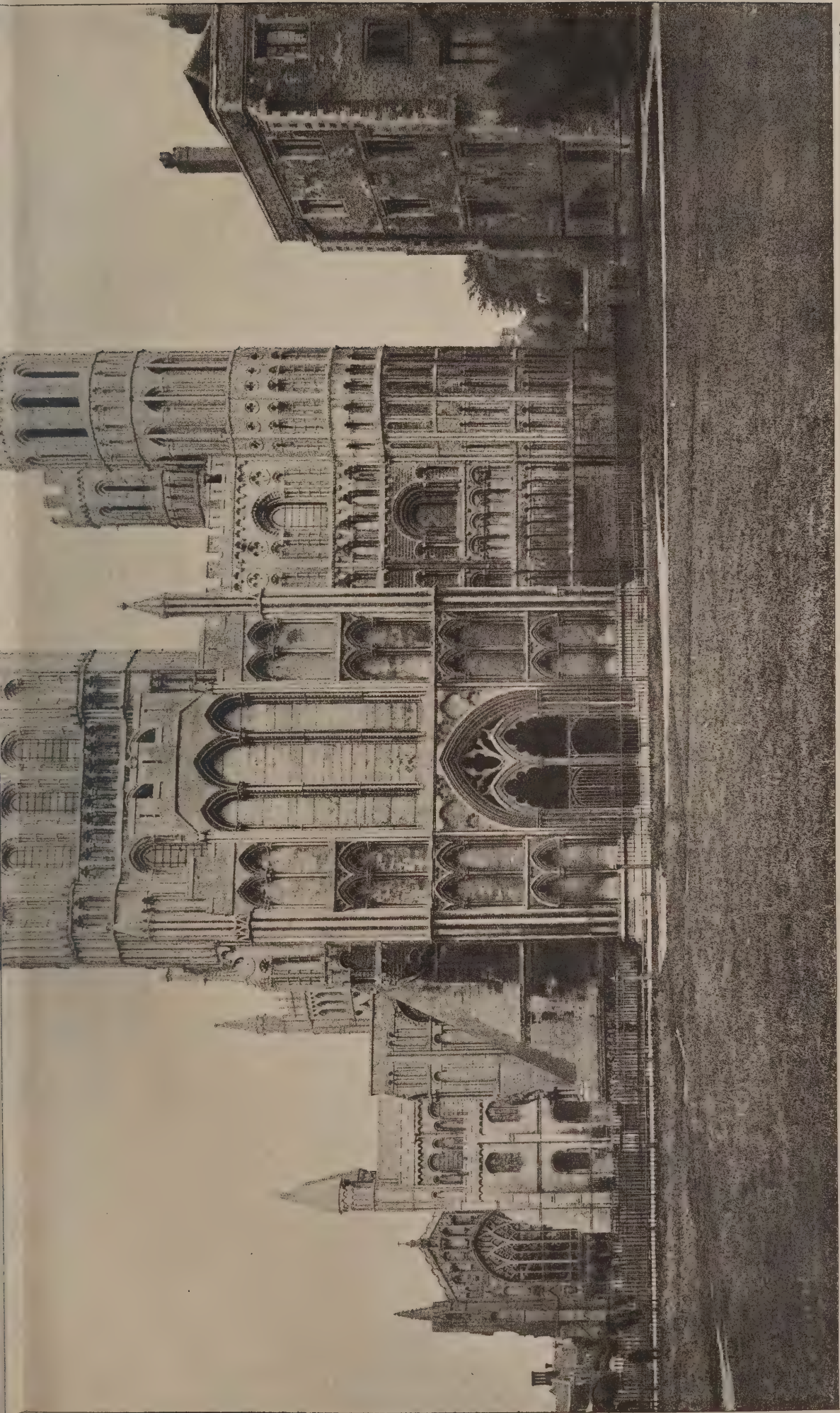




Om Architect, Jan. 29<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO

INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 7.—ELY: THE WEST FRONT.



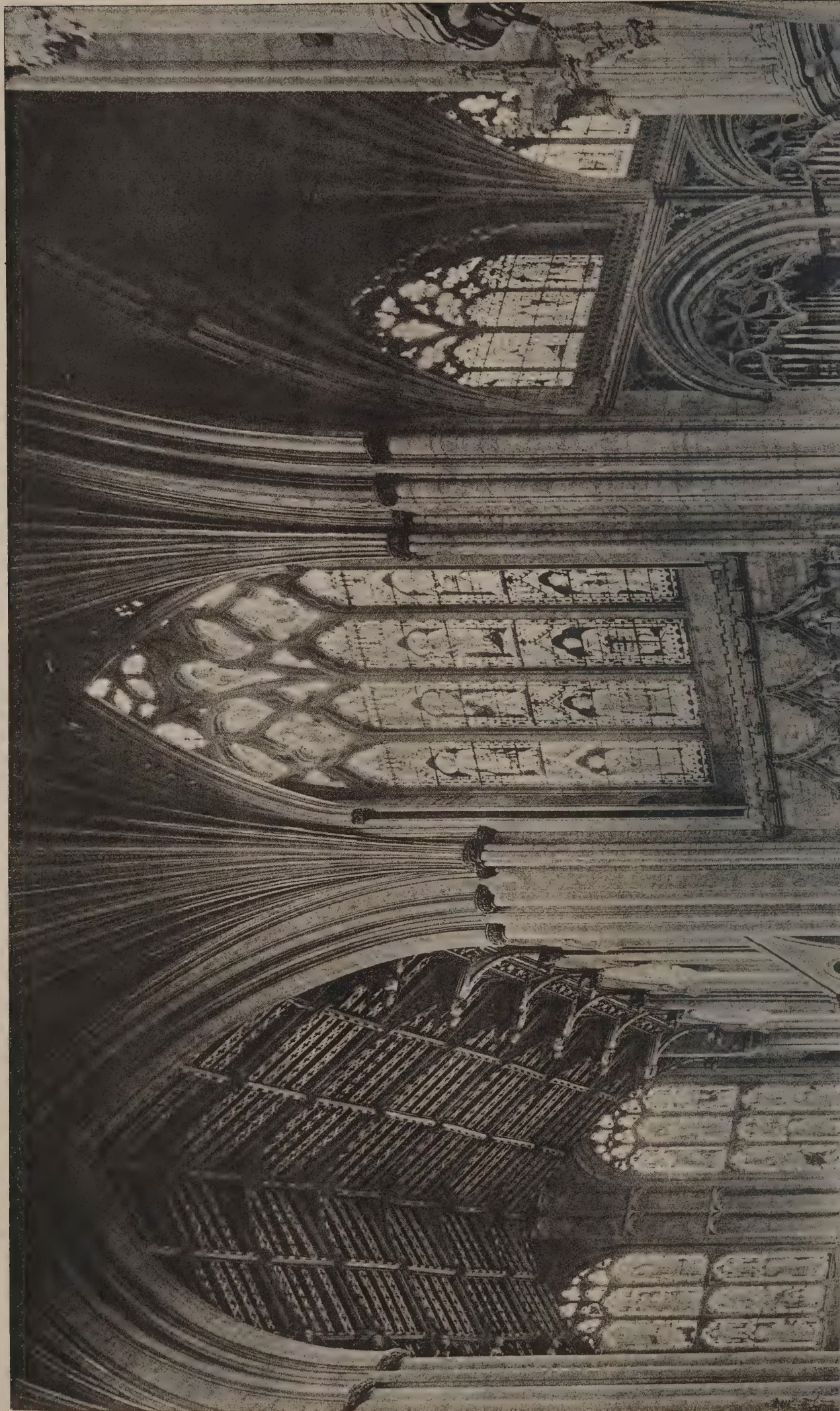




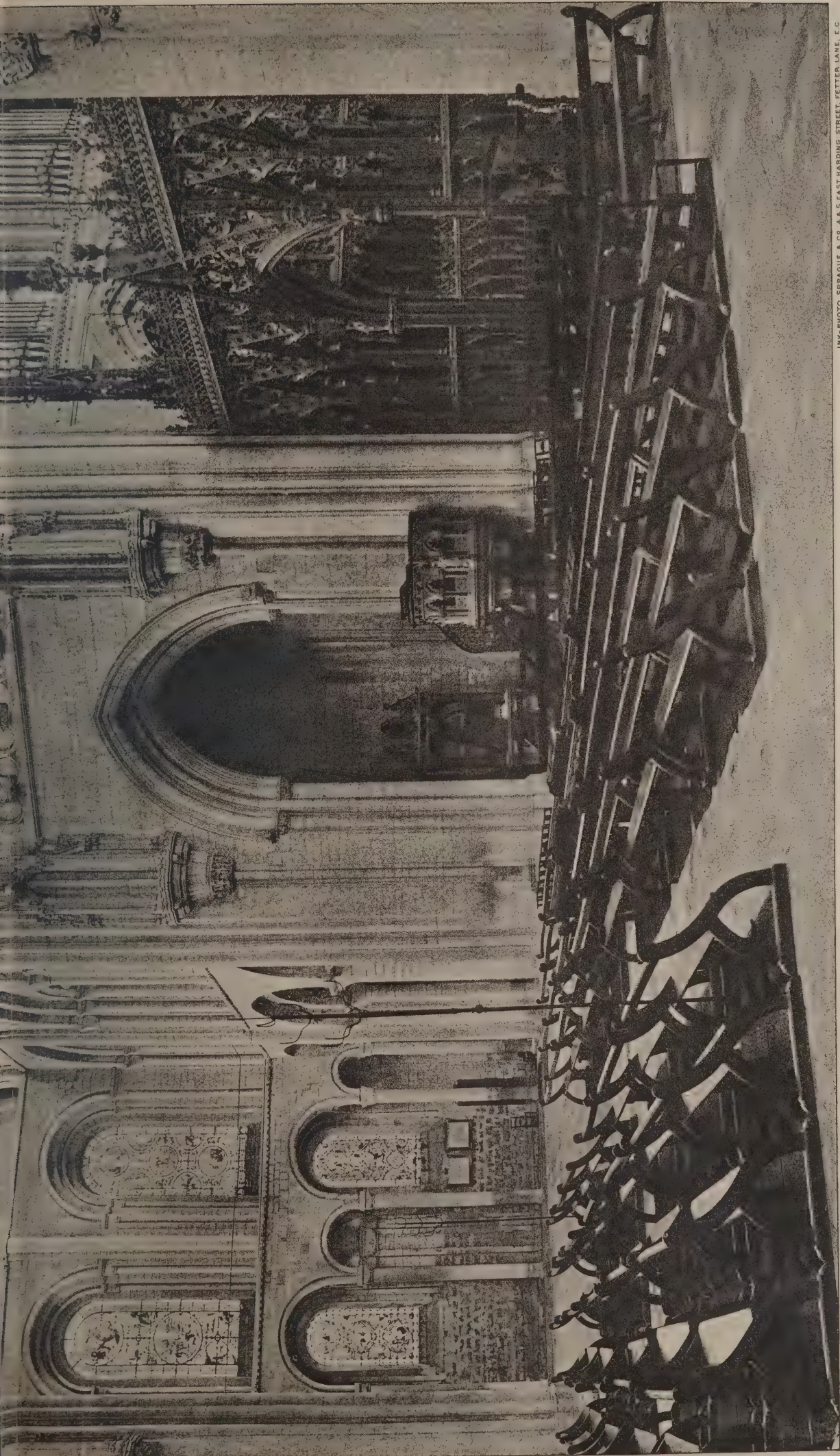




The Architect, Jan. 29<sup>th</sup> 1897







INK- PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

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CATHEDRAL SERIES, No. 8.—ELY: THE OCTAGON.

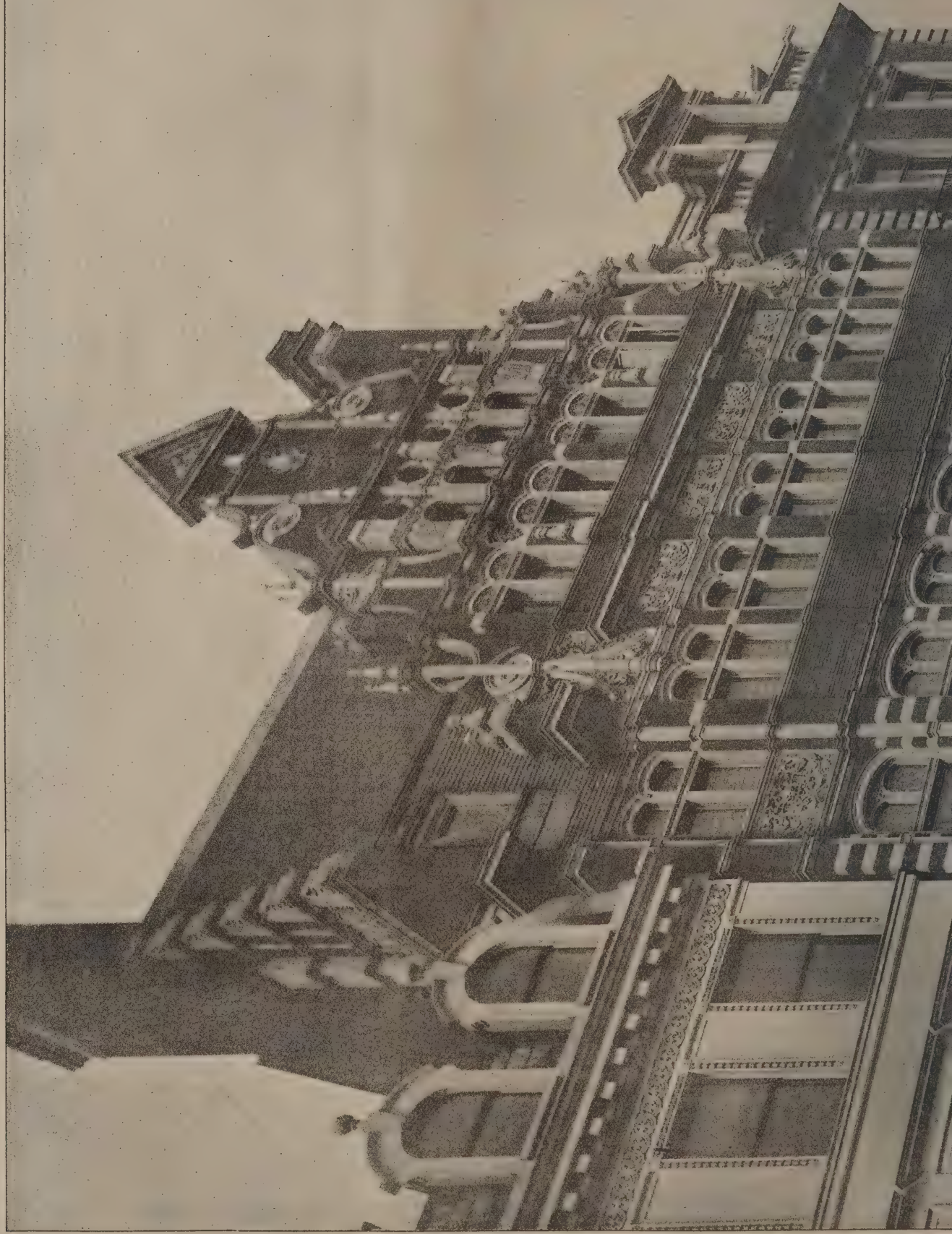
















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26 CONDUIT STREET, W.  
A. H. KERSEY, Architect.



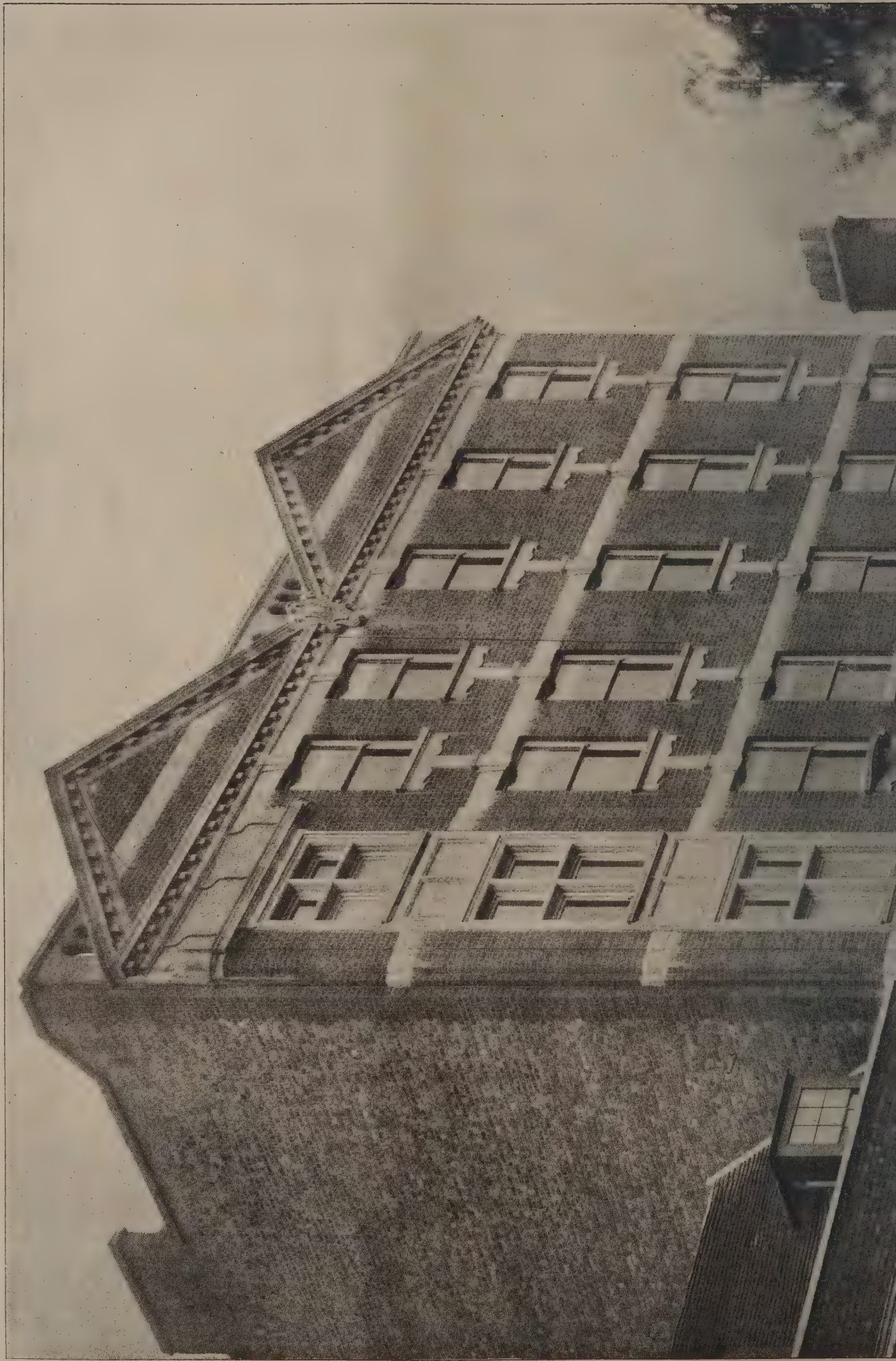




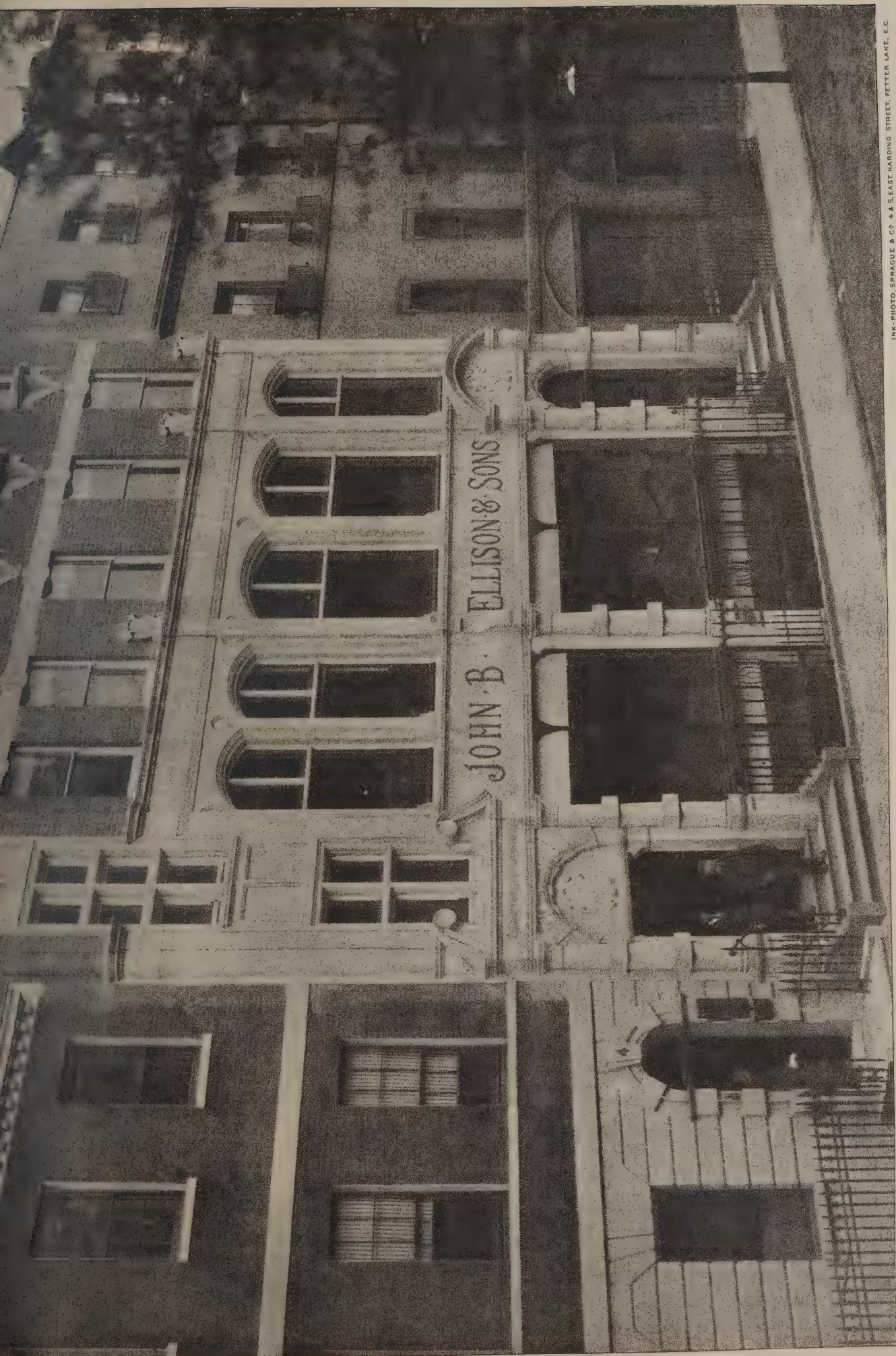




The Architect, Jan. 29<sup>th</sup> 1897







No. 6 GOLDEN SQUARE  
A. J. BOLTON, Architect.

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## ELY CATHEDRAL.

ONCE when the late Professor Willis was serving as cicerone, he remarked that hypercritical people objected to him because he commonly declared that whatever cathedral he was describing was the most beautiful in England. There was really nothing inconsistent in his conduct. In all of our English cathedrals there are features which exercise a glamour over the student, and while he is under the sway of so much beauty, originality or power, a man must be more than mortal to be impartial. Just as poor Robert Burns was always falling captive to some new charmer, the lightning of whose eye became for the time being, as he said, "the godhead of Parnassus, and the witchery of her smile the divinity of Helicon," so the philo-cathedralist finds it is easier to be in a state of constant admiration, from Durham to Exeter, than to surrender himself to the supremacy of Lincoln, or Salisbury, or Winchester, or Canterbury, or Wells, glorious as each of these must be acknowledged and well deserving of fidelity.

Ely, for example, if consistency or unity be a test, is different from Salisbury. The fourteenth-century choir and octagon are as much out of keeping with the Norman nave as with the Early English presbytery between which they were introduced. The lady chapel is in an unusual position. The triforium is also peculiar. But where is a more beautiful Galilee porch to be found than at Ely, or a more effective east end arrangement if judged from the outside? Especially is the cathedral to be admired for its octagon, which is evidence that in the fourteenth century architecture was considered to be a progressive art, and which could meet novel needs. Mr. Fergusson does not exaggerate the importance of that experiment when he says:—

"There is perhaps no feature in the whole range of Gothic architecture, either here or on the Continent, more beautiful than the octagon of Ely as rebuilt by Alan of Walsingham, the sacrist at the time the tower fell. He, and he alone of all northern architects, seems to have conceived the idea of abolishing what was in fact the bathos of the style—the narrow tall opening of the central tower, which, though possessing exaggerated height, gave neither space nor dignity internally to the centre feature of the design. On the other hand, the necessity of stronger supports to carry the tower frequently contracted still more the one spot where, according to architectural propriety, an extended area was of vital importance to the due harmony of the design. In the present instance the architect took for the base of his design the whole width of the nave and aisles, constructing in it an octagon, the sides of which are respectively 25 feet and 30 feet, and the diameter 65 feet in one direction east and west, and 70 feet transversely. By this arrangement a central area was obtained more than three times the extent of that originally existing, and, more than this, a propriety and poetry of design which are not to be found elsewhere. All this, too, was carried out with the exquisite details of the best age of English Gothic, and the effect, in consequence, is surprisingly beautiful."

The history of Ely Cathedral is surrounded with less obscurity than prevails in other buildings. A careful paper on the subject was prepared by the late Sir Gilbert Scott, R.A., in which the origin of the different parts of the building is described and their architectural value determined at the same time. It is as follows:—

*The Pre-Norman Church.*

Of the earlier history of Ely it would be out of my province, and that of an architectural sketch, to say much, inasmuch as no part of the works of these early days remains.

Our church was one of the goodly company which owed their foundation to that holy galaxy of royal and noble English ladies whose piety and good works form so remarkable a feature in the early history of our own race, and with the sketch of whose saintly lives—as so exquisitely portrayed by the Comte de Montalembert—you are all probably well acquainted. Among these St. Hilda, St. Etheldreda, St. Sexburgha, St. Erminilda, St. Werburgha and St. Withburgha hold prominent places, all near relations, three of them queens as well as abbesses, and five at least of them foundresses of religious houses (one being our own foundress, and three successively abbesses of Ely).

It is right, however, to mention that there had previously existed a church on this spot, which, as it appears, was destroyed during the wars between East Anglia and Mercia, and its ruins are said to have formed the nucleus of St. Etheldreda's Church.

I am not aware that we have any record relating to the structure of St. Etheldreda's Church, but as it was erected from the ruins of one erected under the influence of Ethelbert, who had built his cathedral at Canterbury of stone, and was rebuilt under the influence of St. Wilfred, who had built churches of stone at Hexham, Ripon, &c., and was the personal friend of Benedict Biscop, who built churches of the same material at Jarrow and Monk Wearmouth, it is reasonable to suppose that they were all of somewhat similar structure, and our imagination

may be aided by the church at Jarrow and the western porch at Wearmouth, which still remain. These would indicate that it was a structure of the simplest possible kind, whose only decorative architectural feature was, perhaps, the turned baluster column, of which a great number have been found buried in later walls at Jarrow and some still *in situ* at Monk Wearmouth.

Whatever it may have been, the church, like those just alluded to, was laid in ruins during the dreadful invasion of the Northmen about 870, though shortly afterwards repaired, and a century later its possessions were restored though the kindly influence of Ethelwold, Bishop of Winchester, when the Benedictine monastery was first founded in connection with it, and when the bodies of SS. Etheldreda, Sexburgha, Erminilda and Werburgha were enshrined in great state in the newly consecrated church.

I know of no event bearing upon the architectural history of our church till another eventful century had passed. The kingdom had been again under Danish rule, and had been restored to the English under King Edward; it had been conquered by the Normans. Ely had become the "camp of refuge" of the true-hearted English, but had capitulated; the conqueror had reached the close of his career, the first Norman abbot was dead, and the second abbot, Simeon, the brother of Walkelin, Bishop of Winchester, and a relation of the king, had been appointed.

It is not till this juncture that the true architectural history of the church, as it now exists, commences.

*The Norman Period.*

Abbot Simeon, though a very old man when elected to the abbacy, incited by the zeal for building which so characterised the Normans, and well trained to it through having been prior of Winchester while his brother had been rebuilding its cathedral, set boldly to work to rebuild the church and the monastic offices on a scale commensurate with the vast structures which were then rising throughout the length and breadth of the land.

As was usual, he commenced with those eastern portions which were necessary to the celebration of the divine offices.

The usual plan of a Norman abbey or collegiate church consisted of an eastern arm of moderate length, which was not the choir, but the presbytery or sanctuary; a transept, with a central tower at the crossing and a nave, the choir proper occupying the crossing and one or two or more bays of the nave.

The abbot seems to have laid the foundations for the whole or most of this, but to have only proceeded with so much of the superstructure as would at first be needed. This would of necessity include the crossing and a part of the nave, where the choir would be placed. It would also include a sufficient space eastward for the sanctuary and the high altar (whether the whole of the eastern arm or not is doubtful, as we shall presently see). The abutments of the central tower would be incomplete without a portion at least of the transepts, and, as a matter of fact, the whole of them were begun.

Subsequent alterations have only spared us the transepts of Abbot Simeon's work, and these probably no higher than the triforium floor. They consisted of four bays in length (of which three only remain), and they had aisles both on their eastern and western sides. The outer bay of each had a continuation across it of the aisle arcade, forming a gallery north and south, as was once the case at Canterbury, and as still remains in Walkelin's work at Winchester.

The character of this work is very Early Norman, reminding one not only of his own and his brother's work at Winchester, but of the relics of that of Remigius in the west front at Lincoln, and of the chapel in the Tower of London, built by Gundulph for the Conqueror. It will be seen to differ much from all the other Norman work at Ely.

The eastern arm, as planned by Simeon, was not like that of Winchester, with a continuous aisle surrounding the apse, but like that at Peterborough, which was probably imitated from it. It had four regular bays from the crossing eastward with north and south aisles. There was then a group of shafts dividing these bays from the apse, and running up high in the side walls to carry a great cross arch, which, like a chancel arch, divided what we may call the holy place from the holiest of all—the apse.

The curved wall, however, of the apse proper did not spring at once from this pier, but a narrow bay intervened, as still remains at Peterborough. This, in common with the whole of the curved line, was an external wall, the aisles terminating eastward in the line of the great cross to which their ends formed abutments.

We discovered the proofs of this arrangement of the east end when we removed the floor many years ago, and Professor Willis made at the time careful measurements, and wrote a paper on the subject, of which he has since given the substance in Mr. Stewart's book.

The most remarkable part, however, of this discovery was



that the foundations of the semicircular apse had been altered into those of a square east end by a straight wall cutting across the round one. My own idea at the time was that at some period subsequent to the erection of Simeon's presbytery, the idea had been entertained of converting the apse into a square end, which had been interrupted by the more magnificent scheme of Bishop Northwold for a great eastern extension. Professor Willis, however, thinks that Simeon never carried his east end beyond the foundations, and that his successor, in continuing the work, altered its plan. This is quite possible, and the only objection I see to it is the apparent improbability if Simeon carried up the superstructure of the comparatively unimportant transepts, that he should have deferred the far more important apse. As, however, we have no reason to believe that he continued any of his work above the triforium

floor, his successors would have no difficulty in taking down what was built of the east end.

After Simeon's death in 1093 the abbacy was vacant for seven years, but either during that interval, or certainly during the six or seven years of the next abbot (Richard), the work went on so far that on October 17, 1106, the bodies of Etheldred and her companions and canonised successors were translated to the new presbytery. Those of SS. Werburga and Erminilda had, however, four years previously been removed from their places in the pre-Norman church, on account, as it is said, of "the structure of the church proceeding further demanding it." I presume that the services were still continued in the old church, which, as I imagine, stood on the site of the present nave, so that the further progress of the new church in that direction rendered the removal of its eastern parts, where the



*Photographed by S. B. Bolas & Co.*

ELY CATHEDRAL, TRANSEPT.



bodies of the abbesses lay, unavoidable, though the tomb of the foundress, probably as lying further westward, was not required to be interfered with until 1106. Such, we are told, was the case with Westminster Abbey when King Edward undertook its reconstruction. He built the eastern arm, the central tower, the transepts with a portion of the "vestibule" or nave, the remainder of the nave being deferred till the consecration of the completed portions, on account of the old church standing there, that the divine offices might not for a single day be discontinued.

The work of Abbot Richard, if we may suppose the upper storeys of the transepts and perhaps the eastern part of the nave to represent it, shows a decided advance upon Simeon's work, being really fine though still simple Early Norman work. He did away with the gallery at either end of Simeon's transepts, substituting an ornamental arcade. The marks of the old arrangement were very evident against the side arcades, but have unfortunately been rendered less so by the removal of the whitewash.

Richard's successor, Henry, became the first bishop of Ely. It is probable that he continued the nave far to the west—perhaps as far as the great western tower, though one passage in the "Liber Eliensis" which tells of a fire occurring in 1111 in the "Tower of St. Peter, which was placed at the door of the Church of Ely," would lead one to think that the nave had been completed at an earlier date. I cannot, however, think that such can have been its meaning. If it was so, it is clear that the nave was subsequently extended.

This extension, whenever effected, clearly embraced the addition of the noble western transept. This may have been begun by Bishop Henry during the twenty odd years of his episcopate, but I think it more probable that the monks themselves, under their priors, projected and commenced it during the spendthrift episcopate of Nigel, for his successor Ridel is recorded to have completed to the top the "new work towards the west"—a term which would scarcely, perhaps, have been used had the work been lying untouched for six-and-thirty years.



Photographed by S. B. Eolas & Co.

ELY CATHEDRAL, NORTH CHOIR AISLE, LOOKING EAST.



This noble feature may have been suggested by the still larger western transept already existing at Bury St. Edmunds, and in its turn it must have suggested the erection of the smaller one at Peterborough. It is a truly noble work, evincing in its lower stages a more advanced variety of Norman than the nave though working in perfectly with it. Its great apsidal chapels added largely to the dignity of its character, while the central western tower completed the magnificence of the western façade. There was clearly a westward projection also from the tower, where the present porch stands; some evidences of which were found by Mr. Essex a century ago, so that the whole must have been on a larger scale, something like what we see in the ruins of Kelso Abbey.

(To be continued.)

### THE ARCHITECTURAL ASSOCIATION.

**A**N ordinary general meeting of the above Association was held on the 15th inst. in the rooms of the Royal Institute of British Architects, Mr. Beresford Pite, president, in the chair.

The minutes of the last meeting having been read and confirmed, the secretary announced several nominations. The following gentlemen were duly elected members:—Messrs. E. F. M. Elms, S. H. Evans, W. V. Morgan, and A. W. Waddington.

The Chairman said that Mr. W. H. Seth-Smith, in furtherance of the suggestion made in his paper at the preceding meeting, had forwarded to the general committee some suggested conditions for the prize of ten guineas which he offered. A further announcement would be made after the conditions had been considered.

Mr. E. Prioleau Warren read his paper on

#### Decorative Plaster-work (with Models).

Among the subsidiary arts with which the architect has to deal there are few of more general application or importance than that of the plasterer. So much of our construction nowadays is of necessity concealed, and plaster is so handy a means of concealment, and indeed, when rightly used, so excellent a one, that its use in the interiors of buildings is inevitable.

It is a material so sympathetic and lending itself so easily to decorative treatment and the repetition of ornamental design, that a vast amount of decorative plaster-work—good, bad and indifferent, and I fear the last two adjectives are fully entitled to qualify two-thirds of the work—is being daily done. There is no one of us who can well escape its use even if he wishes to do so. It therefore behoves all of us who have to do with building and decorating to consider and to learn what can and should, or what cannot and should not be done with plaster-work, and it is much more with a desire to direct the attention of the younger members of my audience to some of its uses and abuses, than with any hope or intention of giving technical instruction that I venture to appear before you.

One of the first considerations that borders the subject of plaster-work is that of its fatal facility—which constitutes a great decorative danger. Its comparative cheapness, its possibilities of rapid workmanship and the endless and easy opportunities of reproduction that it affords—in a word, its immunity from the natural and powerful restraints that cost and structural necessities impose in most other building materials—seem to me in the case of plaster-work to render self-imposed restraint and careful discrimination more than ever necessary to the designer.

We are all of us, unhappily, familiar with the incontinent cornices of amazing horticultural suggestion, with their basket-work and lattices, their vines and passion-flowers insecurely supported by internal wires, which bedecked the chief chambers of our fathers. We all know, and none of us, I hope, love, the weirdly confectioned "centre flower" with dependent "gasalier" that formed the cherished ceiling ornament of the British householder in the fifties, the sixties, and even the seventies, and dropped, in intermittent fragments, into his tea-cup or his soup-tureen. So fearfully and wonderfully made, so all-pervading were these adornments, that they begot a natural nausea, a nausea that—as often happens in such cases—communicated itself in mental connection to the innocent material that they vulgarised, causing sober folk to forswear ornament of any kind in plaster-work, to find a safe and wholesome refuge in absolute negation, absolute plainness. This was, of course, only a partial revulsion, and was accompanied or followed by "revivals," as they are called, of many types in plaster-work, as in all architectural design. The beautiful ceilings and friezes of the seventeenth century, which made our country famous for its plaster-work, were studied to good purpose by the very few, to evil by the very many, and "Elizabethan" and "Jacobean" travesties became nearly as rife and rampant as the exuberances of the centre-flower period. "Revivals" of

Italian, French, Saracenic—indeed, of all and every bygone manner—have been practised, and there are many eminent plaster-shops where you can buy a "reach-me-down" design in imitation, superficially correct, of any style you please at so much—the term is apt—"per superficial foot." These things have had a great vogue with the uneducated. They please because they offer a romantic suggestion of a possibly romantic original or of the manorial or seigneurial appurtenances of romantic fiction; a suggestion only, for even as copies they are poor, with their dead, level floated grounds, their railway-line rigidity of "run" mouldings, their sharp arrises and mechanical "repeats." What a contrast they offer to the originals they travesty. Anyone who examines, with eyes of discernment, a good seventeenth-century English ceiling will see that, beautiful as the plan of design and forms of ornament may be in themselves, they only count for a portion of the total sum of beauty. The hand of time and recurrent coats of whitewash have often done much in contribution of effect, but the intrinsic, ineffable, underlying charm of handiwork, of human pleasure and interest, of "handling" is there.

The plain surfaces are not hard and level, they are full of slight undulations, the ribs or "strap-work" have no mechanical rigidity, they are by no means accurate at their intersections, they are softly and pleasantly moulded, and usually undulate somewhat with the uneven surface of the ceiling.

The ornamental foliations—bosses, roses and the like—when they repeat, do not do so with regimental exactitude; awkward corners caused by irregular wall lines, chimney-breasts, &c., are lightly and nonchalantly dealt with; there is no strained attempt at fit, begotten of the drawing-board; the design is curtailed, expanded, chopped off or twisted to meet the emergency in a manner that would look queer on a smart office drawing, but is delightful in reality.

Experts differ very much as to the methods of preparing the plaster used for these old ceilings, and as to the way in which they were put up. It is, of course, well known that some were rendered in lathing, some on rough withies and some on reeds or rushes. It is obvious that casting was employed in many instances for the ornamental foliations and bosses, and it is stated that a sort of stamp or pressing-mould was employed for repeating ornaments of small size, such as the roses in the beautiful ceiling at Chastleton, one or two of which I was able to examine closely, as they had fallen down. They certainly seemed to me to have been squeezed into a mould. There are many indications that a good deal of the rib-work was formed by pressing into the plaster ceiling, while still damp, lengths of rib in a similar damp condition. One finds awkward joins and curious failures to fit to a centre, in the case of radiating ribs, which warrant that idea.

If you examine a fallen bit of plaster from one of these old ceilings you will generally find it very thick and coarse—often very earthy and sometimes full of little bits of gravel, &c., the kind of stuff the conscientious architect would have to condemn. But its very coarseness helped the effect of the plain surfaces by giving them texture—a quality we so often miss nowadays. How the elaborate and complicated ceilings were designed and set out we do not know with certainty, but there was probably a rough plan, which was all that a well-skilled workman needed—he had his tools, his models and his traditions. That he had models of ornaments for ceilings and friezes we know, as we find exact repetition not only in different rooms of the same house but in different houses. And you will often find ornamental designs, obviously intended for a ceiling, formed into a frieze or used to decorate the spandrels left between the horizontal frieze and the end of a vaulted ceiling, as in the library at Merton College, Oxford. It is probable, however, that much if not most of the decorative design was modelled *in situ* on the ceiling itself, partly with tools, partly with fingers.

When fingers were used upon the actual plaster it is obvious, as any plasterer will tell you, that the lime used cannot have been as sharp as that we use now—it must have been old or deadened, or no man's fingers would stand it.

There are many lessons to be learned from the abundant examples to be found in almost every county of England of beautiful old plaster-work, while Scotland, Wales and Ireland have their characteristic examples, and one of them is the extreme importance of plain surfaces of texture. I am glad to know that within the last few years that lesson has been taken to heart by one or two artists who have turned their attention to plaster-work. There were some striking instances of the fact in the work of Mr. Ernest Gimson at the last Arts and Crafts Exhibition—work full of charm and feeling and quiet originality, and delightful in uneven surfaces, roughish texture and broad unlaboured modelling—work as different in spirit from the average mechanical plaster-work of to-day as was that of the Elizabethan or Jacobean plasterer. I believe that the first essential of success in plaster-work of frieze or ceiling is the treatment of the ground. It will be difficult but necessary, if we are to succeed, to wrest from the modern workman his ideal of perfect even-floated and set levels, innocent of the faintest undulation as fresh thin snow over a



sheet of ice, and looking just as cold and hard. It is amazing with what skill a good and conscientious plasterer, armed with his float and straight-edge, will arrive at that result. It is neat, it is smart, it is difficult to do, and he is proud of the achievement, and I do not blame him; he does well what is expected of him, and satisfies his conscience, we will hope. When his ceiling is to be subdivided by ribs or decorated with ornament of any kind he still appears to be ruled by the instinct for sharpness, hardness and rigidity. He starts with a billiard-table surface, the "ribs" are run with a zinc mould *in situ*, or are cast in a "run" reverse mould and put up subsequently, the ornaments are cast from sharp feelingless models, and the work reaches a wonderful perfection of mechanical accuracy which, to the mind of an artist, is its glaring imperfection. The arrises are sharp as razors, the beads are round and smooth as glass tubes; a correspondence religiously exact is maintained on both sides of a centre line.

The cornices are run as accurately, as mathematically as the rest, and the drawings and details are faithfully observed. The result is naturally as unsympathetic as the method. I speak of the average. I am well aware that, fortunately, there are exceptions—I am happy in believing that they are many, and the number seems likely to increase rapidly as architects increasingly devote more time and thought to what is one of the most interesting and important crafts, amongst the many that they rule. What we need, it seems to me, to fit us for a more competent control of plaster-work—as of so many crafts—is to draw less and model more. Fortunately within the last few years a good many sculptors of talent have turned their attention to decorative plaster-work, and beautiful ceilings, friezes, and panels in low relief stand to the credit of several men whose names are well known to you. There is an increasing demand for decorative work in plaster. People, even of moderate means, are no longer generally content with the blank white lids of the boxes they live in. This discontent is exemplified in many ways, one of them is that suburban joy, the patterned ceiling paper; other indications are the patent substitutes for modelled ceilings, whose illustrated catalogues, with their alluring titles, are lavished in the letter box and waste-paper basket of every architect. A desire for decorative friezes is also prevalent, and is exemplified by precisely similar instances. If this discontent is responsible for many queer results and unlovely makeshifts, it is not in itself ignoble. It is our business to divert it into wholesome channels. The instinct to enrich the ceiling or the roof is, I think, a natural one—the roof is surely as worthy of adornment as the walls. In a church or a great hall it is, or should be, the crown and glory of the whole scheme. In domestic work, in the home of the average comfortable Briton, the cheap substitute for modelled plaster-work obtains a readier acceptance on account of the fact that we dwell—most of us—like hermit crabs, in other people's shells. The leasehold condition of our occupancy has begotten a leasehold type of decoration. The householder wants something that will "last my time, don't you know"—or, at any rate, suffice for seven, fourteen or twenty-one years. So he not unnaturally shrinks from permanency, which implies cost, and he thinks the real thing costly; but, as a matter of fact, it is by no means necessarily so. With care and thought, and a little ingenuity, it is possible to get good decorative results in plaster at small cost. There are many ways, for instance, of redeeming the absolute bareness of a plain plaster ceiling, without much expenditure. You can have a well-moulded cornice, and divide your ceiling into plain panels by means of shallow ribs. At very little extra cost, if your design "repeats," you can put some simple little ornament into the panels. You can dispense with ribs, and have ornamental corner-pieces and a centre; or you can have the general field plain, and have an ornamental border next the cornice, and modelled in low, broad relief. Where your conditions make it possible, and, I should say, in a longish room or corridor, you can drop the cornice a little way down the wall, and form your ceiling to a shallow curve. This may be delightful in itself, even if quite unrelieved, or can be very effectively decorated with light ribs at intervals and simple flattish ornaments. There is really no end to the simple and effective possibilities of very slightly decorated ceilings. I have seen an old ceiling in a low room at Oxford which has four corner ornaments and a centre, very simply modelled in a highly conventionalised grape vine design—and it wants nothing more—but the plain surface is such as would horrify the skilled plasterer of to-day.

The ceiling under an ordinary collar-rafter roof frequently gives a pleasant opportunity for plaster decoration. You can accept the splayed side between ceiling and cornice and treat it as a sort of sloping frieze, ornamenting the flat under the collars more simply and sparsely, or you can fix out and form a curved or vaulted ceiling, as I have suggested before; and a vault is one of the most delightful fields for decoration.

When cost is not a closely restrictive consideration, the range of possibilities is wide—for ceiling, frieze, decorative panels on chimney-breasts, or such like positions, or for the

treatment of the walls themselves. It is sometimes desirable—in a hall or a ball-room, for instance—to treat the walls with a permanent architectural decoration that precludes further adornment by means of pictures, wall-papers or hangings, and this, if you use low relief and have a good protective base or dado, can well be done with plaster-work by means of pilasters, decorated panelling, reliefs, &c.

If pilasters are used, it is generally advisable to enclose the plaster relief in a wooden frame for preservation's sake. Whatever the field of your decoration, it is necessary, of course, to use restraint, to avoid over-crowding and fussiness, to aim at a broad decorative result, to remember that you will cheapen your devices by over-repetition and spoil your ornament by over-elaboration. The eye wants some unornamented spaces to rest upon. It seems to me in most cases wise to have rather plainly treated walls and a simple frieze, for instance, where your ceiling is elaborate, and a simple ceiling where you want an elaborate frieze. It is hardly necessary to say that your plaster-work should be "plastering" in effect, round and soft, and should not imitate the treatment of any other material.

The ceiling, frieze, panels, or whatsoever form the plaster-work may take, should fall into the architectural scheme of the interior they contribute to; they must be in coherent relation to the rest. The scale must be preserved. And there are many considerations to be taken into account in designing a frieze or ceiling. The proportion of the room, of course, first. It is obvious that the same design would be inappropriate, in one instance, if applied to two rooms, one of which was 10 feet high and the other 20 feet, and that a long, low room needs different ceiling treatment to a high square one. Then the lighting must be taken into account. Where the tops of the windows reach nearly to the ceiling, and especially where a longish room has such windows pretty evenly distributed along one side only, very delicate relief will tell at a considerable height. In the same room, if the windows are low, or so small as to give inadequate light, the relief will require to be bolder in order to tell. A room lit from two opposite sides, giving a strong cross light, is the most difficult to treat successfully. The cross light defeats the shadows and spoils the effect of relief; in such a room greater emphasis, greater sharpness of modelling, is advisable. All these remarks are intended to apply to daylight effects, but artificial lighting should be considered, too. In great reception-rooms, chiefly used at night, and in all rooms intended to be brilliantly lit—say by electric light—it is well to keep the relief rather softer and more delicate than in rooms of more ordinary character in illumination.

As a general rule, in an averagely lighted room, up to 13 feet or 14 feet in height, the relief of ceiling-mouldings or ornaments does not require very great projection if the ceiling is left white or nearly white, as relief looks exaggerated. Ribs, I think, are but rather broad and shallow in form, and with a tendency to round members rather than sharp-arrised ones. Their size, of course, must depend upon the scale of the room, the heights at which they occur and the effect aimed at. Constructional beams dividing the length of a ceiling frequently help the design greatly, and are capable of very effective treatment in themselves. In many a splendid old ceiling the ornament was confined entirely to the beams and the cornice with which they intersected.

When there are no beams I am personally inclined to prefer detachment between the decorative design of the ceiling and the cornice. I like a margin left along the cornice. This helps you if you wish to leave the ceiling whitish and to colour the cornice; and, generally speaking, the cornice must be regarded as the crown of the wall and not as the beginning of the ceiling.

However, that is, after all, a matter of design or circumstance; it is risky to generalise too freely. But it is safe to say that too much attention cannot be bestowed, first, on the ground surface—whether of ceiling, frieze, or panel—and, second, on the modelling of any ornament, whether simple rib or foliated or arabesque design. If you cannot be sure of getting good modelling, have none at all, find safety in plainness. If you wish to avoid sharpness and hardness have ribs and cornices modelled, not run. Keep them simple and broad, not liney and wiry. Generally speaking, I believe that for ceilings a more or less geometric basis for the leading lines gives the happiest effect; the arrangement should, at any rate, be ordered, if not formal. But whatever the basis and whatever the treatment, the design should essentially be a ceiling design, the ornamentation of a flat surface—to be seen from below—and in a room where it is intended to be seen from all points it should "read," as it is called, in all directions equally well, though it may have a main longitudinal or lateral tendency. It is, perhaps, hardly necessary to counsel the avoidance of any obviously unsuitable type of design for a ceiling, such as swags and festoons—suitable, perhaps, on a vertical surface like a frieze, where the sense of vertical dependence is appropriate, but inappropriate and awkward in a ceiling. A frequently effective treatment for a tallish frieze is to have some form of ornament repeated at widish intervals, the interspaces being either quite plain or filled with a plain moulded panel.



I have so far dealt with the consideration of plaster-work for the interiors of private houses. Great mansions and great civic buildings differ in degree rather than in kind from these, and, as regards their internal plaster-work, the principles applicable to smaller buildings apply to them. Where deep-beamed and coffered ceilings are used greater structural support is needed for them, and bolder modelling and moulding, of course, to preserve their relation in scale to their architecture. They often, however, present the decorative problem of the treatment of domes, of which in a civil building I have not yet seen a strikingly original treatment in plaster-work. I have seen, you have all doubtless seen, dozens of domes treated with diminishing coffered panels, whose framework ascends on converging radial lines. Wren left us many fine instances of these. The dome of St. Stephen's, Walbrook, is, I think, the most beautiful instance I know. In this dome there are four tiers of diminishing coffer panels, the second above the cornice, and the final one having panels corresponding in width to two of the first and third. And, indeed, Wren's churches, and those of his pupils and immediate successors, provide an abundant field for study of a certain type of design in plaster-work, mannered and formal—very often, but full of vigorous character and excellent workmanship.

A great deal of the plaster-work, which is by no means confined to the ceilings of our City churches is, of course, subject to the criticism of being in direct and purposeful imitation of Classical Italian models in stone or marble. The coffered soffits of the arches of St. Bride's, Fleet Street, of St. Katherine Cree, show this strongly, and it is observable that in St. Paul's Cathedral stone and plaster details are precisely of the same character. In St. Stephen's, Walbrook, there is much fine plaster-work beside the dome; there are light and narrowish arch soffits with running patterns of roses, &c., and the transverse arches of the vaulted roof mark the plain vaulting bays—unrelieved except by a large centre boss—with a boldly-modelled band of convoluted foliage ornament. The churches of St. Mary Aldermary and St. Katherine Cree both have groined Gothic ceilings in plaster—very reprehensible theoretically, but distinctly picturesque. And at St. Mary's Aldermary, the arch spandrels of the nave arcade are charmingly filled with coats of arms and flowers and fruit, &c.—a good instance of the effect of confining ornament, using it to give special emphasis to particular features of construction, the wall above the arches being perfectly plain. Christ Church, Newgate, shows a sparing use of plaster adornment. And the beautiful little interior of St. Anne and St. Agnes, Aldersgate, shows in its large decorative panel borders, its shallow arch cofferings, and the enriched soffits of its corner spaces, some graceful and delightful examples of this Anglo-Italian architectonic style of plaster-work.

It has been reserved for the last few decades of this century, and the devotees of the "Gothic Revival," to find that plaster-work is inappropriate to the interior of a church. In the seventeenth and eighteenth centuries, and until near the end of the first half of the nineteenth, plaster ceilings were the rule and not the exception in churches.

A great many very charming ones have disappeared before the hand of the restorer, but several seventeenth and numberless eighteenth-century examples remain. I am glad to see that plaster-work is regaining its place in church interiors; it provides, at any rate, a pleasing variant to ceilings of stained or painted deal, or to open roofs with timbers or small scantling and wrought "die-square." For the enriched ceiling of sanctuary chancel or side chapel, I think it is a most excellent material; and the invention of fibrous plaster makes it possible, with little difficulty and comparatively small cost, to use enriched plaster-work, not only for ceilings, but for other decorative purposes in churches.

The slabs of plaster which bear portions of the design, or completely fill separate panels, are put up like woodwork and screwed to the rafters or furring pieces put to receive them. Each slab should be composed of thinish plaster, embedding layers, usually two in number, I believe, of very wide-meshed canvas, the plaster being worked well through the meshes. They are stiffened with laths or battens and can be worked to any required angle or curve. If the relief is not great they are very light. Where a number of slabs have to be joined to form a ceiling without intermediate ribs, it is customary to pack damp canvas between their meeting edges, which not only protects them, but forms a stiff setting when it dries; the fissures are subsequently pointed in with plaster. Brass screws should be used for fixing and the screw-holes, of course, must be stopped in. If steel screws are used, the heads require to be coated with japan or paint to prevent the inevitable rust from staining the plaster.

I put up a panelled ceiling of this kind over the sanctuary at Groombridge Church some two years ago. I believe that many of you have visited that building. In that case the panels were each in one slab, and their edges were clipped by the overlapping oak ribs and fillets.

In my church of St. Clement's, at Bradford, I had the good

fortune to secure for the decoration of the chancel roof the services of Mr. George Frampton, who modelled the fibrous plaster ceiling, and of Mr. Anning Bell, who coloured it.

In this case Mr. Frampton was first provided with a model, to a scale, I think, of one-quarter full size, of one side of the covered inner roof. On this he modelled his first sketch, which, with some other details of the ceiling, he afterwards exhibited at the Arts and Crafts Exhibition two years ago. He then set to work on a full-sized model of the eastern bay, and upon the repeating ornament of shields and rose trees and the frieze of cherubs that fill the rest of the ceiling. Casts were made from his models and were screwed up, joined and stopped in the manner I have before described. The ridge, cornice and vertical ribs are of deal, and are painted and gilded with the rest of the ceiling, which was dry and paintable within a day or two of fixing.

The use of fibrous plaster enables one to escape the flatness and rigidity I have spoken of as due to floating surfaces and running mouldings. The casts bear the direct impression of the modeller's handling. The use of this material is not without its artistic dangers, the chief of which is that its modelling is not as a rule done upon the actual ceiling. It is possible, of course, to model *in situ*, and then cast from the models elsewhere, and that, I fancy, would be one of the safest ways in which to prepare the design of a fibrous ceiling, for nothing can quite come up to the actual position and the actual lighting of the building for which the work is destined. The next best method is to arrange your model in the workshop at as nearly as possible the height that the ultimate casting will occupy, approximating as far as possible the conditions of light and surroundings, and modelling the ceiling from below. If you cannot manage this, it is wise, at least, to get your model either conveyed to the site it is to occupy, or hoisted up in some similar position for your judgment of effect.

It is essential in case of a ceiling with a cornice and divided by plaster ribs to have cornice and ribs cast from models also, not run. In the case of ribs this can be efficiently done by casting a reverse from the first model and pressing the clay into it to form ribs for the model section of the ceiling. The laying of the moist clay ribs into the ground surface of the model insures the avoidance of rigidity. I have said that it is impracticable to mould with the fingers the actual plaster so as to avoid casting altogether, unless that plaster differs very much from what we generally use. But that difference is now obtained, as I am told, by the use of old or deadened lime and some special kind of sand, and ceilings and other decorative work are modelled in plaster and in position. That, it seems to me, must be the best plan possible when the object is to avoid repetition and when cost admits of it: further, where exact repetition can be avoided the better will be the result.

The consideration of decorative plaster-work for the exteriors of buildings is almost a subject by itself. As you know, a great use was made of it in certain districts, the eastern counties especially, in the fifteenth, sixteenth and seventeenth centuries. "Sparrows" house at Ipswich is a striking instance of rather coarse and crude, but very picturesque adornment. A good deal of external plaster-work (using that term to cover work in cement and selenitic mortar) has been done and is doing in our time, as several of Mr. Norman Shaw's buildings testify. Until quite recent times the old traditional and delightful "stick-work" was done by village plasterers in rendered cottage fronts, but I fear that tradition has gone the way of many others.

One suggestion I would make, with regard to external work in low relief, is that the relief should be stronger on the north side of a building than on the others.

I have now only a few words to say as to the treatment of finished internal plaster-work. When the plaster—fibrous or otherwise—is perfectly dry, it can be treated with a thin coating of wax dissolved in turpentine, wiped or rubbed here and there with a rag; this gives it a pleasant, soft, ivory like appearance that is more agreeable than the even tint of distemper. (At Groombridge I had the shields and emblems entirely gilded, and then glazed over partially with thin oil colour, the whole of the remainder being waxed.) If heraldry is employed the coats of arms must, of course, be coloured, or the blazonry is incomplete. There are some good instances of the effect of emblazoned coats occurring in a general field of toned white plaster in the cloisters of Corpus College, Oxford. It is a contrast of which I am fond, that of richly toned heraldry and toned white plaster-work. In church work it is likely that colour over the whole surface of the work may be needed, and this presents no difficulties either in the case of oil-colour or distemper; in the latter case the suction of the plaster will probably need to be stopped with a coat of priming. I referred just now to the effects of a cross light. In my opinion a ceiling lit from both sides requires colour, and perhaps gilding, more imperatively than one lit from side or end only, when the relief gets its full value through shadows.

Plaster reliefs may, of course, be readily used for decorating wall spaces or arch spandrels in churches.



There is, in fact, no end to its decorative applicability.

Time, and your patience, would fail me if I endeavoured to cover all the ground of my subject.

You will notice that I have omitted all consideration of sgraffito work and scagliola, which certainly come under the head of decorative plaster-work; I did so advisedly, for the former subject alone would readily fill the limits of a paper like this.

For similar reasons I have not treated of foreign work—Italian, French, Spanish or Moresque, European or Asiatic—the subject is really a tremendous one. If I have succeeded in arousing any interest or enthusiasm for a very attractive craft, I have realised the full intention of my paper.

Mr. L. A. Shuffey said he was not prepared to add to Mr. Warren's paper, but he thought plaster-work had gone beyond the examples which were shown. He had great pleasure in proposing a vote of thanks to Mr. Warren.

Mr. Miller considered that fibrous plaster had its virtues and its disadvantages. There were many who believed it to be a recent invention, but French authors had shown that it was used in the fourteenth century. For ceiling work fibrous plaster is very useful for renovating old ceilings, in theatrical decorations it was especially applicable, the work being so rapid and drying so quickly.

Mr. H. W. Pratt seconded the vote of thanks. He was prejudiced against the ornamental centre-pieces. Now that the electric light was so widely used he thought more consideration should be paid to the innovation, as the ceilings were shown up more than by gas light. There was a temptation to overdo the ornamentation, and great care should be taken to preserve measure.

The Chairman remarked that those who took part in their annual excursion saw a great deal of plaster work in Kent.

On putting the vote of thanks it was carried with acclamation.

The Chairman also said Mr. J. H. Fellowes-Pryne had been nominated by the committee to fill the vacancy caused by Mr. Begg's resignation as vice-president, and that at the next meeting a successor on the committee would be nominated to Mr. Pryne.

At the meeting on February 5 Mr. A. S. Flower will read a paper entitled "An Unwritten Chapter of Architectural History."

## EDINBURGH ARCHITECTURAL ASSOCIATION.

A MEETING of the Edinburgh Architectural Association was held on the 20th inst., Mr. G. S. Aitken in the chair, when Mr. Alexander Drew, C.E., delivered the first of a series of lectures on "The Practical Designing of Iron and Steel Roofing." At the outset the lecturer pointed out the difference in treatment which was necessary in substituting iron or steel for timber in roof framework, and noted generally the lines on which this treatment should proceed. The necessity of considerable practical training and experience was emphasised, and it was claimed that only those possessing such special training were competent to design thoroughly practical and economical structures. It was admitted, however, that in the case of the smaller and more ordinary types of framework frequently met with in everyday practice, sufficient knowledge might be acquired by study to prevent the architect from falling into serious error, and insure the result being at least practical and safe, if not the best and most economical. A vote of thanks was accorded the lecturer on the motion of Mr. D. Hunter Crawford.

## DEVON AND EXETER ARCHITECTURAL SOCIETY.

AT a meeting of the Devon and Exeter Architectural Society, held on the 21st, a lecture was delivered by Mr. Edmund Sedding on "Local Gothic Architecture." Mr. C. King presided, and those present included Messrs. E. W. Lister, J. Dwelley, B. Priestly Shires, J. H. Vincent, G. W. Hancock, W. J. Corder and E. May Leest, hon. district secretary.

Mr. Sedding said as the town of Plymouth was so favourably situated in its geographical position, it was incumbent on those who spent their lives in the midst of such scenic beauty that they should design well. It was the mass of its domestic buildings that formed the architectural status of any town. The public buildings might form a centre of interest, but if the smaller erections were mean and badly designed the status of that town would be ranked accordingly. In the choice between Classic or Gothic there was no doubt that the latter style was the national one, and was suitable to climate and our religion, and from a constructional point of view the arched form and the gable roof were more in harmony with nature and the uses to which our buildings were designed, and with the materials with which

they had to deal. Ornamentation is the most important part of architecture. On it the intellects and moral power should be concentrated. Whenever the Greeks ornamented the tops of their buildings, Englishmen should, like the Goths, ornament the bottoms, namely, the porches and windows. All ornamentation should be natural, as from the earliest times, but from our limited capacities and materials the English were forced to conventionalise. Ornamentation must be proportionate to the distance it will be seen from the eye. The lecturer, illustrating his meaning, said the leaves in a carved capital in Winchester Cathedral, at a height of 55 feet from the ground, were about 9 inches square, but in others at a short distance from the eye there were some six or eight leaves in a similar space. It was unfortunate that there was so little stimulant in their large population for the artistic craftsmen to keep in touch with old work, or even with the best modern work. But in order to design even little things—for if they could not do little things they certainly should not attempt large ones—the artist must study old work. Without help and inspiration his artistic capacities must grow weaker, as eyes would that have been long bandaged. The lecturer advised the Society to take regular excursions to visit old buildings, and try and improve the architectural prospect of Plymouth, which was not looking very bright at the present, so that it might not be said of them hereafter that it would have been better for art if they had never existed.

A vote of thanks closed the meeting.

## TESSERÆ.

### Mediæval Use of Stone.

FOR a long period the most refined taste in elegant architecture was extensively practised throughout this country upon scientific principles which, if ever equalled, have most assuredly never been surpassed, yet the quality of the stone employed seems rarely to have been considered further than for the facility with which it might be wrought by workmen. Relics of long-departed grandeur, either of the ecclesiastical or baronial order, abound in most parts of the kingdom. Nearly all these beautiful works of our ancestors are constructed with stone from the immediate neighbourhood of such buildings, apparently without any regard to colour, strata, or durability; and hence we frequently find stones of very different tints indiscriminately placed together in the same elevation, some extremely perfect, others in a very mouldering condition. Whitby Abbey is built of sandstone varying in colour from white to a dark umber brown, carelessly mingled, and presenting a motley appearance. In all cases the brown stone is more decomposed than the white. Bristol Cathedral is built of red sandstone and yellow limestone strangely intermingled. The sandstone appears to be invariably more decomposed than the limestone. King's College Chapel, at Cambridge, is built partly of white magnesian limestone from Huddlestone in Yorkshire, and a brown shelly oolite from Weldon in Northamptonshire, evidently without distinction or study to suit the architectural arrangement. The magnesian limestone is throughout much more dilapidated than the shelly oolite. It is easy to conceive the difficulties that would arise in obtaining a large quantity of so ponderous a substance as stone from the distance of only a few miles; and in situations remote from the sea, or from navigable rivers, at a period when few good roads were available, and canals were neither known nor thought of, the transporting a supply of stone for an extensive edifice would necessarily be attended with vast labour, and in many cases would appear to be an insurmountable difficulty.

### Old St. Paul's after the Great Fire.

The first thing arranged after the deplorable fire was to fit some part of the church thus ruined for a choir, wherein the dean and prebends might have divine service until the repair of the whole, or a new structure could be accomplished. It was, therefore, resolved that part of the body of it, towards the west end, might, with the least change, be made useful for that purpose; whereupon workmen were set upon it, and scaffolds raised for search of the walls, and cutting the remainder of the unmelted lead from the high roof and other parts of the church. In which employment, as also in digging up the melted lead, clearing the rubbish, taking down the remainder of the vaulted roof and walls, with the greatest part of the tower steeple, digging up the floors, sorting the stone, and carrying it to several places, repairing the convocation-house, and building new offices for the work, no less than two years (viz. the rest of the year 1666, the whole of the year 1667, and part of the year 1668) were spent. Towards the latter end of which two years they fell to casing some of those great and massy pillars which stood betwixt the middle aisle and the side aisles, beginning with those below the little north door towards the west; but before the third pillar was perfectly cased (so weak and unsound had the excessive heat of the fire left it), with the



remaining pillars and walls, which were all miserably scaled with the flames and shattered, that upon further search into them they were found to be altogether incapable of any substantial repair. It was, therefore, fully concluded that, in order to a new fabric, the foundations of the old cathedral thus made ruinous should be totally cleared, and preparation of materials, and all things needful made ready conducing to a new fabric, which work continued until April 1674.

### Phidias and his Disciples.

Agoracritus, who was sincerely devoted to the master, and Alcámenes, who was more independent, and even disputed with his instructor, applied their art principally to the images of the gods. Beauty in full bloom, combined with a mild and tranquil dignity in the features, characterised the statues of the female deities which they produced in emulation of each other—the Aphrodite in the garden, by Alcámenes, and the corresponding statue by Agoracritus, of Parian marble, which, having lost the prize, was, with the addition of the proper attributes, consecrated as Nemesis, at Rhamnus. There still exist, as works of this first of all schools of art, the architectonic sculptures with which it adorned the temples of Athens, doubtless under the immediate superintendence and direction of Phidias. First, there are preserved portions of the eighteen sculptured metopes, together with the frieze of the end of the cella in the Temple of Theseus, the style of which evidently belongs to the Phidian school; secondly, a considerable number of the metopes of the Parthenon, all ornamented in alto rilievo, as well as a great part of the frieze of the cella, besides some colossal figures and a mass of fragments from the pediments of that temple, on which latter the master himself seems chiefly to have employed his hand. In all these works there appears, on the whole, the same style of art, only that artists who belonged to the elder school, which still continued to exist, and whose workmanship is less round and flourishing, seem to have been sometimes occupied on the metopes, and that in the frieze the uniform filling up of the space which the architectonic decoration required, as well as the law of symmetry and eurythmy, in many points imposed conditions on the striving after nature and truth. Leaving this out of view, we everywhere find a truth in the imitation of nature which, without suppressing anything essential (such as the veins swollen from exertion), without ever allowing itself to be severed from nature, attained the highest nobleness and the purest beauty; a fire and a vivacity of gesture when the subject demands it, and an ease and comfort of repose where, as in the gods especially, it appeared fitting, the greatest truth and lightness in the treatment of the drapery where regularity and a certain stiffness is not requisite, a luminous projection of the leading idea and an abundance of motives in subordinate groups evincing much ingenuity of invention, and, lastly, a natural dignity and grace united with a noble simplicity and unaffectedness, without any effort to allure the senses, or any aiming at dazzling effect and display of the artist's own skill, which characterised the best age not merely of art but of Grecian life generally.

### The Houses of Parliament.

It is in the greatest of his works that we trace the effect of difficulties in bringing out Sir Charles Barry's latent genius and the native depth of his resources. Never probably had architect to labour under trammels so narrow and so galling. What have been most unsparingly fixed upon as the worst faults of the new palace at Westminster resolve themselves, on an impartial review, into little more than the iron conditions under which the architect had to labour from the first. Neither the choice of site nor level was in any way his. The lofty and noble elevation he would have gladly given was out of the question. It would have left the Abbey and the Hall buried in a hole. The space at his command—a narrow strip wedged in between the river margin on the east, the Hall, the old law courts and Parliament Street on the west—almost dictated the long unbroken line of frontage, the monotony of which has naturally met with so much disfavour. The choice of styles was limited to the Gothic and the Elizabethan; and, the latter being set aside as the hybrid of a fanciful and transient taste, there was nothing for it but to reconcile somehow the exigencies of such a site with the laws of a style which depends for its effect upon variety, irregularity and picturesque freedom. Not an inch of space could well be spared. Instead of the architect being free to embody in a vast independent design his ideas of what befitted the seat of a nation's Legislature, there was not much for him to do but to clothe in Gothic detail the utilitarian structure which had to roof over a given acreage. No wonder that the general result was the shell of a gigantic factory breaking out into a fretwork of Mediæval ornament. Towards the open vault of the sky alone did there appear the slightest semblance of an outlet for the imagination to expand. But even there the spirit of Mr. Joseph Hume frowned down upon the upward aspirations of the architect. Still, it is in the manifold and various lines which lead the eye heavenwards away

from the river level, in bold contrast of tower with spire, and in the picturesque grouping of the whole against the sky that the real power of the design is seen. The architect, it is known, had carefully studied and calculated the effect of his work at a distance. And few even of those who, on a nearer and microscopic view speak of it as a "mouldering toy," will refuse it a place among the most successful of public undertakings in modern times.

### Assyrian and Indian Art.

The general affinity between Indian and Assyrian art may be in part due to the common Turanian substratum, and common Aryan inspiration of Indian and Assyrian civilisation. When the Aryans made their way through Afghanistan and Cashmere into the Punjab, they found the plains of the Upper Indus already occupied by a Turanian race, which they indeed easily conquered, but which, as the caste regulations of the Code of Manu prove, was far superior to themselves in industrial civilisation. These aborigines already worked in metal and stone, and wove woollen, cotton and linen stuffs, knew how to dye them, and to embellish their buildings with paintings; the descriptions of Megasthenes prove that, even at its highest development, Hindu civilisation was more Turanian than Aryan, and the pre-Aryan Turanian civilisation of India must have been similar to the pre-Semitic Turanian civilisation of Babylonia, Chaldaea and Assyria, and probably preceded it. All that is monstrous in the decorative forms of Indian and Assyrian art, all that is obscene in Indian symbolism, is probably derived from common Turanian sources, anterior to direct commercial intercourse between India and Assyria. But when we find highly artificial and complicated Indian decorative designs identical in form and detail with Assyrian, we feel sure that the one must have been copied from the other, and indeed there can be no doubt that the Indian ornamental designs applied to and derived directly from sculpture, which are identical with Assyrian, were copied from the monuments of Assyria; Egyptian, of course, from Egypt. We cannot trust alone to the allusions, references, or even descriptions of the Bible, Homer, and the Ramayana and Mahabharata to identify the art manufactures of India with those of Assyria, Phœnicia and Egypt; by themselves they indicate generic likeness only, and their specific identity can be demonstrated only by a comparison of the actual remains of ancient art, and of the carved and painted representations on contemporary monuments. But when this identity has been proved from the monuments and other remains, the Bible, Homer, the Ramayana and Mahabharata and Pliny are invaluable, in that they enable us to complete our information on the sure and certain foundation so laid; and to the picture thus composed of the early civilisation of the world we are justified in giving colour and motion from the strictly traditional, still living, civilisation of India.

### GENERAL.

**The Venice Municipality** will grant three prizes of 1,500 frs., 1,000 frs. and 500 frs. respectively for the best critical essays on the Second International Fine Arts Exhibition, to be held in Venice from April 22 to October 31.

**M. Albert Ballu**, architect, has given a lecture in Paris describing the recent discoveries at Timgad in Algeria, in the course of the explorations which he is directing. The triumphal arch of Trajan, the forum, the capitol, the theatre which could contain over 3,000 spectators, and other remains were represented.

**A Monument of Pasteur** (in addition to the monumental chapel wherein his remains are deposited) is to be erected in a public place of Paris. A commission has been constituted to select the artists to whom the work is to be entrusted.

**An Exhibition** is about to be held in Paris of paintings and sculpture which are the works of actors and actresses. Madame Sarah Bernhardt is president, and the vice president is M. Bouvet of the Opéra-Comique.

**A Meeting** of the Yorkshire branch of the Sanitary Inspectors' Association, held at Bradford on Saturday last under the presidency of Mr. T. Pridgin Teale, discussed the sewage question and also the supervision of drains.

**At the last Ordinary Meeting** of the Royal Institute of British Architects, Mr. Harold Smith and Mr. R. C. James, architects, of Bristol, were elected Associates, having passed the final examinations last June. Both gentlemen are Associates of the Bristol Society of Architects.

**The Fifth Ordinary Meeting** of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, February 1, at 6 P.M. prompt, when a paper will be read by Mr. F. I. Thomas, entitled, "Art out of Doors," illustrated by sixty limelight views.



# The Architect.

## THE WEEK.

THE works committee of the London School Board do not appear to be satisfied with the cost of the operations of the measuring surveyor, economical as they are. At present measurements appear to be taken systematically during the progress of the works. It is now contemplated to have the variations on the contract measured up and adjusted within six weeks after the completion of the school. But the work is to be done by the quantity surveyor who took out the original quantities. The price to be paid is to be specially arranged, and a report is to be prepared showing the comparative cost of the measuring-up by outside quantity surveyors and by the Board's measuring surveyor. The quantity surveyors are to furnish the School Board with details and abstracts of their measurements, as well as of the actual cost of additions and omissions. The architect of the Board is to be answerable for the measurement of foundations, drainage, &c., which has been hitherto done by the measuring surveyor. The monthly valuations are to continue to be made by the latter. The experiment is to be tried on six selected cases at first.

ONE of the reasons for the proposed change may, however, have been suggested by a recent arbitration case. Messrs. KIRK & RANDALL were the contractors for the Elizabeth Street School, North Woolwich. A dispute arose between the Board's measuring surveyor and the contractors concerning the measurement and allowance for pumping in connection with the foundations. According to the surveyor's account, the contract provided for excavating and carting away to a depth of 22 feet. The excavation was only carried down to an average depth of 16 feet 3 inches. The contractor claimed to be paid at the same rate for his excavation to the less depth as he had in his contract for the greater depth, while the surveyor contended he should be paid at a less rate. The contract also provided for pumping and keeping the trenches clear of water to a depth of 22 feet, for which the contractor put down the sum of 153*l*. As the excavations were not carried down to the contract depth and less pumping was required, the surveyor maintained that the Board were entitled to the value of the less pumping. The two items in dispute were submitted by the contractors to the architect of the Board, who adopted the surveyor's theory. The contractors again appealed to the architect, who upheld his decision. The contractors then applied to the President of the Royal Institute of British Architects to appoint an arbitrator. This was agreed to by the Board, but only the latter question, viz. the pumping to a less depth, was submitted to arbitration by the contractors. The amount of the contractors' claim was 70*l*., the School Board's offer was 35*l*. The case was referred to Mr. E. A. GRUNING. The arbitrator's award was 68*l*. 14*s*. 10*d*. The arbitrator's fees amount to 14*l*. 19*s*., and the witnesses' fees are 12*l*. 12*s*. Payment has been made in accordance with the terms of the award.

THE first conversazione of the Society of Designers was held on last Tuesday evening by the invitation of Mr. and Mrs. PHILIP H. NEWMAN, at their studio, 21 Endsleigh Gardens. Among the notable features of a very enjoyable evening may be mentioned the exhibition on the screen of some of Mr. NEWMAN's architectural and artistic views in Normandy, Brittany and Italy, which were rendered the more interesting by a running and lucid commentary by Mr. PHENÉ SPIERS, F.S.A. Some very remarkable and artistic photographs of London by night, taken by Mr. MARTIN, were then shown by Mr. F. H. EVANS. We hear with much pleasure that Sir E. J. POYNTER, P.R.A., has consented to become an honorary member of the young and promising society; a previous engagement unfortunately prevented his appearance at the conversazione. A society of designers is needed for many reasons, and the encouragement received already from old as well as young artists is evidence that the time selected for its formation was opportune.

At the annual meeting in Leeds of the Yorkshire Archæological Society it was reported that the council, in conjunction with the Thoresby Society, had entered into an agreement with the Yorkshire College to rent the rooms of the old Medical School for a period of five years, with the option of purchase at the end of that period. The books belonging to the Society had been removed from Huddersfield. The number of members is 607, as against 615 last year, and only fifty-three are in arrear with their subscriptions as against eighty-five at the date of last annual meeting. Colonel BROOKE, who was elected president for the ensuing year, in his address referred to the work of the Society at Mount Grace Priory, which was one of the most interesting places connected with the monastic history of the country, and which, as a practically unique specimen in England of what a Carthusian monastery was, possessed an interest which perhaps hardly attached to any other place within the country. They were deeply indebted to the owners of the property for allowing the excavations to be made, and to Mr. HOPKINS for the great research which he had shown in elucidating the different matters that had been discovered.

It is not a gratifying spectacle to find architects, engineers and other technical witnesses, giving evidence in the law courts with a confidence resembling that shown by the counsel in their speeches, although it is notorious that neither witnesses nor advocates have selected the side they uphold. But in Canada, where the line between right and wrong might be supposed to be more strongly marked owing to the simplicity of the conditions of daily life, there is at least equal latitude. The subject was introduced in the presidential address of Mr. H. B. GORDON at the annual convention of the Ontario Association of Architects. According to him "the public distinctly discounts all expert evidence, and many go to the length of stating that they can hire professional experts to give any kind of evidence they like." Mr. GORDON ascribed the laxness to the method of questioning adopted by counsel and the bias derived from the manner of stating the case. His remedy for the evil is the adoption of the French system of having architectural and other experts appointed and paid by the courts to make disinterested investigations and reports. Mr. GORDON therefore suggested the co-operation of a committee selected by the Convention with another from the Society of Civil Engineers in order to discover whether such a body could be constituted.

KILMALLOCK, in the county Limerick, is often called the "Irish Baalbec," but an applied designation is no safeguard against vandalism. The town contains some remains of old buildings, and they are not too numerous to allow of the removal of any of them unless it is intended to make Kilmallock as commonplace as many other Irish towns. The latest proposition is to remove the remains of the castle. The building never was a remarkable example of architecture, but it is a memorial of one of the struggles to dominate Munster, and it has enough historic interest to ensure its preservation. The subject was brought before the last meeting of the Council of the Royal Society of Antiquaries of Ireland, when the following resolution was adopted:—"That the Council of the Royal Society of Antiquaries of Ireland has heard with regret that a presentment has been passed by the presentment sessions for the liberties of Kilmallock for the purpose of taking down the King's Castle at Kilmallock. The Council is surprised at the contemplated act of vandalism, inasmuch as the preservation and protection of ancient and historic monuments are recognised as a matter of great public interest, and trust that now public attention has been directed to the subject the presentment will not be proceeded with. The Council would further suggest that steps be immediately taken to place this interesting monument in charge of the Board of Works for protection under the 'Ancient Monuments Protection Act.'" "Presentment" is a word of bad augury for Irish antiquities, but it is to be hoped some respect for antiquity will be shown in this case by the authorities, who will be asked to approve of the vandalism decreed at the sessions.



## FORD MADOX BROWN.

THE English school of painting is distinguished from others by its variety. There could hardly be stronger evidence of that peculiarity than the exhibitions which are open at the Royal Academy and the Grafton Gallery. BROWN and LEIGHTON sprang from the same class of English life, for they were the sons of medical doctors; both studied in foreign schools, both avoided the representation of everyday life, both aspired to be decorators of buildings, both derived inspiration from books. But while there was so much in common with the painters, it would be difficult to assemble two collections of works which appear more unlike. Hardly one principle of art appears to have been received with equal respect by LEIGHTON and BROWN, and it might easily be imagined that each wished to display as marked a difference as he could from the style of the other. LEIGHTON always endeavoured to create beautiful forms, and he sought subjects in which they could be introduced. It must have been an extraordinary commission which would oblige him to represent an Homeric scene with *THESSITES* as one of the characters. What a difference appears between his *SIMOETHA* and the ferocious sorceress of the poet, who screams out menaces against *HECATE* if the love potions should fail to have the desired effect, and threatens to deny the goddess she has hitherto served. Death in the *Hercules Wrestling* is no hideous monster. At one time LEIGHTON, in his *Plague at Florence*, asserted his right to treat forms that were not beautiful, but the attempt was evidently considered by him to be a sort of escapade and was never repeated. His dislike of ugliness was, we suppose, one of the causes which kept him from becoming a portraitist unless in exceptional cases.

It would be wrong to say that MADOX BROWN was indifferent to beauty, for that would be tantamount to asserting he was not an artist, but undoubtedly he was always ready to sacrifice it to whatever he supposed was truth. He appeared to believe that whatever could be expressed by a writer was feasible in painting, and he may have often regretted the days when printed books did not exist. Would any painter but himself have the courage to make the absence of a tooth in a girl's gum the subject of a picture, and to defend his experiment on such philosophical grounds as the following:—"How any thinking person can in his mind confound together a law in nature that we have all undergone, in itself full of promise and symbolic of much, with such an accident as a broken tooth in a grown person, is to me inexplicable"? MADOX BROWN, it will be observed, does not in his remonstrance confer on beauty the omnipotence in art, and apparently does not remember that many things which exemplify laws of nature and symbolism may not be pleasing to look upon. Nor is it a sufficient excuse for exciting disagreeable notions to say a picture is Hogarthian. The *Stages of Cruelty*, which, like *Toothless*, is in the Grafton Gallery, is thus described:—"The child tortures, the dog, while her grown-up sister tortures her lover; 'love-lies-bleeding' is the instrument of torture in the one case." Without the explanation it might be supposed the child was innocently playing with the dog and the dog was enjoying himself, while the elder sister was no less innocently discussing future domestic arrangements with her lover. MADOX BROWN wished, however, to excuse himself for painting so simple a scene, and therefore, in his title at least, attempts a feat in generalising which he could not adequately express on canvas. So kindly a man was unjust to himself when he attempted to play the cynic.

Not only LEIGHTON, but the majority of painters, ancient and modern, endeavour, whenever they introduce many figures in a picture, to dispose of them in such a way that, while they all conduce to one end, there will be degrees of importance manifest among them. Hence the old rules of composition about placing the principal figures in positions where their importance will be manifest. It has happened that many stiff and spiritless pictures were manufactured from too subservient attention to such rules. It is, however, preferable to have an arrangement which will suggest the relative value of figures than one which suggests no more than a crowd which is under no control. The picture called *Work*, by MADOX BROWN, which belongs to the Manchester Corporation, and by many people is considered to be the artist's best work, is one example of the latter

class. The artist found that five, closely-printed pages from his pen were required to explain its meaning. Primarily it is a representation of a few navvies digging a trench for pipes at Hampstead. But HOMER's "Shield of Achilles" was hardly more of a reflection of the universe. In the ancient work the different scenes were kept apart. In the picture all are heaped together. CARLYLE is seen expounding in angry mood some theory to the Rev. F. D. MAURICE. Nobody listens to them, for wisdom is neglected. A member of Parliament having 15,000*l.* a year and a pack of hounds, who is riding, finds he cannot jump over the trench and the crowds. His daughter says to him, "We must go back, papa, round the other way." Pride has thus to succumb to necessity and municipal needs. A policeman observes a fruit-seller resting her oranges on a post and knocks them over the road. The administration of justice in England is in that symbolised. "Sandwich men", with election petitions announce that a maker of sausages is seeking later to enter Parliament—an indication of another English weakness. The man with a beer-tray is not merely a representative of an English need, but of "town pluck and energy contrasted with country thews and sinews." His black eye proves him to be a hero, for he must have received it "in an encounter with some huge ruffian whom he has conquered in fight and hurled out through the swing doors of the palace of gin prone on the pavement." The Flamstead Institute in the background is a satire on English science, for there Professor SNOOX is to deliver that lecture on the "Habits of the Domestic Cat," which has excited the contempt of the cats on the roof. A ragged man who sells wild flowers typifies those who were never taught to work, and is contrasted with a group of rich folk who have no need to work, and who are accompanied by a porter who bears "the pastry-cook's tray, the symbol of superfluity." There is one lady who distributes tracts and who it appears would be the better by the study of tracts containing navvies' ideas, and another lady whose business is to dress and look beautiful for our benefit. Motherless children, "a stoic from the Emerald Isle," an old sailor, young peasants in search of work, and various other representative men, women and children are to be discovered in this microcosmic picture.

The work is evidence of MADOX BROWN's belief in his mission. He could not suppose he was endowed with so much power for so humble an office as to paint figures which would give pleasure to all who looked on them. His notion of art was more exalted; it was to be a teacher of ethics and other sublimities, and accordingly he spared no toil in order to make his canvases as impressive as sermons or tracts. MADOX BROWN must often have felt he was a sort of Precursor, for if his voice could not be heard in the wilderness of London he was at least able to suggest to all who had eyes to see which was the narrow and which the broad way. The painter was inspired by the true Puritan spirit, and if he had lived two centuries earlier he would have gained the favour of CROMWELL, and be allowed to practise his art without restriction. His admiration of the Protector is suggested by the *Cromwell on his Farm*, in which the member for Huntingdon is supposed to be raised to a state of trance by the sight of a heap of weeds which two of his labourers are burning, and *Cromwell, Protector of the Vaudois*, where he is shown dictating the despatch to the most serene and potent Prince LOUIS, King of France, in favour of the Protestants of Piedmont.

MADOX BROWN was as conscientious in execution as in choice of a subject. The purchasers of his pictures would be amazed if they knew how many hours were occupied with the smallest of his works. In some of his early pictures, such as *Parisina's Sleep* and the heads after FRANK HALS and REMBRANDT, he painted boldly; but afterwards he adopted a method which was more gratifying to his over-sensitive conscience than advantageous to his art. He employed the finest pencils, and with them he laboured on flesh and costume as if he were a line engraver. The stuff of which Eastern garments are sometimes made was not unfitly represented by such a multitude of very narrow stripes, and it must be allowed that the flesh tints are often successful, although the outer surface, being made up of lines, might be the work of a machine, but the method was fatal to breadth of effect. The extent of the labour he imposed on himself is indicated by his description



of how he painted the small picture, *The Last of England*:—"To insure the peculiar look of *light all round* which objects have on a dull day at sea, it was painted for the most part in the open air on dull days, and the flesh was painted on cold days. Absolutely without regard to the art of any period or country I have tried to render this scene as it would appear. The minuteness of detail which would be visible under such conditions of broad daylight I have thought necessary to imitate, as bringing the pathos of the subject more home to the beholder." It did not strike MADOX BROWN that a painter can be preoccupied with "minuteness of detail" until he sacrifices more essential qualities to it. His painstaking is further seen in his costumes and details. The pictures in the Manchester Town Hall, of which there are reduced copies in the Grafton Gallery, show almost an excess of archæology. Without an explanation, what ordinary visitor to the hall would understand one part of the *Romans building Manchester*, of which the painter says:—"The general's wife, with her little boy, has stepped out of her cathedra, or litter, to take the air on the half-finished ramparts. She wears a fur cloak hooded for the cold, and on her hands are muffles. Her naturally black hair is represented as dyed yellow, her eyebrows remaining black, to indicate the luxury of Roman living, even in a camp. Her little son, who is attired in soldier's uniform and 'caliga' (boots) is mischievously aiming a kick at one of his mother's Nubian slave chair-bearers. The interior of the camp with the Roman four-square tents is to be seen behind the group."

His anxiety to be exact is further exemplified in the scenes from "King Lear." The period of the tragedy is as uncertain as that described by OSSIAN. The late E. W. GODWIN, who gave much attention to the subject, maintained that "the Early Celtic period, or a time at least from 100 B.C. to 400 B.C. is best fitted for the story. MADOX BROWN endeavoured to surmount the difficulty of defining a date for scenes which are "British nominally, Mediæval by external customs and habits, and again savage and remote by the moral side." The costumes might therefore be Roman, British or Mediæval, "but I have rather chosen," he adds, "to be in harmony with the mental characteristics of SHAKESPEARE'S work, and have therefore adopted the costume prevalent in Europe about the sixth century, when paganism was still rife and deeds were at their darkest." He apologises for introducing a fragment of the Bayeux tapestry in one of the scenes because it is an anachronism, his excuse being that it represented a hawking-scene and suggested a contrast with the exhausted LEAR. MADOX BROWN'S cartoon of *Ehud and Eglon, King of Moab*, which was prepared for a woodcut in a cheap bible, was no less a subject of earnest study. He derived the costume from Assyrian and Egyptian remains. EGLON as a Moabite he concluded would be dressed as an Assyrian, EHUD being an Israelite as an Egyptian, because his people had come from that country. And he opposed the French theory, according to which the Semitic races have not changed their character or costume from the earliest ages, a theory which he points out came suspiciously into vogue in France at the time of the conquest of Algiers.

MADOX BROWN'S pictures are, therefore, of the nature of puzzles to all who are not prepared to spend days in front of them and make efforts to decipher their meaning. It was wrong to refuse admission to any of them in the Royal Academy, but visitors to the exhibitions are not disposed for serious studies and expect to be able to "do" the galleries at a gallop. The whole meaning of a picture must be seized at a glance, and for works which retard the customary progress few would be grateful to the Academicians. MADOX BROWN lived in the hope that he was to find earnest gazers, who, taking their pleasures sadly, would be willing to devote time to the study of his pictures. There are few works in the Grafton Gallery which do not supply men and women of that sort with materials for thinking. His was one of the agglomerating spirits that cannot be contented with old fashions in literature and art, and endeavour to impart an encyclopædical character to trifles. MADOX BROWN could not introduce a couple of figures in a view of London from Hampstead without suggesting that as only in England and America a pair of the kind would be allowed out, therefore we are "true

inheritors from the Norsemen" of Iceland, whose ladies would take horse and ride for three months about the island without so much as a presumptuous question on their return from the much tolerating husbands of the period."

So ample a collection of MADOX BROWN'S works as is found in the Grafton Gallery was not heretofore seen, and probably may never be again seen. It deserves to be visited. Varied as are English artists, it is rarely that a man so peculiarly endowed as MADOX BROWN is found among them. To accomplish similar work not only exceptional ability is needed, but also a spirit of self-sacrifice which will encourage the endurance of privations rather than comply with the whims of fashion. He once entered the lists against his contemporaries, when he produced a cartoon of *The Spirit of Justice*, and another of *Harold*, in the competition for the adornment of the Houses of Parliament in 1845. But subsequently he realised he was not destined to please the crowd, and he followed his own inclinations with only a pardonable jealousy of those who, with no greater ability, easily won fame and fortune. The directors of the Grafton Gallery may claim to be the first body of men who have acted in the belief that so much labour and self-denial did not end in failure.

MADOX BROWN tried to express his thoughts in many different ways, and it may be he was not always equally clear. We can see some of the efforts of his student's days when he believed in DELACROIX and WAPPERS. Then we have the brilliant attempt to make a popular but decorative work, the sketch of *Chaucer at the Court of Edward III.*, which is Gothic by its arrangement as a triptych, and also enables the introduction of SHAKESPEARE, SPENCER and MILTON, POPE, BURNS and BYRON as descendants of the early poet. The failure to gain a space to decorate in BARRY'S building was followed by another effort to illustrate a theme in which his archæological tendencies would be shown, the scenes from "King Lear." Many another trial was made without attracting the attention of the buyers of pictures. The majority of his works were doomed to remain on his hands and to be touched up or altered as time went on. *Oure Ladye of Good Children*, which is Italian in spirit, was executed in black chalk in 1847, and the colour was added in 1861. *Wickliffe reading his Translation of the Bible* was painted in 1848 and retouched in 1861. *Byron and Mary Chaworth* occupied him at intervals during twenty years, and never got beyond a portrait study. The painter did not confine himself to works in oil. He drew cartoons for stained-glass, painted panels for furniture (as in the remarkable cabinet designed by Mr. J. P. SEDDON), and was ready to utilise his skill as an artist in any worthy form. He painted several portraits, and in the case of SHAKESPEARE collated various portraits in order to "supply the want of a credible likeness of our national poet, as a historian recasts some tale told long since by old chroniclers in many fragments." Yet all this striving was not cheered by much success. If MADOX BROWN did not feel he was bound to be true to himself, regardless of long years of neglect, he must have succumbed at an early period of his career. It is too late to make compensation, but at least we can render him the tribute of studying and discussing the works which were produced under conditions that were enough to daunt the bravest man.

## BUILDING LEASES UNDER THE SETTLED LAND ACTS.

BY A BARRISTER.

ALL persons who are not under any legal disability may make building contracts, and may grant building leases for such terms, and subject to such conditions and restrictions as are not inconsistent with the nature and quantity of the estates which they possess. There are some persons, however, who may only grant building leases subject to certain statutory restrictions and rules of law.

In carrying out a building scheme, the builder has sometimes occasion to mortgage the property. A tenant under a lease from the builder made prior to the mortgage cannot be turned out of possession (otherwise than by virtue of non-performance of covenants) by the mortgagee,



who is only the assignee of the reversion, with no other rights than those exercisable by the mortgagor. But the mortgagor, upon giving notice of his mortgage, is entitled as well to rent which has fallen due since the mortgage and remains unpaid, as to rent accruing due after notice. The Conveyancing and Law of Property Act, 1881, provides that a mortgagor of land while in possession, as against every incumbrancer, and a mortgagee while in possession, as against all prior incumbrancers, if any, and as against the mortgagor, shall have, by virtue of that Act, power to make from time to time a building lease of the mortgaged land, for any term not exceeding ninety-nine years. Every such building lease is to be made in consideration of the lessee, or some person by whose direction the lease is granted, having erected or agreeing to erect within not more than five years from the date of the lease, buildings, new or additional, or having improved or repaired buildings within that time, or having executed or agreeing to execute within that time on the land leased an improvement for or in connection with building purposes. In any such building lease, a peppercorn rent, or a nominal or other rent less than the rent ultimately payable may be made payable for the first five years, or any less part of the term. This section of the Act of 1881 (sec. 18) applies only if, and as far as, a contrary intention is not expressed by the mortgagor and mortgagee in the mortgage deed, or otherwise in writing, and has effect subject to the terms of the mortgage deed, or of any such writing, and to the provisions therein contained. All such building leases must be made in accordance with the conditions provided by the Act. If any restriction is to be placed on the power of the mortgagor to lease under the 18th section, it should at most extend to prevent him from granting leases without the consent in writing of the mortgagee.

By the provisions of the Settled Land Act, 1882, wide powers are given to a tenant for life, and with the exception of section 60, as to an infant, the management is taken entirely out of the hands of the trustees and placed in those of the tenant for life.

The general regulations respecting leases under this Act are as follows:—

1. Every lease is to be by deed, and to take effect in possession not later than twelve months after its date. But by the Settled Land Act, 1890, however, a lease for a term not exceeding three years may be by writing only and need not be by deed.

2. Every lease shall reserve the best rent that can reasonably be obtained, regard being had to any fine taken and to any money laid out or to be laid out for the benefit of the settled land, and generally to the circumstances of the case.

3. Every lease shall contain a covenant by the lessee for payment of the rent, and a condition of re-entry on the rent not being paid within a time therein specified not exceeding thirty days.

4. A counterpart of every lease shall be executed by the lessee and delivered to the tenant for life, of which execution and delivery the execution of the lease by the tenant for life shall be sufficient evidence.

5. A statement contained in a lease or in an endorsement thereon, signed by the tenant for life, respecting any matter of fact or of calculation under this Act in relation to the lease shall, in favour of the lessee and of those claiming under him, be sufficient evidence of the matter stated.

Every building lease must be made partly in consideration of the lessee or some person by whose direction the lease is granted, or some other person, having erected, or agreeing to erect buildings, new or additional, or having improved or repaired, or agreeing to improve or repair, buildings, or having executed or agreeing to execute on the land leased an improvement authorised by the Act, for or in connection with building purposes. A peppercorn rent or a nominal or other rent may be made payable for the first five years, or any less part of the term. Where the land is contracted to be leased in lots, the entire amount of rent to be ultimately payable may be apportioned among the lots in any manner, save that (1) The annual rent reserved by any lease is not to be less than 10s.; and (2) the total amount of the rents reserved on all leases for

the time being granted is not to be less than the total amount of the rents which, in order that the leases may be in conformity with this Act, ought to be reserved in respect of the whole land for the time being leased; and (3) the rent reserved by any lease is not to exceed one-fifth part of the full annual value of the land comprised in that lease with the buildings thereon when completed. These provisions remove the liability of each lot to bear the risk of breaches of the covenants attaching to other lots, and there will now be no difficulty in laying out an estate by means of building leases, and the several leases will be rendered more valuable.

Where it is shown to the Court with respect to the district in which any settled land is situate, either (i.) That it is the custom for land therein to be leased or granted for building purposes for a longer term or on other conditions than the term or conditions specified in that behalf in this Act or in perpetuity; or (ii.) that it is difficult to make leases or grants for building purposes of land therein, except for a longer term or on other conditions than the term and conditions in that behalf in this Act, or except in perpetuity, the Court may, if it thinks fit, authorise generally the tenant for life to make from time to time leases or grants of or affecting the settled land in that district, for any term or in perpetuity, at fee farm or other rents, secured by condition of re-entry or otherwise.

The chief building improvements authorised by the Settled Land Act, 1882, are the making or execution on, or in connection with and for the benefit of settled land, of any of the following works, and any operation incident to the execution of any of those works viz. (1) Drainage, including the straightening, widening or deepening of drains, streams and water-courses; (2) farm roads, private roads, roads or streets in villages or towns; (3) cottages for labourers, farm servants and artisans employed on the settled land or not; (4) farmhouses, offices and outbuildings and other buildings for farm purposes; (5) reservoirs, tanks, watercourses, pipes, wells, ponds, sluices, &c., and other works and machinery for supply and distribution of water for agricultural, manufacturing, or other purposes, or for domestic or other consumption; (6) streets, roads, paths, squares, gardens, or other open spaces for the use gratuitously, or on payment, of the public or of individuals, or for dedication to the public, the same being necessary or proper in connection with the conversion of land into building land; (7) sewers, drains, watercourses, fencing, paving, brickmaking, &c., and other works necessary or proper in connection with any of the objects aforesaid; (8) reconstruction, enlargement, or improvement of any of those works. In proposing a scheme for the execution of improvements, the initiative rests with the tenant for life. The contract for the execution of the improvements is made by the tenant for life. The trustees, acting in conformity with the regulations of the Act, are duly authorised and discharged. The tenant for life must submit the scheme for the approval of the Court, where the capital money to be expended in improvements is in Court; and after it has been approved the Court may make such order or give such directions as it thinks fit. In support of the application, there must be evidence of a report or certificate of the Land Commissioners, or of a competent engineer or practical surveyor to be approved by the Court. Three courses are open where the money is in the hands of trustees:—(1) They may apply to the Land Commissioners for their report or certificate that the work has been properly executed, and that a given amount is properly payable in respect of such work; (2) they may nominate an engineer or surveyor, procure the approval of his nomination either by the Commissioners or by the Court, and then act on his certificate or report; (3) they may apply to the Court for its direction and authority. When the improvements have been executed the tenant for life is subject to the direction of the Land Commissioners, who may make certificates as to maintenance and repairs, &c.

By the Settled Land Act, 1889, any building lease, and any agreement for granting building leases under the Settled Land Act, 1882, may contain an option, to be exercised at any time within an agreed number of years not exceeding ten, for the lessee to purchase the land leased at a price fixed at the time of the making of the lease or



agreement for the lease, such price to be the best which, having regard to the rent reserved, can reasonably be obtained, and to be either a fixed sum of money or such a sum of money as shall be equal to a stated number of years' purchase of the highest rent reserved by the lease or agreement. The price when received shall for all purposes be capital money arising under the Settled Land Act, 1882.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

THE usual fortnightly meeting of the Institute of Architects was held on Monday evening last, Mr. Alexander Graham, vice-president, in the chair.

The minutes of the last meeting were accepted as read.

The Chairman announced that the Council proposed to recommend that, subject to Her Majesty's gracious sanction, the Royal Gold Medal for the current year be presented to Mynheer P. J. H. Cuypers, of Amsterdam, for his works as an architect. Attention was drawn to the photos exhibited on the table representative of some of Mynheer Cuypers's buildings. His practice extended for over fifty years, and his works are to be found in all parts of Holland.

Arrangements were made for a party of thirty to visit Peterborough Cathedral to-morrow. The Council, however, passed the following resolution at the meeting of January 18:—"That the Council, having fully considered the matter of the restoration of the west front of Peterborough Cathedral, are of opinion that it would be inexpedient for the Institute to take any public action therein."

### The Sculptors' Architecture of the Renaissance.

Mr. Alfred Gilbert, R.A., said his remarks were meant to convey only suggestions. The subject of his lecture would appear to promise a critical view, but it seemed to him that this should be rather entertained by discussion.

Could those great men of the Renaissance hear all that might be said at that meeting they would be filled with wonder and delight at the pains they had inspired in us to reduce to theory the origin of their aims. There might be yet some concern at the thought that their most cherished gifts to us had been made out, explained and proclaimed to the world. In the days when those great men lived art was young in her rebirth. It was not an age of assertion but of endeavour, yet not tentative, but as decided as the handwriting on the wall. Therefore it held us, enchanted us, and allured us to inquiry. Surely we recognised in certain works the handicraft of certain individuals, the distinct work of a class of individuals who, though cunning with their tools, were yet not too friendly with the tee-square and set-square of modern days. That the results of their labours under such conditions should prove so splendid as to create in us a desire to study their methods was refreshing, not to say restful in these days of hurry.

Sculptor-architects, architect-sculptors: what was the difference? And yet there was a difference. Add the magic word Renaissance and the query was answered. The sculptor-architect of that period still survived, but the architect-sculptor—well, his existence was not really matter for their inquiry. He probably did exist, despite the fact that his efforts form less of a phenomenon than those of his brother craftsman. How came this so-called sculptor-architect into existence? At this period, despite a desire to create a national architecture, there seemed to have been little attempt on the part of architects to realise anything beyond a free revival or imitation of classic models. Examples were not lacking. The sculptors had fewer examples in their art, and indeed, the best they had were Greek or Roman productions. Sources of inspiration were open to all in the study of nature in all her suggestiveness. At that time the architects were hard at work as students of antiquity, whilst the sculptors were yearning, burning, in fact, to create and give to future generations a true impress of their own lives and time. Is it to be wondered at that the sculptor should long for license and liberty and a greater field for his invention, and that he should venture on the accompaniment of his own architecture? Thus greatly enlightened, he was led by his ambition to attempt the creation of the very forms he had been called upon to decorate, to govern instead of being governed. This, to his mind, constituted the real origin of the most remarkable phase of the history of the Renaissance since its inception, spreading as it did throughout Europe, and inspiring such works as were to be found in all the great centres of architecture. Since the influence of it was so great, he ventured to think that if more attention could be paid to the study of this subject much good would accrue and there would be some hope for the next generation. Art is not imitation but creation, and it recognises no specialties. This was realised by the men of the Renaissance, and it is not surprising that the striving to excel should become a passion, and that the ambition to build

palaces to adorn should have taken the place of the former contentment to ornament palaces already built—in fact, that the sculptor should aspire to place his work above the standard of decoration to the master adaptor, and furthermore to work on lines of his own. Thus far he had endeavoured to explain the existence of the phenomenal sculptor-architect, in order that they might more readily follow in the remarks as to his work. He was in no way prepared to hold for it the highest place as directed simply in the erection of edifices. It was rather in the treatment of ornaments that combine with purely architectural forms that he felt inclined to favour the sculptor in his dual capacity. He had been used to design and execute the ornament of buildings in which he had had no hand, and with which doubtless he often entertained no sympathy. He could realise that his ornament meant to his employer so much decoration, while to him it was the expression of an idea. Another qualification must not be overlooked, for it was very marked in the productions of the Renaissance, the period immediately following. It was the training they usually received in the art of the goldsmith. To this, no doubt, must be attributed the extreme freedom and that delicacy of execution, to say nothing of the appreciation of colour and light and shade which characterised their work. With such knowledge and practice of their craft, who can wonder at the result? He wished to emphasise a remark he had made earlier, and that was with regard to the desirability of the study by young architects and sculptors alike of the particular phase of the art of the Renaissance which was under consideration. Such a study could not fail to impress upon them that it was a duty every architect owes to himself, to his art and to his generation, that he should endeavour to place himself beyond a mere imitator, but rather he should go to the root of the flowers and learn to graft on the stem flowers as beautiful as the originals. It is the spirit of the age, not the letter, with which he should commune. He should worship it, and by bending himself to the application of its great influences endeavour to pass on to posterity a legacy further enriched by the print of his own time and individual adornment. Art is a very old republic, and to it had been given the elixir of life—that secret which has been denied to man. It is as young to-day as it was centuries ago. Its existence was at once retrospective and progressive. Its every movement forward is the reflection of past ages. Its every act was a mere reflection. Its future was written in the mystic word tradition—a word which, with its mighty significance, would ever remain to assist art in its onward movement. It was in the spirit and traditions of art's great principles that we must be governed. We can hope to hand on the important legacy we inherited from men who were far more than mere specialists.

The Chairman hoped the very charming lecture, which had only one defect, that it was far too short—they had quality, not quantity—would lead to a lengthy discussion.

Mr. Alma-Tadema, R.A., considered the remarks most interesting and full of theories of the highest aim which had made him dream of the beauties of the Renaissance and the revival of the antique, without disturbing their general admiration of the beautiful things in the light of which they were daily feasting and from which they daily profited in their art. He said he felt very proud in proposing a vote of thanks to Mr. Gilbert.

Mr. J. M. Brydon thought they had arrived at some progress when such a subject as the Renaissance was discussed by the Institute. It was only a few years ago when Renaissance work was considered a thing to be scouted by purists. But they ought to have looked on it with lenient eyes as something that came after Gothic. There were one or two names which stood out as sculptor-architects, such as Michel Angelo and Sansovino. The former was not the greatest of the Renaissance men, but he looked upon architecture from the decorative point of view. The characteristic of his work was decorative. Referring to the staircase of the Laurentian Library, Mr. Brydon thought the steps were most sumptuous, although they were not quite as Michel Angelo left them. Another one of the things he did was to save the façade of the Farnese Palace at Rome. When Michel Angelo was called in after Sangallo's death, he designed the magnificent cornice which saved the building from being commonplace, and brought the whole structure into harmony. It was constructive as well as decorative work, and he clothed it with beauty. It was to be hoped they were getting back to the day when sculptors and architects would not feel a building was great unless they worked together. He desired to join heartily in the vote of thanks, and had pleasure in seconding it.

Mr. Beresford Pite said some of them regarded Mr. Gilbert in a peculiar light with regard to this subject, and the very person to put them right in their views. The architect suffered from a complaint with which the sculptor was not afflicted. The architect was fettered by facts, lines, orders, plans and by constructive circumstances. He could not get free of his traditions. The sculptor suffered from a loss of these afflictions. He had to create an ideal out of nothing. As archi-



jects could they not take up with zeal the sculptors' tools and work with them? As a record of beautiful building, which could not be attributed to any one school, he thought the Science School at Kensington, by Alfred Stevens, was most interesting.

Mr. H. L. Florence was struck by the great analogy of the architecture and sculpture of the Renaissance. In the early days the lines of the sculpture were purely architectural, but in later times there was a period which deteriorated. Bernini was a great artist in a florid way, but he was the commencement of a period which led to degeneration.

The Chairman considered the great fault of the work of modern times was that one knew exactly where the architect left off and where the sculptor came in. The London University building in Burlington Gardens was a fair example of such a structure which had been carried out as originally designed.

Mr. Gilbert, in reply, thought it would have been better had a second thought been entertained with regard to the construction of the London University. The very essence and training of a sculptor was more with the sense of imbuing than with the idea of constructing. The structure of the building was contained in very little. It was the sculptor's task to master construction; whereas the architect had, so to speak, a log-book to fall back upon. The sculptor had no book, where it was worked out for him; he had only one principle—plumb. The sculptor could begin at the top and work down; but the architect must start from the bottom and work up.

It was announced that the next meeting would be held on February 15, when Mr. H. E. Milner would read a paper on "The Garden in relation to the House."

### CONTINENTAL PAINTING.

AN address was delivered on Saturday last at Stirling by the Earl of Moray at the opening of the exhibition of the Stirling Fine Art Institute. His lordship said he was not a distinguished connoisseur of paintings as was the late Sir William Stirling-Maxwell, who opened their first exhibition, and who was well known as a man of art and genius. He felt he was somewhat out of his element in such a gathering, in such a building, with so many of the citizens of Stirling about and around, and that brilliant display of pictures hanging on the walls; but he would just say a word or two, and hope it would not damp or discourage them in any further exhibition or effort of the kind it might be their intention to carry out. As they were aware, their own country was not the home of painting—they could hardly consider it indigenous—and he would say a word or two about the paintings existing in previous ages, and in other countries than Great Britain. The art of painting stretched far back into the Middle Ages, and even before what they generally called the Middle Ages there was a school of painting in the ancient cities of Greece, and sculpture was also carried out there to a great extent, as well as in Rome and the east of Europe; and it was the good fortune of those who inhabited the countries washed by the Mediterranean Sea to be placed where, from the physical circumstances of those countries, painting had its rise and origin. While on his way to Stirling that afternoon he thought of the contrast between that wintry day in the end of January and those perpetually bright days which the inhabitants of those countries—Italy and Greece—experienced, where the people lived in constant sunshine, and lived all their days, as it were, in the open air. Everything was open, easy and delightful for the encouragement and carrying out of painting, and he thought what a contrast they had here. Yet they saw that even in this country, in their own beloved Scotland, painting had grown and was growing. It was taking a greater hold upon the thoughts and education of the people, and that was in a considerable degree due to the excellent facilities that now existed for travelling from this to other countries, and seeing the works of the great masters. Many a family now went abroad for two or three weeks at this time, who would not have gone thirty or forty years ago. After getting the new year over, and settling up their accounts, they went away to the south of France—to Cannes, or perhaps Genoa or Florence, where there had been distinguished schools of painters, whose works remained to testify to the results they attained, and the position they occupied in their own country. Owing to the improved facilities for travel, the people of our own day and generation have been brought into closer contact with those works of art. They could go out there and make purchases, or bring back sketches or reproductions in the shape of photographs of those pictures and scenes they visited, and show to their friends the works of the Italian, the Dutch or the Flemish schools. Some people had a taste for one kind of pictures and some for another. One could go over to Holland and see some of the galleries of The Hague and Amsterdam and the Dutch and Flemish schools, where they found such works as those of Rembrandt and Franz Hals and men of their time and type. The pictures of that age

were very striking and were always included in the galleries of large cities. The growth of painting had gone steadily on, and all the paintings they saw round these walls were the works of modern artists. This country, they could not but admit, was well adapted for the education, upbringing and perfecting of the works of those who painted in oils and water-colours such beautiful and interesting specimens of scenery as were within the reach of Stirling. He had the pleasure of a look round the galleries before the proceedings began, and he could not but congratulate them on the splendid exhibition he had now the pleasure of declaring open. He hoped the result would be encouraging to the Association, and that they would have many such exhibitions in the future.

### GERMAN GOTHIC ARCHITECTURE.

A LECTURE was delivered by Professor Meissner, Ph.D., at the Belfast Art Society, upon "German Gothic Architecture of the Fourteenth Century." German architecture of the fourteenth century owed, he said, some of its character to the rivalry which existed amongst builders of churches with regard to the towers. The position of the architect and the peculiar circumstances of his calling differed from those of the painter, the sculptor, or the musician, for the latter were able to proceed at once with the work which had been conceived in their minds without incurring anything beyond nominal preliminary expenditure, whereas the architect required an almost unlimited supply of money before commencing operations. He was also handicapped by other circumstances—for instance, the place where the building was to be put, the surroundings, &c. The almost general use of brick in connection with German architecture was explained by the fact that the whole of the lowlands of the country produced no stone, consequently the other material was brought into requisition. It had also been found much more easy to construct the arch with brick than with stone. They might go throughout the length and breadth of Northern Germany and find nothing but brick churches, and they would not find a single church with a wooden roof; while, on the other hand, in many districts in England they found where stone was plentiful Gothic churches were built with wooden roofs. The Professor went on to allude to the use of brick in the North of Ireland, mentioning that a great deal might be done with a very slight outlay to make the buildings more ornamental and artistically beautiful. The lecturer next described the great cathedral at Cologne, which he said had always been looked upon as the St. Peter's of Germany. The original plans of the cathedral were lost, and after the building of the old cathedral in 1248 the present cathedral was begun and was only finished in 1880, so that 532 years were spent in the erection of this edifice. Between 1820 and 1825 a great enthusiasm spread throughout Germany in the direction of having the cathedral completed, and for that purpose collections were made throughout the country. Not only were these collections supported by Christians but were also liberally contributed to by the Jews. Having detailed the interesting story of the discovery of the plans and other details in connection with the carrying out of this immense undertaking, he stated that the original idea had been that the design was the product of one brain; in other words, that it had proceeded from one genius, as Minerva sprang from the head of Jupiter. But recent investigations had shown that three, if not four, architects had to do with the plans which had been followed in the building of the cathedral, which (as he had already suggested) was the great national temple of Germany.

Mr. William Gray expressed his agreement with the suggestion made by Professor Meissner as to the desirability of their relieving the monotony, if not the positive ugliness, of the brick buildings in Belfast. He hoped the result of that suggestion which he had thrown out would be that they would see an improvement effected in this direction in connection with local buildings.

### THE BOADICEA GROUP.

IN December last the London County Council received an offer from Mr. W. J. Bull, one of the members, to defray a portion of the expense of casting a model of a group of Boadicea by the late Mr. Thornycroft and erecting it in London conditional upon the Council contributing not more than 1,000*l.* The Council, having no power to incur expenditure for such a purpose, passed a resolution instructing the parliamentary committee to take the necessary steps for a clause to be inserted in one of the Council's Bills, empowering the Council to purchase or contribute towards the cost of purchasing, or incur expense in connection with the provision and erection of works of art in London. The general purposes committee now report that a further letter has been received from Mr. Bull to the effect that the Boadicea fund committee are anxious to have the statue erected this year, and that Mr. J. I. Thornycroft, the son of the



sculptor, who has offered to present the group to the Council will give an order at once for the casting of the model and pay the money as and when required, he relying upon the Council to repay him if and when it obtains Parliamentary powers, or upon further subscriptions being secured, or finally standing to any eventual loss if the Council does not contribute. The committee, while thinking this a generous offer on the part of Mr. Thornycroft, consider that, as in the ordinary course the necessary power for the Council could not be obtained for eighteen months, it would be inexpedient for the Council to accept at the present time any liability whatever in the matter. They accordingly recommend the Council to pass a resolution asking Mr. Bull to convey to Mr. Thornycroft the thanks of the Council for his liberal offer in connection with the Boadicea statuary group, but at the same time to inform him that the Council was not in the position to contribute towards the cost of casting the model of the group or to bind itself to do so later should Parliamentary power be given for the purpose, and that, while the Council would proceed to promote the Bill, it must be understood that any steps which Mr. Thornycroft might take in the matter were entirely on his own responsibility.

### THE LISKEARD TOWER COMPETITION.

A MEETING of the church tower committee was held in the vestry of the parish church, Liskeard, on January 29, when reports on the competition plans of the tower and a supplementary report as to the condition of the tower were presented by Mr. Edmund Sedding, of Plymouth. That gentleman stated that of twenty-five sets submitted he had selected three for final consideration, and had come to the conclusion that the set submitted by Moorstone (there were two sets with the same motto) be adopted. His decision referred to the design which incorporated the interesting old features of the present tower, and also showed a south vestry (No. 20). The design with the motto Trecarrel he had accorded second place (No. 19). Of the total number of designs submitted he considered that several were worthy of merit.

In Arte et Manu, No. 4.—Design good, but too modern for an adjunct to an old church.

A. C. H., No. 8.—Exhibits some knowledge of Cornish work, but out of keeping with Liskeard Church.

A. K. B., No. 9.—Shows evident appreciation of old work.

Ready, aye, Ready, No. 12.—Would have been placed higher, but the design is marred by the large middle window.

Design in beauty, build in truth, No. 14.—Has somewhat grasped the Cornish character, but his heavy pinnacles are out of keeping altogether.

Design in beauty, build in truth, No. 15.—Clever design, but too conventional as an adjunct to an old Cornish church.

Moorstone, No. 16.—Able design, with Somersetshire feeling.

Resurgam, No. 17.—Shows careful conservative feeling, but the tower is too squat; it resembles the old Essex work.

Trecarrel, No. 19.—A very pleasing design, which, but for the costly enrichment and the narthex in front of the west doors, might have won first place.

Moorstone, No. 20.—Placed first (under conditions).

Mr. Sedding recommended the adoption of a compromise between Moorstone's main design and his alternative scheme; that the height should not exceed 80 feet; that all the old features of the present tower be reused, of course including the old tower arch—in short, that a scheme of rebuilding be aimed at rather than a demolition of the existing structure. There were many parts of the old fabric that might well be utilised for the new building that it would be unwise to discard, if only for the archaeological interest that they afforded, for it would be a lasting discredit to the town were they suffered to be destroyed. He referred to much of the old stonework that might be utilised for outside facing, with some weatherings and other moulded work, placing all the old at the lower part of the tower. This would help the committee in the cost and materially add to the interest of the new structure. The successful competitor should be restricted to these conditions, or an interesting old landmark would entirely vanish.

The first premium was obtained by Mr. John Sansom, of Liskeard (Moorstone); and the second by Mr. H. P. Burke-Downing, of Great College Street, Westminster.

On January 29 Mr. Sedding informed the committee that he had carefully examined the existing structure. The gaping cracks through which a hand might be thrust, although so apparent on the inside, were far less discernible on the outside, owing no doubt to their having been externally repaired in past times. The tower was rent in various directions by these cracks, apparently in consequence of defective foundations. The fabric dated from the twelfth century, but had been altered from time to time. The interesting arch was, in his opinion, of two dates, the responds being the original Norman, their leaning lines being a corroboration of that opinion, whereas the arch

was depressed and pointed. This he attributed to some half-century later. Probably this arch was rebuilt, it may be owing to the same mischief as that with which the committee now had to deal. They should, however, notice that the later workmen reintroduced the same old material, redressed, of course, to suit the altered shape of the arch. The twelfth-century windows were now in danger of having their outer facing completely detached from the inner, there being apparently no bond to keep the two facings together. The seventeenth-century mask of granite, with the west door, extended to about one-third of the height, and only half-way, more or less, along the sides of the tower. The battlements were of this date. The height of the tower was 60 feet. There could be no doubt whatever that the present structure was in a precarious condition, and should be promptly prevented from further dislocation, which would cause the fabric to collapse. It was, he understood, the desire of the committee to heighten the tower some 20 feet, as suggested by the successful competitor. This could not be done with safety without strengthening the substructure, which was now unable to support itself. Any methods, far short of rebuilding, would be but temporary, for the tower needed a foundation. Under the circumstances he should not recommend underpinning, for it would be attended with considerable danger. The only alternative—and, in the end, the most conservative method—would be (as Mr. Pearson is doing now at Peterborough) to rebuild, carefully preserving and marking the old materials, so that the present tower might be re-erected as far as it could be done, and new walling stone being in harmony with the old. The seventeenth-century granite facing to be used in the lowest part, with the old plinths. He was quite sure the committee could have no better man than their chosen architect to carry out this most important work, which, if accomplished on the foregoing lines, would be one of the most interesting pieces of conservative craftsmanship executed in this county.

### THE ARTISTS' CORPS.

ON Monday last the regimental prizes of the 20th Middlesex ("Artists") Rifle Volunteers were distributed at the headquarters of the corps in Duke's Road, Euston Road. Among the large number of officers present were Col. Edis, V.D., F.S.A., the commanding officer, Lieut.-Col. Bruce, Majors Horsley, Davidson, Duffield, White and Lamb (the late adjutant), and Capt. Annesley (the present adjutant), Col. Somers Lewis (4th Middlesex), Col. Balfour (London Scottish), Major Neil, of New South Wales, Col. L. Pott (17th Middlesex), Col. Grey (2nd South Middlesex), and Col. Barrington Campbell (Scots Guards), commanding the South London Brigade. Major Davidson presented the annual report, which showed that the regiment had increased in numbers from 741 in 1895 to 818 in 1896. Col. Edis expressed his regret that the Commander-in-Chief, who was to have distributed the prizes, was unable to be present. Lord Wolseley had sent him the following letter:—"War Office, London, S.W.: February 1, 1897. Dear Col. Edis,—It is a real disappointment to me that I am prevented from being the guest of the Artists' Corps this evening. Long confinement to the house has reduced my strength, but I am daily picking up now and hope to be about as usual very shortly. Pray remember me very kindly to all my friends in your battalion, and believe me to be, sincerely yours, WOLSELEY." Mrs. Barrington Campbell handed the prizes to the successful competitors. The Brigadier, in the course of a few remarks, said that, in his opinion, there was no regiment more efficient than the Artists. He hoped the volunteers would soon be provided with better firing ranges.

### NORTHERN ARCHITECTURAL ASSOCIATION

THE seventh annual social gathering and exhibition of sketches of the Students' Sketching Club in connection with the Northern Architectural Association took place on the 26th ult. at the Grand Assembly Rooms, Barras Bridge, Newcastle. Mr. Jos. Oswald occupied the chair, and there was a large attendance. The Chairman during the evening presented the prizes to the successful students in the competitions held during the summer. Mr. S. M. Mould was first for the measured drawings and Mr. B. Procter second, whilst for sketches Mr. H. Raine was first and Mr. S. M. Mould second. An election of members, associates and students resulted in unanimous voting for Mr. H. G. Badenoch and Mr. J. Bruce as members, Mr. S. M. Mould, Mr. R. P. S. Twizell and Mr. G. Brumell as associates, and Mr. C. W. Milburn and Mr. T. C. Weatherall as students. This concluded the business of the meeting, and then the musical programme, which was of a more ambitious character than heretofore, was proceeded with. For the next competitions Mr. Glover has offered two additional prizes for sketches or drawings.



## NOTES AND COMMENTS.

A RETURN has been prepared by the Science and Art Department, but not yet published, which shows how local authorities are devoting the residue obtained under the Act of 1890 as well as the sums derived from local rates to education. It appears that thirty-eight out of the forty-nine county councils in England (excepting the county of Monmouth) are applying the whole of the residue to technical education, and eleven a part of it; and that of the sixty-one councils of the English county boroughs, fifty-four are devoting the whole and seven a part to the same purpose. The councils of thirteen county boroughs, sixty-seven boroughs and 109 urban districts in England are making grants out of the rates under the Technical Instruction Acts. In several cases local authorities are also devoting funds with the same object out of the rate levied under the Public Libraries' Acts. The thirteen county councils and the councils of the three county boroughs in Wales and Monmouth are applying the whole of the residue to intermediate and technical education. Further, the councils of eleven counties and county boroughs and twelve boroughs and urban districts in Wales and Monmouth are making grants out of the rates, and one local authority is devoting part of the public libraries' rate to technical education. The total amount expended on technical education during the year 1894-95 in England and Wales was 697,273*l.* 3*s.*, and the estimated total expenditure during the year 1895-96 was 754,253*l.* 15*s.* 11*d.* In addition, the following sums were raised (by twenty-five local authorities in each year) by loan on the security of the local rate, mainly for the erection of technical and science and art schools, viz. in 1894-95, 119,258*l.* 15*s.* 2*d.*, and in 1895-96, 152,000*l.* 19*s.* 1*d.* The estimated total amount to be devoted annually to intermediate and technical education in Wales and Monmouth is 42,861*l.* The total amount expended on technical education during the year 1894-95 in Scotland was 36,366*l.* 14*s.* 6*d.*, and the estimated total expenditure during 1895-96 was 35,035*l.* 17*s.* 10*d.* In Ireland no part of the residue under the Act of 1870 is allowed to be applied to technical education, and the grants which are doled out by the Science and Art Department are an inadequate compensation. In consequence the expenditure in 1894-95 was only 4,169*l.* 7*s.* 10*d.*, and the estimated expenditure for 1895-96 was 4,218*l.* 3*s.* 10*d.*, or less than an eighth of the amount available in Scotland.

CATALOGUES are not always prized by the uninitiated. For that reason it is right that attention should be drawn to the peculiar value of one by Sir A. W. FRANKS, describing "A Collection of Continental Porcelain," lent by him to the Bethnal Green Museum. The author's knowledge is comparable to his generosity, for Sir A. W. FRANKS appears to have mastered all varieties of connoisseurship and to be able to obtain possession of any sort of treasure he may desire, but he either gives away or lends his most prized specimens. The "Continental porcelain" now described is not his earliest collection and does not entirely consist of the finest specimens, but it is, as he says, "documentary," and is, therefore, of more interest to students and collectors than one more costly. It contains examples of German, Dutch, Danish, Swedish, Russian, Belgian, Swiss, French, Italian, Spanish, Portuguese and Turkish porcelain. Sir A. W. FRANKS gives twenty pages of inventors' marks and fifteen pages of engravings of them. So genial an author could not confine himself to the preparation of lists. It is interesting to learn that a little bust of the Emperor VITELLIVS, produced at Meissen, is declared by some experts to be a portrait of the great potter, J. F. BÖTGER, the creator of porcelain in Saxony. A specimen of Sèvres, although without the official mark, presents a portrait of C. J. Fox, with laudatory verses in English, thus showing the esteem in which the Whig leader was held in France. A Meissen plaque has a copy of JOHN FLAXMAN'S "Apotheosis of Homer." VOLPATO'S name is memorable for unsurpassed engravings in line, but it appears that in 1790 he set up a porcelain factory in Rome. The one specimen possessed by Sir A. W. FRANKS—a pastille burner of white biscuit—once belonged to M. DIGBY WYATT. Among the suggestions for the guidance of collectors is one relating to Meissen porcelain. Pieces made in the factory are decorated outside it by "chambrelans," or chamber-masters.

When the porcelain is sold in the white state a cut is made across the crossed swords, which form the mark of the factory, and if there are considerable defects in the piece two or three cuts are made; where such cuts occur it is certain the decoration was not painted in the royal factory. Considering the limits, it would be difficult to find a safer guide than the catalogue.

THE War Office contemplate the expenditure of large sums on building. The Military Works Bill shows that a further sum of 150,000*l.* is to be devoted to works at the Royal Barracks and Military Hospital, Dublin; besides 165,000*l.* for new cavalry barracks to replace the Island Bridge Barracks in that city; 18,000*l.* is put down for the provision of a military hospital at Edinburgh; 66,000*l.* for the completion of the infantry barracks at Parkhurst; 143,000*l.* for the provision of a central military hospital, Army Service Corps Barracks and married soldiers' quarters on the site of Millbank Prison, London; 66,000*l.* for the reconstruction of the existing barracks for the Royal Horse Artillery and the Royal Artillery at Newbridge; 88,000*l.* for the provision of infantry barracks at Pembroke; 39,000*l.* to complete the reconstruction of the citadel for artillery at Plymouth; 72,000*l.* for the replacement of Winchester barracks, destroyed by fire in 1895; 66,000*l.* for the conversion of the female prison at Woking into barracks for the Royal Artillery; and 20,000*l.* for the replacement of wooden huts at sundry stations. In addition, 150,000*l.* will be assigned to the continuation of replacement of huts in permanent material and provision for lighting the military buildings at Aldershot; 220,000*l.* for similar work at the Curragh, 165,000*l.* for the same purpose at Colchester, and 115,000*l.* at Shorncliffe. Of the 247,000*l.* to be expended on foreign stations for accommodation of increased garrisons and improving barrack accommodation at fortresses, 67,000*l.* is to be spent at Bermuda, 64,000*l.* at Gibraltar, 13,000 at Halifax and 103,000*l.* at Malta. Of the 846,000*l.* intended for the accommodation of increased garrisons and improving barracks accommodation at Imperial coaling stations, 160,000*l.* is for the Cape of Good Hope, 11,000*l.* for Ceylon, 133,000*l.* for Hong Kong, 29,000*l.* for Jamaica, 169,000*l.* for Mauritius, 260,000*l.* for St. Lucia, 25,000*l.* for St. Helena and 59,000*l.* for Sierra Leone. The 5,458,000*l.* proposed by the Bill is to be distributed as follows:—Defence works, 1,120,000*l.*; barracks, including completion of large camps, 2,989,000*l.*; ranges, including accommodation for manœuvring and mobilisation, 1,149,000*l.*; staff and contingencies, 200,000*l.*

WOOD-CARVING is again coming into fashion. The support given to it by county councils and other dispensers of public funds is easily to be understood. The art is one which can retain the humbler classes in their homes, and temperance and allied virtues will, in consequence, be promoted. For humble amateurs who cannot be considered as endowed with much talent for sculpture, Gothic models are more easily imitated than Renaissance, because more aid from geometry is obtainable in determining the outlines. The large plates which are found in "Details of Gothic Wood-carving," by Mr. FRANKLYN A. CRALLAN, late instructor in wood-carving in the Derby Municipal College (published by Mr. BATSFORD), are admirably adapted to serve as models for students of the class we have mentioned, and who have not opportunity to study work in the solid. The examples are selected from fourteenth and fifteenth-century work, and they are represented by shaded chalk drawings with strong outlines of details. All are drawn to scale and are so definite, there is nothing to puzzle a beginner. There is still a sufficient demand for Gothic furniture to reward a student who can reproduce geometrical patterns, and a copy of Mr. CRALLAN'S examples would be likely to become a profitable investment for an industrious workman.

## ILLUSTRATIONS.

ELY CATHEDRAL.—GENERAL VIEW OF CHOIR.

ELY CATHEDRAL.—CHOIR FROM OCTAGON.

THE LIBRARY.—HALTON, HERTS.

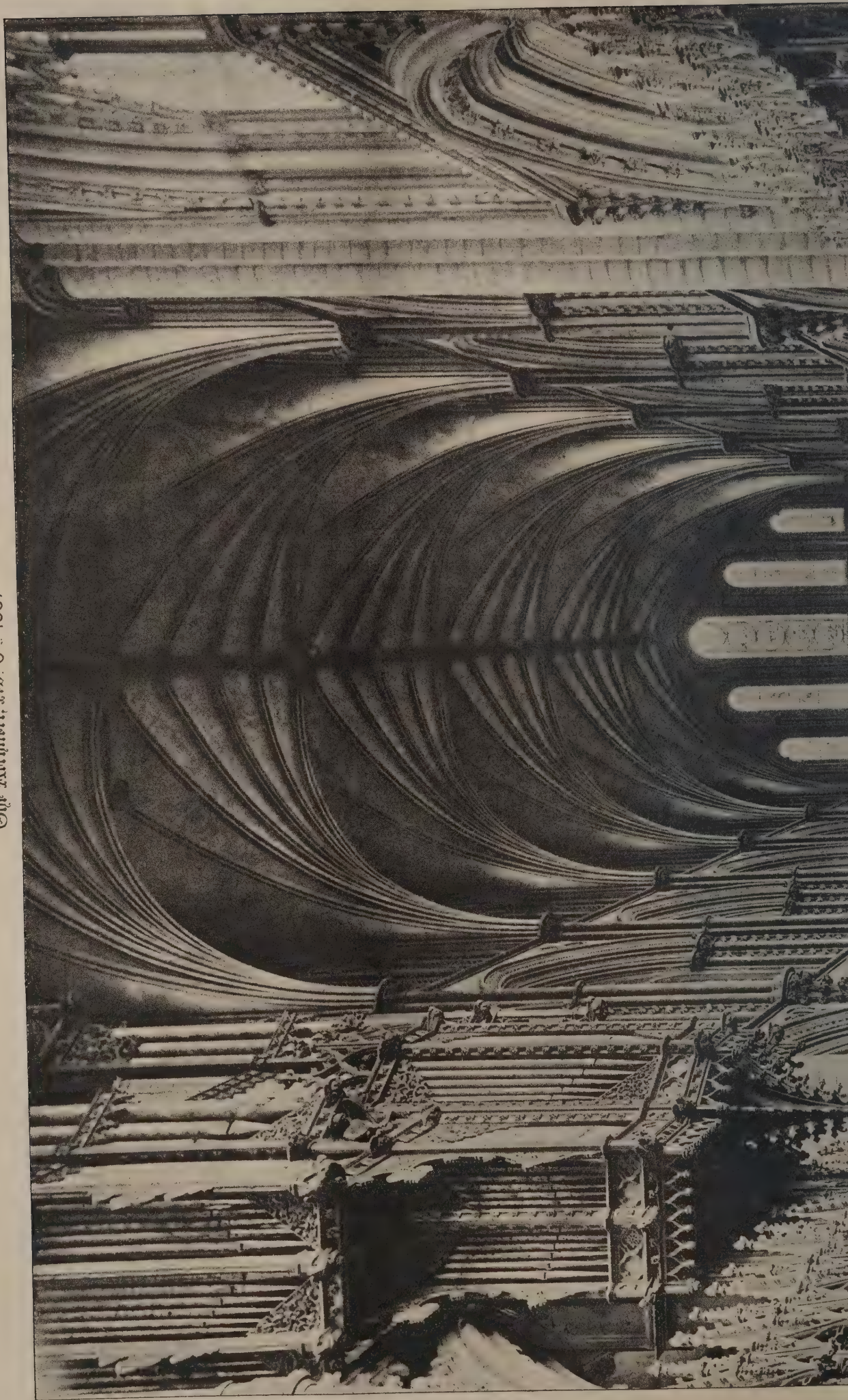
GARDEN ENTRANCE.—HALTON, HERTS.



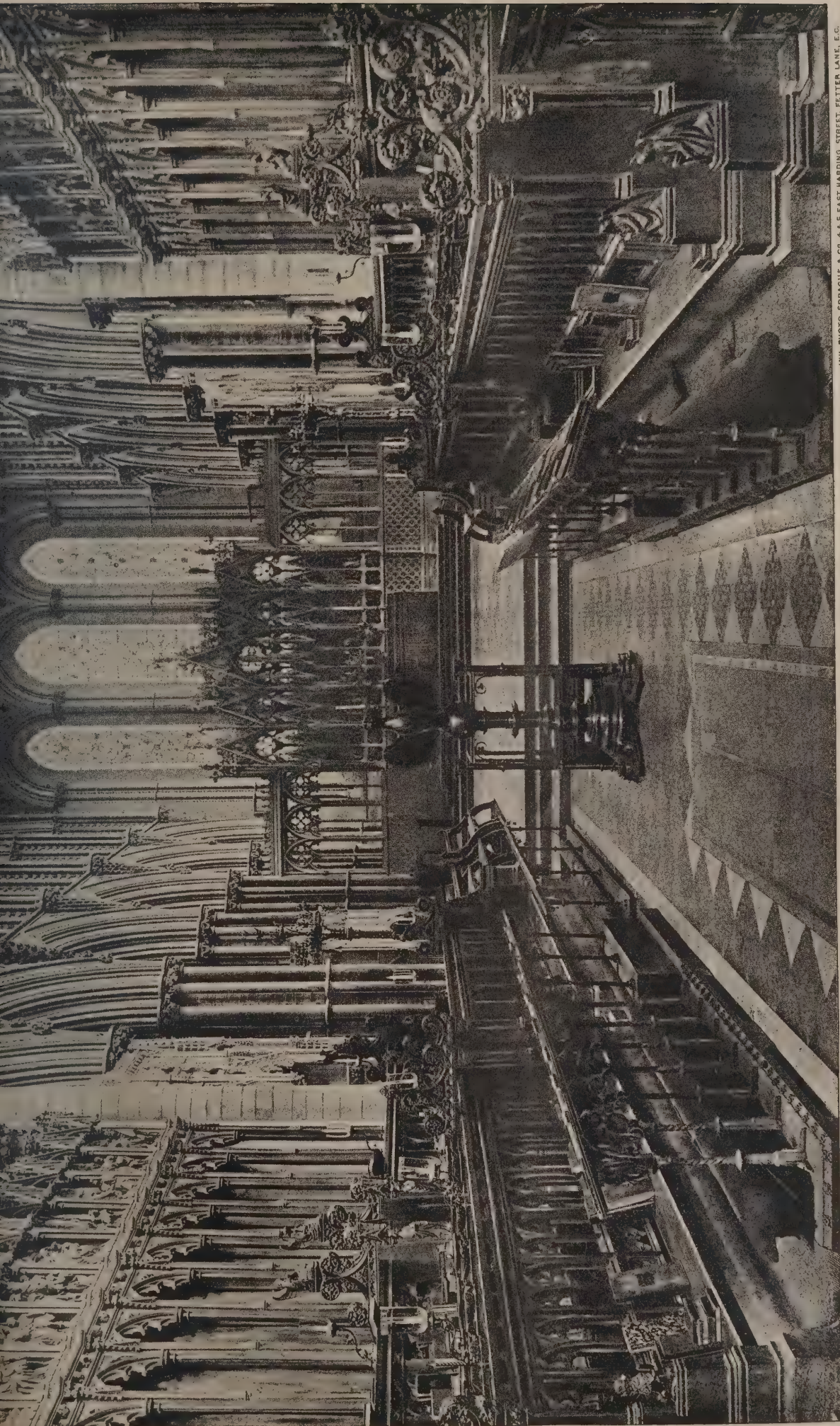




The Architect, Feb. 5<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO

INK- PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 9.—ELY: GENERAL VIEW OF CHOIR.

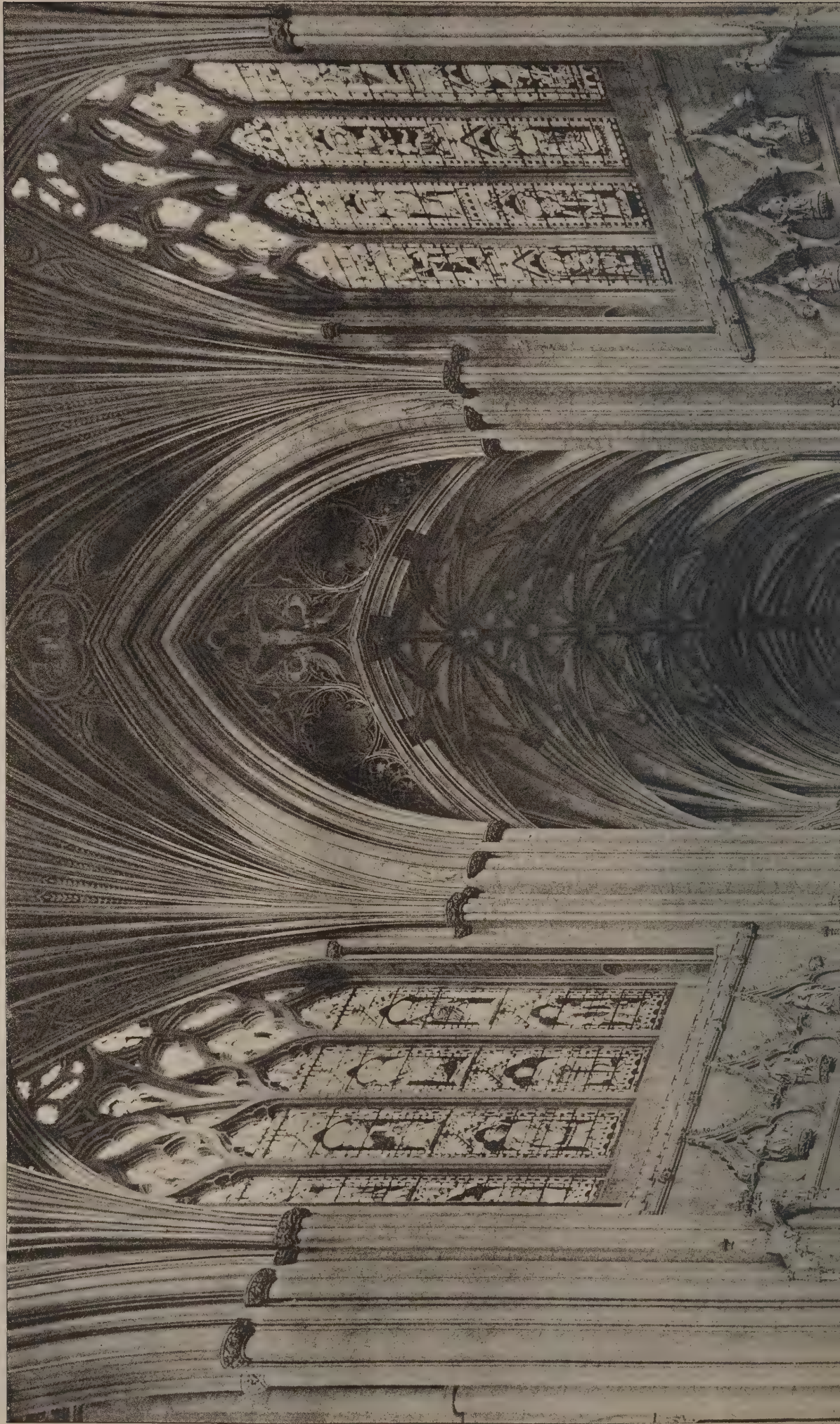
















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CATHEDRAL SERIES, No. 10.—ELY: CHOIR FROM OCTAGON.











The Architect, Feb. 5<sup>th</sup> 1897







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THE LIBRARY: "HALTON," HERTS.  
THE SEAT OF ALFRED DE ROTHSCHILD, ESQ.



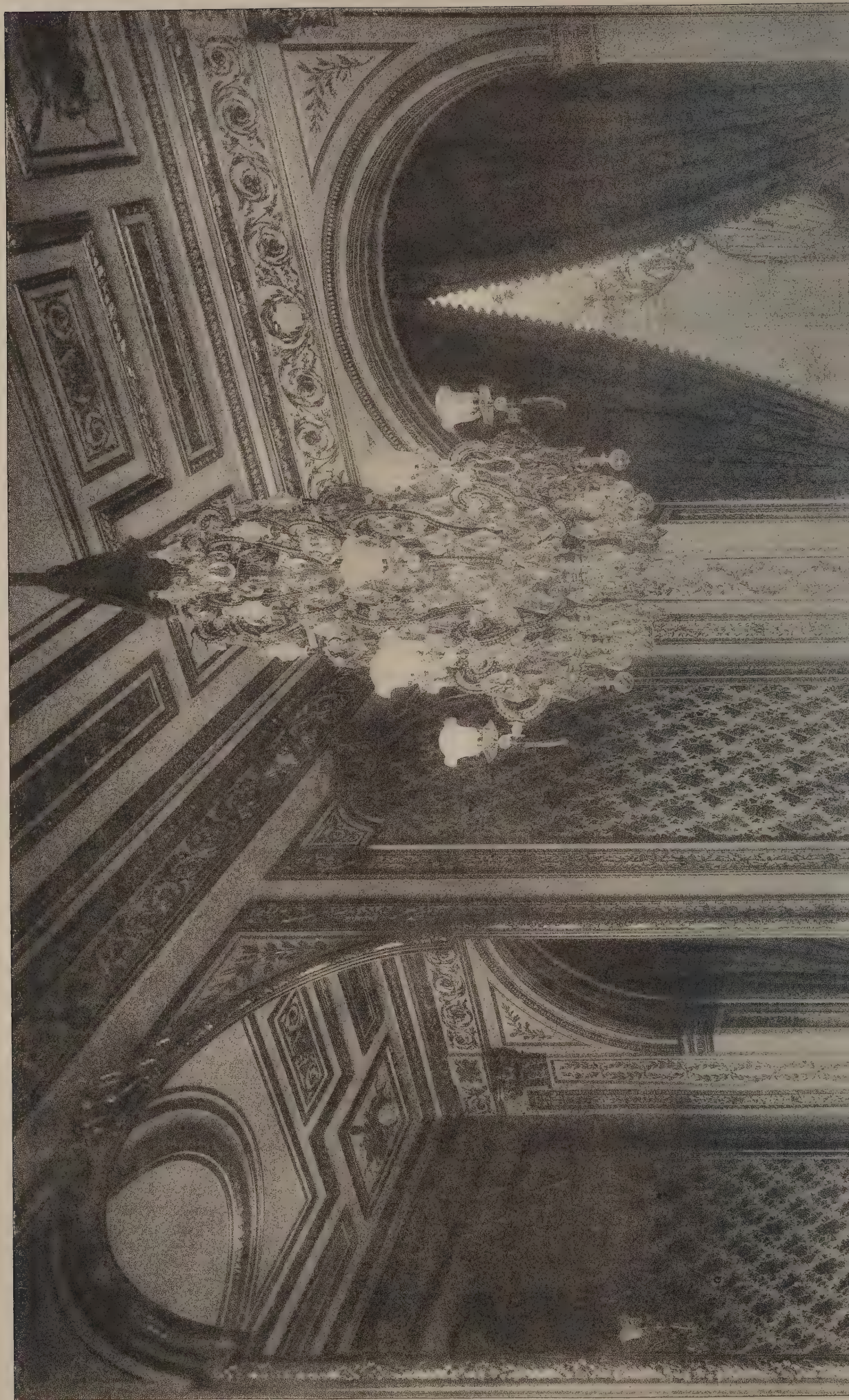








Die Architektur, Feb. 5<sup>te</sup> 1897.







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GARDEN ENTRANCE: "HALTON," HERTS.  
THE SEAT OF ALFRED DE ROTHSCHILD, ESQ.







## ELY CATHEDRAL.—II.

*Transition Period.*

MEANWHILE, however, a great change was coming over the prevalent architecture. We see it foreshadowed by the greater richness of this western transept (in its lower storeys); we see it carried on in the highly refined Norman work of the beautiful ruined infirmary, but these are still Romanesque and round arched. By the time, however, that Bishop Ridel undertook the completion of "the new work towards the west," the change had proceeded much further and the Pointed arch, with many of its accompanying details, had been introduced.

Bishop Ridel held the see from 1169 to 1189, a space of time comprehending nearly the whole period of this great architectural transition in England. In France the movement had commenced earlier, as we see from Abbot Suger's work, both at the east and west ends of his church at St. Denis, and from the contemporary work in the west front at Chartres—all dating from about the middle of the century. In England we find it foreshadowed from about the same time at St. Cross and in many other works, but the change was rendered more definite by the appointment of William of Sens, in 1175, as the architect for the rebuilding of the eastern part of Canterbury Cathedral after the great fire there. This work, continued by his disciple William the Englishman, was finished in 1185, and the work of the English architect, which was not influenced by the remains of older work, carried on the style to a perfected form in its earlier phase. After this, though we find the use of the round arch, with reminiscences of Norman ornament long lingering in English work, the style may be said to have been essentially changed.

The new style evinces, more I think than that of any other period, a determined resolution to refine every detail, to bring workmanship to perfection and to advance architecture in every way. The upper stage, or possibly the two upper stages, of this western transept, with the whole of the western tower (except, of course, the octagon stage) are of this period, and may be viewed as a Transitional work, carried on probably at the same time with that at Canterbury, but under English rather than French influence; it is a work of great vigour and beauty, the pride of Ely, so far as its earlier architecture is concerned.

Whether the western transept was completed on its northern side has been questioned. My own conviction is that it was so. In the first, I do not see why the architects, &c., who had conceived so noble an idea should, while carrying it on during two generations, have been content to leave one of its wings, so essential to its beauty, unbuilt; in the second place, I do not believe that anyone would have had the temerity to carry up so vast a tower, buttressed well on three sides, but unbuttressed on the fourth; thirdly, I do not think that Ridel would have been recorded to have "finished the new work towards the west" had he left so essential a feature untouched; and finally, the portions of the north transept attached to the tower and corresponding in design with those on the south, seem to suggest that the whole was carried up together. The details of a different character, which we see combined with these, are so late in date as not to affect the question.

I conceive that the great western tower, when first finished, was covered by a form of timber and leaded spire, which subsequently became frequent in the neighbouring marshlands, a vast octagonal pyramid, surrounded by four of smaller size rising from their turrets at its angles.

Such a spire still remains at St. Mary's, Sutton; such must clearly have terminated the beautiful detached tower at West Walton; such I think existed at St. Margaret's at Lynn, and probably at several of the neighbouring churches, and all these, as I imagine, followed the great type first established at Ely, either by Bishop Ridel, or in the next century by Bishop Northwold. The front, with its tower thus terminated, with leaded spires also on the four terminal turrets of the transept, and with the high roofs on the transept and the western porch, must have presented a *tout ensemble* of the most imposing and majestic character.

Bishop Ridel is also recorded to have done much in adorning the interior by painting. There can be little doubt that the painted decorations of one bay of the south aisle which yet remain and are of exquisite beauty, though unhappily fast fading away, were a part of his work. Such may also be the case with those in one or more of the chapels of the great north transept, and with others whose traces are still visible in many parts of the Norman work.

*Early English Period.*

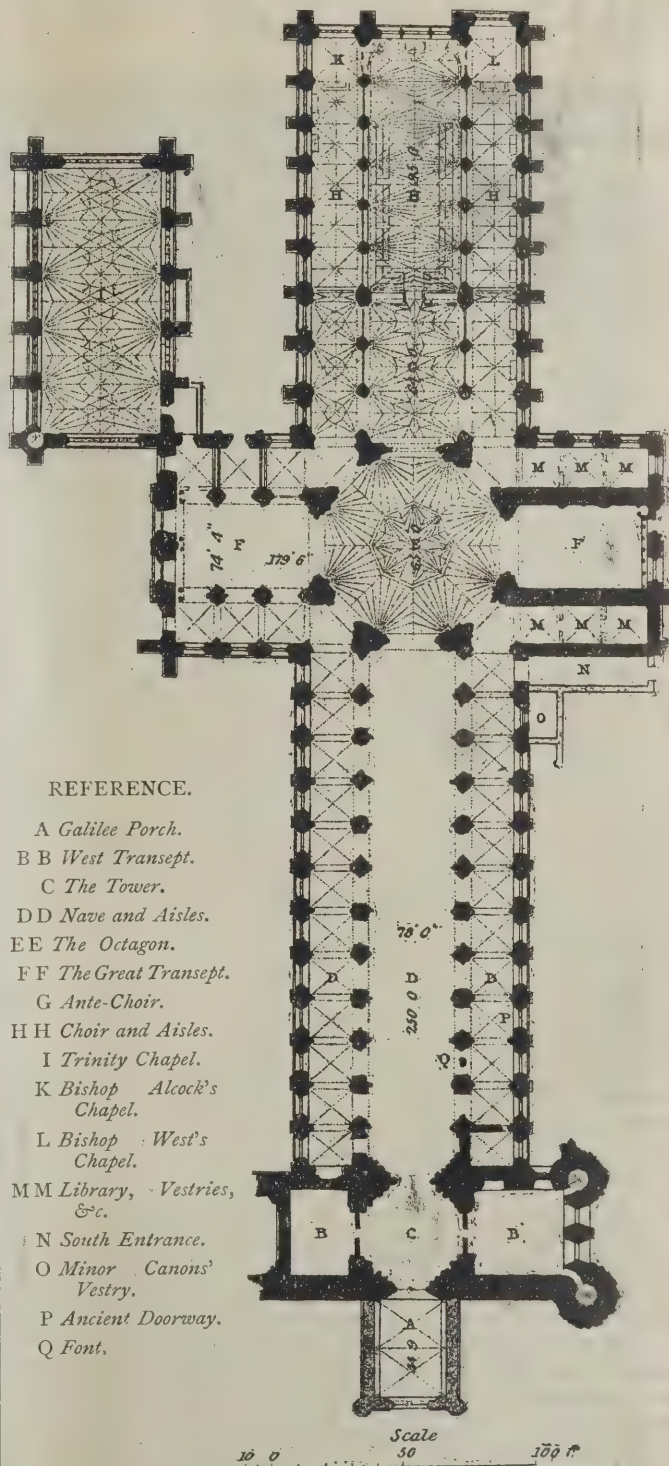
After Ridel the see was held for some eight years by Bishop Longchamp, who did nothing to the cathedral.

He was succeeded in 1197-98 by Bishop Eustace, of whom it is recorded that "he built from the foundation the New Galilee of the church at Ely, towards the west, at his own cost."

Now this has given rise to much difference of opinion.

Some think that by the "Galilee towards the west" is meant the western porch, while others, holding that so fine a work is inconsistent with so early a date, suppose the Galilee to have been the northern half (now lost) of the western transept.

The term "Galilee" might probably be applicable to either. It was (as I believe) a part of the church in which dead bodies might remain while awaiting interment, to which processions were accustomed to make their return and in which women might meet such of the monks as were their near relations. It was the equivalent of the narthex of the ancient church—a sort of court of the externs—a "Galilee of the Gentiles," and the form of consent for a woman to see her relative who was a monk is said to have been "Behold, he goeth before you into



## REFERENCE.

- A Galilee Porch.
- B B West Transept.
- C The Tower.
- DD Nave and Aisles.
- EE The Octagon.
- FF The Great Transept.
- G Ante-Choir.
- HH Choir and Aisles.
- I Trinity Chapel.
- K Bishop Alcock's Chapel.
- L Bishop West's Chapel.
- MM Library, Vestries, &c.
- N South Entrance.
- O Minor Canons' Vestry.
- P Ancient Doorway.
- Q Font.

Galilee." The Galilee at Durham was more than a porch; it was an extensive chapel, probably because of the unusual strictness in St. Cuthbert's Abbey with reference to women while at Lincoln it seems to have been an open porch to the west of the great transept. At Ely it might either be a porch or a chapel.

My own impression has always been that it was the west porch which still exists. I will first mention that in one of the ancient records the west tower is described as being towards the Galilee, "*versus Galileam*," an expression which would seem to point to the Galilee as being an advance of the tower. To the argument that the work is too refined and advanced for the period (a formidable argument, I admit), I would reply

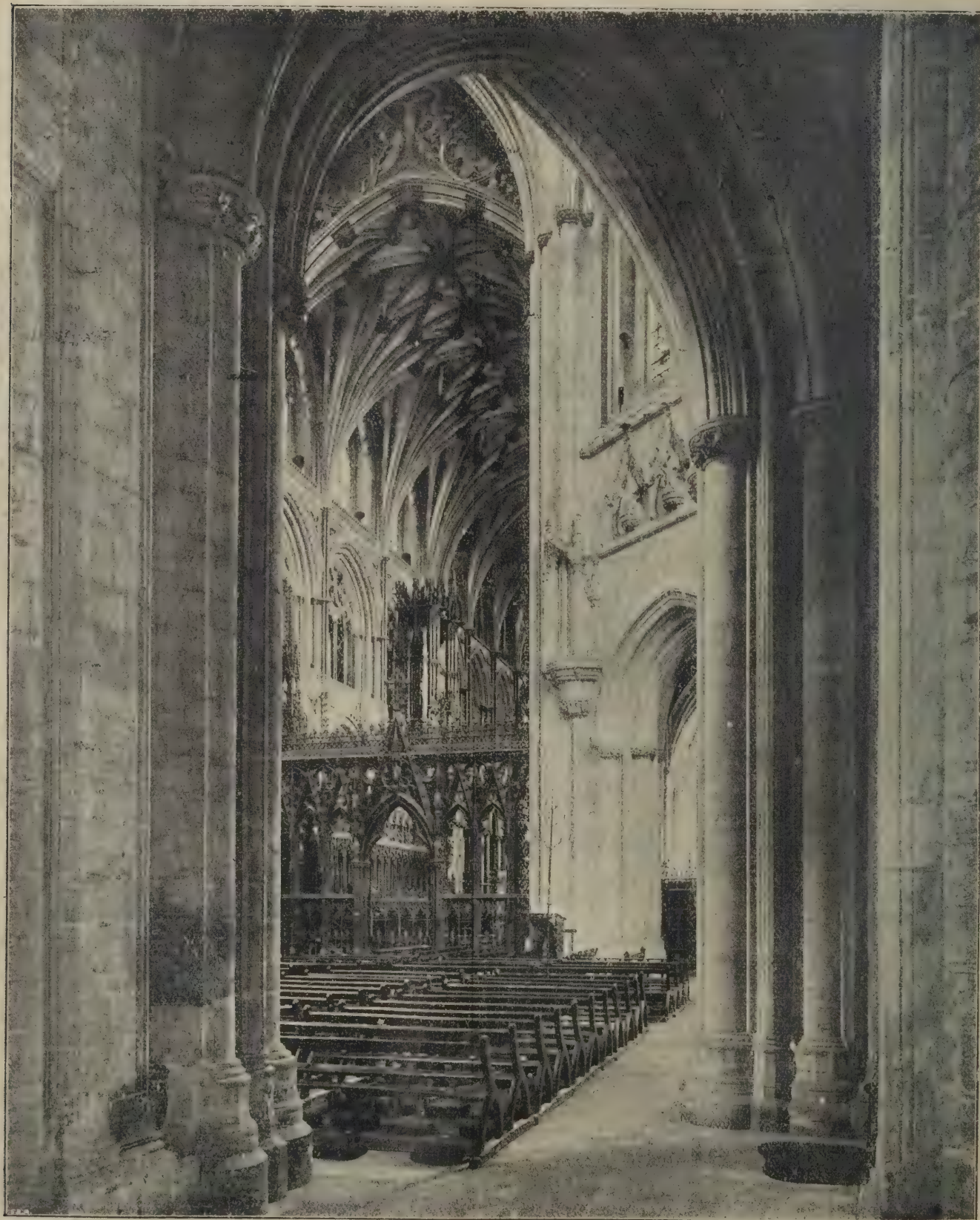


that from the death of Ridel, who had been working in Pointed architecture, to the death of Bishop Eustace, there was an interval of twenty-six years, sufficient in those days of most earnest pressing onward to account for a very great advance, and it is possible that Eustace (if he built the porch) may have done so towards the close of his life, or even have left it to be completed after his death. Let us inquire what was the character of the works of this critical period.

I will first instance the works of St. Hugh at Lincoln, which I think Professor Willis agreed embraced the parts lying between the great transept and the presbytery, including both the eastern transept and, as therein found, a part of the east side of the greater transept. This work, though of early character, is fully-developed Early English. Its abaci are

generally round, and though its arch mouldings retain a form which had been suggested by a square abacus, they are of a character peculiarly refined and studious in their profile; indeed, I may say of the whole that it is more refined and more carefully studied than the much later work of the nave, attributed, I believe, to Bishop Grosseteste. Now, the whole of this work is supposed to date previously to the year 1200. Again, Professor Willis has, I think, attributed the eastern chapels at Winchester to Bishop de Lacy, who died in 1204. These no one would distinguish from other developed Early English works.

Lastly, we have the fullest documentary evidence given us by Matthew Paris of the dates of the western portals and adjoining parts at St. Albans.



*Photographed by S. B. Belas & Co.*

ELY CATHEDRAL, VIEW OF CHOIR.



These were built by Abb6t John de Cella, between 1195 and 1215. He records minutely the abbot's earnest but abortive attempts to raise funds, his failure to raise the work above a certain height, his relinquishing it in despair several years before his death in 1215, its resumption by his more business-like successor, William of Trumpington, his cutting down the details to a plainer scale, omitting or curtailing the use of marble, &c. And all this we can trace out to this day in the design as it exists. The work to a certain height is richer than above; the use of Purbeck marble is curtailed; columns having bases and annular bands for eight shafts have capitals only for four, the remaining bands being broken off as useless. The proof is perfect, showing the more ornate work to have terminated some years before 1215; yet the character of the work is fully developed, having no trace of Transitional feeling, and is in every way better and more refined than the later work of Trumpington. The work in the west porch at Ely is, of course, later in its mouldings than that at Lincoln, having fifteen more years to deal with. It is, I think, a little later than that at St.

Albans, but it still has a few more years to play with, De Cella having given up his work in despair, while Eustace may have continued his till his death; but the character of the capitals at Ely and St. Albans is identical, while the portals at both are among the most exquisite Early English works which we possess.

Having offered these arguments I leave the question open. The fact that Northwold's much later work is (if anything) less refined I submit to be only parallel to the similar differences between that of Grostete and St. Hugh at Lincoln, and between that of Trumpington and De Cella at St. Albans; indeed, I would appeal to those who have given most study to the subject whether they have not often found greater and more studious refinement in even clearly Transitional work than in fully-developed Early English.

We now come to the great work of the thirteenth century—Bishop Hugh de Northwold's magnificent extension of the eastern arm of the church, one of the noblest pieces of architecture of that glorious architectural period.



Photographed by S. B. Bolas & Co

ELY CATHEDRAL, NAVE FROM OCTAGON.



This great work was commenced in 1234 and finished in 1252.

The Norman apse, or its substitute, at the east end was taken down and six bays with a magnificent eastern façade added. The work cost what in our money would be equal to 100,000*l*. I will not dwell in detail upon this work as it is before your eyes, and no controversial question arises respecting it; I will mention, however, that its design was in some degree influenced by that of the Norman presbytery, of which it formed a continuation. Hence its triforium storey is unusually lofty and had an external wall with beautiful windows of its own. A like fatality has happened externally to both the Norman and the Early English triforium; their walls have been so transformed that their original design would be unintelligible had not a single portion of each been happily left untouched, viz. the two bays of the Norman wall east of the north transept and two bays of the Early English wall on the south side of the presbytery. From these a restoration on paper of nearly the whole cathedral, so far as relates to its bays, whether Norman or Early English, could be laid down.

The new work was magnificent in all its details, profuse in the use of Purbeck marble, and noble in every portion of its design.

I do not recollect any other important work of the thirteenth century in the cathedral, excepting the windows of the eastern chapels of the south transept, which are beautiful specimens of the style of the later part of the century, contemporary as it would appear with what remains of the refectory.

I now proceed to the two great and famous productions of the fourteenth century, the two special objects of pride which our cathedral boasts, the lady chapel and the central octagon, with the three adjoining bays eastward.

These works are to Ely what the rebuilding of the choir was to Canterbury. Each work forms the great central fact in the history of its church; each work is of the highest and of undisputed merit, and forms the most marked feature in the building; of each the architect and his history is known, and of each the history and progress of the work are carefully recorded. The erection, too, of the great octagon, like that of the eastern arm of Canterbury, was the result of a great and notable catastrophe.

In 1321 the foundation-stone was laid of the vast and magnificent lady chapel. Its position, running parallel with the choir and corner to corner with the north transept, was peculiar, and was probably suggested by that already erected in a somewhat though not precisely similar position at Peterborough. Both were parallel to the choir, and both had entrances from the choir aisle, but as the chapel at Peterborough darkened three of the chapels, the Ely lady chapel was placed further north, so as to leave the windows of the transept chapels unobstructed. The size was enormous, being externally more than 100 feet by 50. The first stone was laid by Alan de Walsingham, then the sub-prior, who no doubt had designed the building, and perhaps, if he cared for artistic fame, may have rested satisfied to trust for it to this noble work, little thinking that the following year would place at his command so much more notable a foundation for future celebrity.

The cathedral had now had two periods of glorious completeness.

When Bishop Ridel had completed his western tower and façade, it became a perfected Norman structure of the first order, not to be surpassed in grandeur and beauty by any of its compeers. When Eustace (perhaps) had added his gem of art to the western entrance, and Northwold his majestic presbytery at the east, the structure, though less unique in character, had become more replete with architectural beauty, but this completeness was destined to be rudely broken into by the misfortune now to be recorded, although it did but make way for new glories.

## THE ARTISTIC TREATMENT OF HERALDRY.\*

IN laying before you this evening a few suggestions on the artistic treatment of heraldry I assume that most of those present have some idea what heraldry is, and are sufficiently acquainted with the rudiments of the science to justify my passing over such matters as may be readily learnt from text-books like Boutell's smaller work on "English Heraldry."

The subject of the artistic treatment of heraldry is not one that can be dealt with satisfactorily in a short paper, even with the aid of illustrations. It is rather one to be studied from good examples of the many applications of it in which our forefathers took such delight, as in tombs and in painted glass, or in conjunction with architecture or coloured decoration generally. The best examples of all are to be found on seals, but these, unfortunately, are not so available for study as the more easily accessible authorities I have just named.

Heraldry, as we know it, was first reduced to a science in this country about the beginning of the thirteenth century, and we fortunately possess a long and splendid series of examples of its use, even from the first, from which much valuable instruction may be derived.

The question has perhaps often suggested itself to some of you, why do the ancient applications of heraldry always look well, while the modern attempts to use it are invariably dull, lifeless and uninteresting? The answer is much the same as the explanation of the difference in appearance between the old west front of the cathedral church of Peterborough and the new north front of Westminster Abbey. The one was the handiwork of masons who were themselves artists, while the other is the mechanical interpretation of an architect's drawings by mere human machines who work by rule. Ancient heraldic art was the product of men who thoroughly understood it and revelled in it. Modern heraldry is a lifeless thing, dependent on needless rules and restrictions, and derived from a succession of text-books and manuals that might profitably be collected and burnt in one huge bonfire.

I propose on the present occasion to deal with English heraldry only. Not that no other is worthy of consideration, but because there is not time except for the one, and that so fully illustrates the general principles of artistic heraldry followed in other countries that it is unnecessary to go further afield.

We will begin with a consideration of shields, and their treatment. The shape of a shield is in itself entirely arbitrary and devoid of meaning, and varied from time to time simply from change of fashion, like the form of an arch or the design of a window. These changes must not, however, be overlooked, for the shape of a shield varies according to its date, and it would be absurd to use one of the ornate forms of the fifteenth or sixteenth century on which to paint, say, a thirteenth type, or to fill an early form of shield with charges that tell of a much later date. There will, however, be found from the thirteenth century downwards one simple form of shield—that known as the heater shape, from its likeness to the base of a flat-iron, which, on account of its capability of displaying any one of the countless possible combinations of heraldic charges, has continued always in use. This may safely be adopted in general practice, and the elastic way in which its curves may be slightly altered when required specially commends it.

From the form of the shield we may pass to the consideration of its surface or field, and the way in which this should be treated.

In the simpler shapes the field when painted is invariably shown flat, but if carved a slight convexity, or even concavity, is often met with, the artistic advantages of which I need not dwell upon. Some of the ornate late forms, such as shields with incurved or engrailed edges, are often worked when carved into a series of ridges and furrows, and occasionally with good effect, but there is a tendency to carry this to excess, and so to injure the appearance of the charges. If the shield is well covered by the bearings on it, it is better to use a simple form than one with a ridged surface.

A reference to a number of good ancient examples of heraldic shields will disclose the care that has been taken to cover or fill up the field, as far as possible, with whatever is placed upon it. A lion or an eagle, for instance, will have the limbs and extremities spread out so as to fill every available corner, and the same will be found in every group or combination containing objects capable of arrangement or extension. Even with most unpromising combinations, or a group of charges that cannot be extended or altered in any way, or with a single ordinary, like a bend, pale, or chevron, the Mediaeval artist was still equal to the occasion, and by judicious adjustment of proportions or some equally common-sense method, contrived to make his shield look well. Another important point will also be noticed in all ancient heraldry, that in shields containing a number of like objects, such as the three lions of the royal arms, no two are exactly alike, but each differs slightly from another in pose or in size according to its place in the shield. So, too, lines and curves are hardly ever quite true, but are drawn by hand and not with pen or compasses.

Herein lies one of the great differences between the ancient and the modern treatment of heraldry. The modern artist draws his lines and curves with mechanical precision, his charges are exact copies one of another; the fact that they do not fill up the field is quite unimportant, and the final result is in every way unsatisfactory and hopelessly bad. Until such first principles as those I have shown to be what the old men followed be adopted and practised, no good result can be looked for.

Another feature of the old heraldry which it is well to bear in mind is the sparing use of that method of combining the arms of two or more persons or families in the same shield, which is known as "quartering." One of the oldest examples of this occurs on the tomb of Queen Eleanor, the consort of Edward I., in Westminster Abbey, where her paternal arms of Castile and Leon are so arranged. So long as the shield

\* A paper read before the Applied Art Section, Society of Arts, by Mr. W. H. St. John Hope, M.A., on Tuesday, January 26, 1897.



contained four quarters only, of which the first and fourth and the second and third were respectively alike; the effect was often good, as in the case just noticed, and in the beautiful royal arms of Edward III. But where, as became common in the fifteenth century, these quarters were multiplied or subdivided, the artistic effect of the old simple shields was destroyed. As the principle was further abused, especially in the Elizabethan and Stuart periods, the whole became more and more confused in appearance, until the field rather resembled a piece of Turkey carpet than a combination of various arms, each more or less beautiful in itself.

Another cause of the bad effect of much modern heraldry is to be found in the rules laid down in some of the text-books and manuals as to the relative widths of the ordinaries and sub-ordinaries. The old heralds certainly did not fetter themselves with such restrictions. A bend, or a chevron or a cross, whether alone or charged, was drawn of the best proportion to look well. If placed between other charges it was drawn narrower, if itself uncharged, and thus took its proper relative position with respect to the size and arrangement of the charges. So, too, with a bordure; if uncharged, or merely compons, it was drawn very narrow; and, even if charged, it was not allowed a much greater width. It thus never unduly intruded itself upon the other charges of the shield, and yet continued an artistic addition in itself.

In many ancient heraldic shields, especially in painted glass and to a lesser extent in carved work, the uncharged surfaces of the field or ordinary are sometimes relieved by covering them with the purely ornamental decoration known as "diapering." This beautiful treatment has happily been largely revived of late years by the glass-painters, who use it very successfully, probably from the ease with which in their case it can be applied. Carvers, like their Mediæval predecessors, use it very sparingly; this is perhaps as it should be. Diapering requires to be done with great skill in sculpture to look well, and a careful study of old examples is advisable, in order to thoroughly understand the principles of its application. Some of the finest diapered shields we have occur on the splendid monument of Lady Eleanor Perry in Beverley Minster. A few good instances are also to be met with on seals. It is, of course, to be borne in mind that diapering is merely a relieving of the surface, and it must not be emphasised by a difference of colour, or treated with such prominence as to render it liable to be mistaken for a charge or charges.

On the question of what tint or colours ought to be preferred in heraldic decoration I do not think I need take up your time, as some excellent suggestions will be found in Mr. Boutell's manual before referred to.

I should, however, before passing on to other matters, like to enter an earnest protest against what I may call the "dot-and-dash" system of expressing gold and the several colours. This disfiguring method of showing the tinctures was not invented until the end of the sixteenth century, and it is absolutely destructive of the artistic effect of any shield. Yet carvers and sculptors delight in its use, and examples abound in our streets and on our public buildings. If these good craftsmen would satisfy their craving for relieving plain surfaces by filling up the shield as far as possible with its charges, or by the skilful and judicious use of diaper-work, the poor shields would look better and the artist's capabilities be enlarged. Finally, before leaving the shield, let me say a word as to the treatment of the label. This, as some of you may know, is a narrow band, with three or five long pendent strips or "points" placed upon and across the upper part of a shield. It is now used to distinguish the arms of an eldest son from those of his father. Anciently the label was very narrow, sometimes even a mere line or cord, and the pendent points were narrow strips of the same, or nearly the same, width throughout, even when charged, as they occasionally were. In modern heraldry the label is often drawn unduly wide, and the points have become short and ugly wedge-shaped pieces hanging from it. The result is that, instead of being an unobtrusive addition to the shield, the label, which is usually white, becomes the most conspicuous part of it, and destructive of all artistic effect.

I must now say a few words concerning crests, the meaning and use of which seem to have been almost entirely forgotten. A crest was originally, as its name reminds us, a tuft or plume on the head of a bird. Such a tuft or plume in very early times was fixed as an ornament in the top of a helmet, of which it thus formed the crest. Other devices, such as could be conveniently so worn, were soon used for the same purpose, and by a perfectly natural process became associated with particular individuals. In later days, when the helmet enveloped the whole head, the crest played a useful part in revealing the wearer's identity, though his face was hidden. As the crest was thus so closely associated with the helm it was never by the individual heraldic artist represented separated from it except perhaps in some late examples of standards. So, too, the crest was always something that could be actually worn, objects that were naturally too large or heavy being represented by models made in boiled leather (*cuir-bouilli*), wood or

other light material. Such impossible crests as the pictorial scenes and other absurdities granted by the heralds in this and the last century, and even back into Elizabethan times, would not even have been thought of at an earlier period while heraldry was a living art.

The helm, of which the crest formed part, was, it is hardly necessary to say, such an one as was included in the war harness of the time. In heraldry it was almost invariably shown in profile, the present custom of different types facing different ways to denote various grades of rank being a comparatively recent one. In actual use the helm was often covered behind by a scarf of some kind to temper the heat of the sun, like a modern puggaree. Heraldically this is represented by what is called the mantling. At first this was a simple affair, disposed puggaree fashion, as on the tomb of Edward, Prince of Wales, at Canterbury, but it was by degrees enlarged until it extended on either side beyond the helm, and was disposed in graceful twists and folds with dagged edges which are supposed to represent the cuts it was liable to receive in war. The usual colour for the mantling was red, and it was lined with ermine fur, but there is ample precedent for a difference of treatment, as may be seen in that wonderful storehouse of ancient heraldry, the stall-plates of the Knights of the Garter in St. George's Chapel, Windsor, where mantlings of various colours and powdered with badges or formed of feathers occur. Of wreaths, coronets and the caps of maintenance usually associated with helms and crests, I need not say much. The history of their origin and use really belongs to the grammar of heraldry. Good examples, as models, should however be looked for, and of these there is, fortunately, no lack, as, for instance, the stall-plates at Windsor, or the beautiful plates of monumental effigies published by Stothard and the Brothers Hollis.

From what I have said as to the invariable ancient close association of helm and crest, it follows that the modern fashion of representing the crest by itself, without the helm, is entirely wrong. It at once renders the crest meaningless; in appearance it forthwith becomes insignificant, and any attempt to treat it artistically is usually a failure. Let crests be shown as crests, with practicable helms beneath them, and with the mantling treated with all the freedom that it is capable of.

Crests, unfortunately, do not stand alone as regards their misuse, for modern artists are equally at sea as to the proper treatment of supporters. These charming adjuncts to heraldic compositions no doubt originated in the animals or monsters often introduced on early circular seals to fill up the space between the shield and the surrounding margin.

A very slight exercise of the engraver's inventive powers represented these beasts as holding the shield itself, and thus they became the supporters of it. Once invented, they were very popular, and many grand examples occur on seals and monuments. In those Mediæval instances where the shield is surmounted by, and more or less subordinate to the helm, crest and mantling, the supporters invariably uphold the helm as being the heavier and uppermost object, the shield being assumed to depend from it. But whatever the thing supported, whether a shield alone or the helm and crest and shield combined, it ought not to be forgotten that the duty of supporters is to uphold and support. Nowadays, however, especially in representations of the royal arms, the so-called "supporters" often do not support anything, but are degraded into a pair of cowering beasts at the base of the shield, like the lion and unicorn over the door of the new National Portrait Gallery. The depth of heraldic degradation could hardly be illustrated better than by this very recent representation of royal arms. In marked contrast to them are the boldly sculptured arms of George I. (1726) over the portico of St. Martin's Church hard by.

During the fifteenth and sixteenth centuries a pretty fashion prevailed of utilising heraldic creatures generally as supporters or bearers of banners, which were often charged with arms or devices. Some of you may be familiar with the grand examples at the corners of the tomb in Westminster Abbey of Lewis Robsart, Lord Bourchier, who died in 1431. In this case large quartered banners of arms, the poles of which are ingeniously worked into the buttresses, are held by lions and falcons alternately. Some beautiful examples also occur on seals. In architecture these banner-bearing creatures were often used with happy effect as terminals to buttresses or pinnacles and in other suitable places. The buttresses of St. George's Chapel, Windsor, for instance, were once surmounted by stone figures of the "King's feasts," as they were called, holding long rods with gilt vanes, the effect of which as they turned with the wind in the sun must have been very pretty. Similar figures also formerly stood on stone bases at the angles of the trim little walks in the privy garden at Hampton Court.

The use of banners for the display of armorial bearings might with advantage be more widely adopted. Everyone is familiar with the banner of the royal arms, which is so wrongly called the royal standard, and with our splendid national naval banner, better known as the Union Jack. Many of you, too,



may have noticed the banner with the arms of the City of London, which floats above the Mansion House when the Lord Mayor is in residence. Let a banner once be regarded in the light of a rectangular shield, and its fitness for armorial bearings directly becomes apparent. Mediæval banners of arms were usually placed upright, that is, with the long side next the staff, and in this form they have an excellent decorative effect. At a later date they became square, and then longer than they were high, so reversing the old state of things. In practice it will be found that though this latest form is convenient when the banner is used as a flag, so it is not always easy to arrange the arms on it that they will look well. In the royal banner, for example, although the lions of England may be sufficiently elongated and attenuated to fill up the quarters allotted to them, it is very difficult to properly display the lion rampant of Scotland in a space which is more suitable for a lion passant. Had the banner been of the old form, or even square, no difficulties whatever would have arisen. Whatever be their shape, banners, like shields, ought as a rule to be completely covered with the heraldry, like the banners of the Knights of the Garter of Windsor. Examples, however, are not wanting even in the fifteenth century of banners charged with regular heraldic achievements, sometimes on striped or parti-coloured fields. Banners were generally bordered with a narrow fringe, either of gold or of the principal colour and metal of the arms displayed upon it.

Of the curious long and tapering banners called "standards," which were so popular in the fifteenth and sixteenth centuries, and of the badges for the display of which they were chiefly used, a very interesting chapter might be written. The whole history of badges is of itself one of great interest, and the facility with which badges lend themselves to artistic heraldic decoration renders them of peculiar value. A badge is, properly speaking, any figure or device that is assumed as the distinctive mark or cognisance of an individual or family; and it should be borne alone, without any shield, torse, or other accessory. A badge, however, may be, and often was, accompanied by a motto. The wearing of a man's badge by his dependents still survives in the "crest" on the buttons of liveried servants, and were the torse or wreath on which it is placed omitted, the "crest" would at once become a badge. Seeing that a crest was pre-eminently the personal device of its wearer, it needs but little consideration to show that what was once an ensign of honour ought not to be degraded to a mark of servitude.

Badges were anciently used as ornaments, or ornamental devices, in every conceivable way and on almost every conceivable object, and now that crests are no longer actually worn, the revival and use of badges is a subject worthy of consideration.

A point that is often overlooked in modern heraldry is the proper way of drawing the various creatures that are used in arms, crests, badges and supporters. Since heraldry is but a survival of what was once a living thing, it is clear that, if our work is to look well, we ought to draw our animals in a more or less conventional manner. Some creatures, such as dogs, elephants, falcons, &c., may be drawn almost directly from nature; but others, especially lions, if so represented, would be manifestly unfit to consort with the dragons, the gryphons, the double-headed eagles and other queer creations of the early heralds. The conventional treatment should not, however, be carried to excess, nor should natural forms be too closely copied. Here, as in other matters connected with heraldry, a comparative study of good ancient examples will soon show what are the best types to follow.

The treatment of mottoes may not, at first sight, seem to have much connection with my subject, but actually it is one of some importance. There is a good deal to be said for the theory that mottoes are derived from war-cries of early times, and hence their frequent association with the crest worn on a man's headpiece. In such a connection the motto should pictorially be represented on a scroll disposed about the crest, as may be seen on divers seals and other authorities. The association of a motto with a shield was not common anciently, and when it is so found it is generally placed on a scroll, like the well-known examples on the Black Prince's tomb at Canterbury. In later times, when shields began to be encircled by the Garter of the famous Order, mottoes were often arranged round the shield in a similar way.

There was, however, always this very important and noteworthy distinction, that the buckled band now so universally adopted was anciently never used for any other than the motto of the Order of the Garter. Other mottoes were written on a band which was fastened in a different way, or merely disposed, Garter-fashion, round the shield. Two examples in illustration of this practice readily suggest themselves, one is on the west porch of the cathedral church of Norwich, where the royal arms of Henry VI. are encircled by the Garter, while the motto of the builder, Bishop William Alnwick (1426-36), is placed on a scroll surrounding his shield of arms; the other case, which is exactly parallel, occurs in the well-known brass of Robert Hallam,

Bishop of Salisbury, who died and was buried at Constance, where his brass is, in 1416. The distinction was carefully borne in mind when the insignia of our Orders of Knighthood, other than that of the Garter, were designed, and in every case their mottoes are shown on plain and not buckled bands. In the Albert medal the encircling motto has been most improperly placed on a buckled band like the Garter.

The lettering of a motto must of course depend upon the circumstances of its use. Nothing looks so well as the so-called "Old English," or small black letter, especially if the height of the words is as nearly as possible that of the width of the band or scroll and the capitals are kept down to about the size of the other letters. The form known as Lombardic is often preferable for capitals to those of the black-letter alphabet. When capitals alone are used fanciful types should be avoided, a good Roman form, such as is found in Tudor inscriptions, being far better. If the motto is a short one it can be conveniently extended if necessary by a judicious use of ornamental stops, such as roses or other flowers. The ends of scrolls with mottoes have a more satisfactory appearance when represented curled up and partly pulled out spirally, than if forked and waved, as may be so often seen nowadays. The scrolls themselves also look better if they are not bordered or edged in any way, but if this is necessary, as sometimes in the case of enamelled work, the border should be of the smallest possible width.

I have so far only referred to the ordinary applications of heraldry, and to the way in which, in my humble opinion, a more artistic treatment might be adopted with advantage. I have also spoken of the difficulty of dealing with the subject satisfactorily within the compass of a brief paper, and to the necessity of studying good examples of heraldic art.

Before showing you a number of such examples on the screen, I would like to call your attention to one of the many interesting facts that a comparative study of ancient heraldry will soon disclose, and that is the way in which our forefathers, as it were, played with heraldry. They were not content with confining it to its original use as an aid to recognition in the field or in the lists, but on their seals, their weapons, their garments and vestments, their jewels, their plate and furniture, their carpets, hangings and cushions, in the windows and on the walls of their houses, in their churches and on their tombs every kind of heraldic decoration was used with the utmost profusion. With many of these forms of application most of you are familiar from the examples we are still so fortunate to possess, but for some we must go further afield. Where, for instance, can we see the like of the great bed of black satin embroidered with gold roses and the white lions of the House of March, with escutcheons of Mortimer and Ulster, that was bequeathed by Edmund Mortimer, Earl of March, in 1380, or such jewellery as the brooch of Stafford Knots, left to his daughter in 1385, by Hugh, Earl of Stafford? Who could now, like Richard, Earl of Arundel, in 1392, bequeath such articles as a blue bed with the arms of himself and his late wife; the hangings of his hall, of blue tapestry with the arms of his three sons-in-law; and a pair of silver basons with his arms emblazoned at the bottom? We read, too, of such legacies as that of Eleanor de Bohun, the wife of Thomas of Woodstock, of a psalter with clasps of gold enamelled with white swans—the badge of her house—and with the arms of her lord and father, and ornamented with gold mullets, such as were borne in her paternal arms. Again, Edward the Black Prince—among other bequests to the cathedral church of Canterbury—left a chalice of gold with his arms on the foot, two basons with his arms, a great gilt and enamelled chalice with the arms of WARENNE, and his "hall-ing" of black tapestry powdered with his ostrich feather badge, with a red border with swans with ladies' heads. He also left, for the use of his chantry priests, a mass book and a porthos, which he had caused to be illuminated in divers places with his arms and "our badges of ostrich feathers."

These are but a few specimens taken quite at random, such as may be gleaned from any collection of wills or inventories; but they are enough to show, with the many examples of heraldic decoration in our churches, our museums and elsewhere, that our forefathers knew better than merely to paint their arms on the panels of their carriages, or engrave a helmetless crest on their spoons and forks, or emboss the same feeble device on the buttons of their men-servants. This bald and paltry treatment of a really beautiful art, which is generally all that it receives nowadays, ought surely to be amended.

That heraldry is becoming more and more popular daily there can be no doubt whatever, and with its increasing popularity there must come a greater appreciation of its many beautiful forms of application. If there should be concurrently with such a revival a corresponding improvement in the artistic treatment of heraldry, we may yet again see folk so alive to its merits as to wear heraldic ornaments and embroider their bed quilts with arms and mottoes, and have their badges woven into their carpets and hangings. People are proud of their



ancestral homes, their old furniture, their pictures and plate; why should they not show their pride in their armorial bearings by displaying them in every legitimate and artistic manner?

### GLASGOW INSTITUTE OF ARCHITECTS.

THE usual quarterly general meeting of this Institute was held in the rooms, 187 Pitt Street, on the 28th ult., Mr. John James Burnet, A.R.S.A., president, in the chair. It was reported that among other recent additions to the Institute library was the fine work by Taylor and Cresy on the "Antiquities of Ancient Rome," presented by Mr. David Thomson, for which a vote of thanks was accorded him. The President referred to the fact that two of the members, Messrs. Honeyman and Leiper, formerly associates of the Royal Scottish Academy, had now been elevated to full membership, and it was unanimously agreed that the hearty congratulations of the Institute should be sent to them. The secretary reported that the prize drawings of the Royal Institute of British Architects would be on exhibition in the rooms of this Institute during the two weeks commencing April 12 next. It was agreed to hold an informal dinner in the rooms on March 3.

### GLASGOW ARCHITECTURAL ASSOCIATION.

AT the meeting held on the 25th ult., under the chairmanship of the president, Mr. William Tait Conner, A.R.I.B.A., Professor Mills, D.Sc., F.R.S., delivered a lecture on "The Application of Photography to Architectural Measurement." The lecturer proceeded to show that by means of photography correct architectural measurements could be obtained, heights could be accurately ascertained, and by simple methods the plan of a building, or part of a building, could be laid down from a photograph. The lecturer explained in detail as to the various apparatus required to produce these results. A number of photographs taken by the lecturer were then thrown on to the screen. On these the professor showed that, given one or two measurements, any particular size could easily be ascertained by scale. At the conclusion a hearty vote of thanks was accorded to the lecturer.

### ST. PAUL'S ECCLESIOLOGICAL SOCIETY.

THIS Society, of which Dean Gregory is president, held its eighteenth annual meeting on Saturday in the Chapter-house of the Cathedral. The Society is the outcome of a suggestion, made in 1878, that many City men would be glad of opportunities of visiting buildings of architectural and antiquarian interest, under the guidance of experts. Canon Lewis Gilbertson, who presided at the meeting, said their transactions took a very high place among the learned societies up and down the country, and he hoped the members would do all in their power to extend the usefulness of the St. Paul's Society.

### THE NEW YORK ARCHITECTURAL LEAGUE.

THE twelfth annual exhibition of the Architectural League of New York will be held in the building of the American Fine Arts Society, 215 West Fifty-seventh Street, next month. Exhibits will be received, closing Wednesday, February 10, at 6 P.M.; the press view will be on Thursday, February 18, from 10 A.M. to 4 P.M.; the annual dinner the same evening, the League reception Friday evening, February 19, and the public exhibition from Saturday, February 20, to Saturday, March 13, inclusive. Hours, 10 A.M. to 6 P.M., 8 P.M. to 10 P.M. Sundays, 1 P.M. to 6 P.M. and 8 P.M. to 10 P.M. There will be public lectures on Wednesdays, February 24, March 3 and 10; members and guests' smokers on Saturdays, February 27, March 6 and 13. The pay days are all Tuesdays and Thursdays, when the admission is 50 cents. All other days free. The exhibition will consist of architectural drawings in plan, elevation, section, perspective and detail; drawings of decorative works; cartoons for stained-glass; models of executed or proposed work; completed work, such as carvings in stone, wood, bronze, wrought-iron, mosaic, glass, textile fabrics and furniture; sketches and paintings of architectural or decorative subjects. Photographs will be admitted only when they serve to elucidate an accepted exhibit.

The subject of the tenth annual competition for the gold and silver medals of the Architectural League will be a court enclosure and entrance. This structure is designed to furnish a covered passage, 10 to 15 feet wide, connecting the projecting wings of a public building constructed around three sides of a court open to the street, and to form at the same time a screen or enclosure between court and street, with an imposing

central entrance. The distance between the wings is 83 feet and the height of the ground storey 18 feet. Each sheet must be distinguished by a motto or cypher. A sealed envelope bearing the same motto or cypher must contain the name, full address, place and date of birth of the author, and must be mailed to the committee on competitions and awards, Messrs. Bruce Price, chairman, W. T. Owen and A. D. F. Hamlin.

### TESSERÆ.

#### Rome under Goths and Vandals.

THE same causes which diminished the population of Rome did not necessarily affect the public monuments. It is generally acknowledged that the Gothic and Vandalic conquerors, with the exception of Totila, "affected to spare" them; or, what is more likely, found no use for the materials of stone and marble. Belisarius, in his letter to Totila, could still call Rome the greatest and most splendid city in the universe, observing that it had not arrived at such a pitch of grandeur and beauty by the power of any one man; but a succession of kings, a long series of generations, a crowd of enterprising men and an abundance of wealth and resources from every part of the world, had alone raised it to the splendour in which it then was. In another place Procopius remarks upon the zeal which the Romans had ever shown about the ornaments of their city, "and although," says he, "it has now been a long time ruled by barbarians, the edifices are still preserved, and, as far as could be expected, very many of the architectural ornaments also." After the vengeance of Totila was gratified this was no longer true; for there can be no doubt he destroyed many of the temples and other edifices; and although he afterwards showed some anxiety about repairing the mischief he had done, still his age may be considered as the first great epoch of the city's ruin: for the rest being but the work of time, it was sufficient to bring the stately buildings down to the ground. Nearly half a century after the dominion of the Goths ceased, St. Gregory thus writes:—"We behold in what condition Rome hath survived: oppressed in various ways by the greatest calamities; by the loss of her citizens, the ravages of her enemies, the constant falling of her ruins." And again:—"But why do we say these things of men when we see the very buildings falling asunder by increasing decay?" Such, then, is the picture of the "eternal city" at the end of the sixth century, in which we see the edifices neglected and gradually falling into ruins, but not wantonly destroyed; and it is evident that Rome in her public monuments, except the plunder of the precious metals, escaped out of the hands of Goths and Vandals with all the features of her pristine glory, which were reserved only for time to tarnish, until a new period of wanton destruction arrived.

#### Expressiveness of Gothic.

It is a mistake to lay too much stress upon the forms of Gothic architecture, as though it was from them and not from the man who uses them that their expression comes. Hence the dissatisfaction with so much of modern Gothic work. The forms are correct enough, but you want the old master's soul behind them. The fact is that Mediæval art gets its romantic charm from the spirit that animated its designers. So far as mere variety of form and play of fancy are concerned, Wren's spire at St. Mary-le-Bow far transcends Salisbury's spire; but the conscious art of the former, studied harmony of its proportions, the subtleties of its fancy, are not favourable to romantic effects. It lacks the simple aspiration and naïve utterance of the other. The expressiveness of Gothic art is usually ascribed to the variety and contrast of its effects, and to the intricate harmony of its constructive lines, such as is to be found at Abbeville, Rouen, York, or Gloucester. But to stop here were to leave the tale untold. There is a noble severity about the early phase of English Gothic, both in regard to proportion and scale, that is highly stimulating to the imagination. Think of the interiors of Durham and Peterborough, with the strange colossal scale of their features and ornamentation, that hint of the sense of physical power and indomitable will of their builders. The majesty of their pregnant lines carries us back to the grand buildings of old Rome that are like vast mountains haunted with mighty shadows. That there is more picturesqueness of plan and construction in the later work like York or Gloucester, more harmony of related parts, more play of sequent motive than in the tentative earlier phases was to be expected, for art "widens with the process of the suns," and just before the Gothic forms were forsaken the art comes to a head in that "glorious work of fine intelligence" at King's College, Cambridge, so eloquently described by Wordsworth, with its lofty pillars, its "branching roof self-poised and scooped into ten thousand cells, where light and shade repose, where music dwells lingering, and wandering on as loath to die." Yes, Wordsworth finds architecture to be something more than bird-and-beaver craftsmanship, and his spirit is



stirred by its magic, though of figure sculpture it has none. What affects him is its piquant variety of light and shade, and colour and play of motive, and borrowed charm of personality that makes the logic of passion and imagination in a fine building, and speaks of divinely inspired cunning. What is more, he realises that not sculpture but organ music will interpret the meaning, fill with expression and make to vibrate every nook and corner of the amplest and loftiest edifices. Milton found it out before him.

### Heraldry of Oxford Colleges.

Magdalen bears the arms of William of Waynflete—one of the great prelates of the Middle Ages, the patrons of learning, the promoters of all reforms and the civilisers of England—who alternately presided over Eton and Winchester Schools, and afterwards, becoming Bishop of Winchester and Lord Chancellor of England, founded Magdalen College in Henry VI.'s troubled reign. His paternal coat was lozenges, sable and ermine, and three lilies proper on a chief sable, the lilies being the noble Lincolnshire gentleman's remembrance of Eton School, which bore the same distinction. Very priestly and solemn is their prelate's shield, with its sable field and silver lozenges, and silver lilies tipped and stalked *or*. No blood ever defiled it, and very precious ink dyed it of that sober colour. Merton's shield is three chevrons—gules and azure on a field *or*—and was the arms of Walter de Merton's patron, Gilbert de Clare, Earl of Gloucester, with a difference of blazon; for in those days, when men so often put out strong helping hands to each other, it was not unusual to borrow arms. Walter de Merton was another of the broad brows—priest and statesman, architect and scholar—who buttressed up the troublous ages. Walter was Bishop of Rochester and Lord High Chancellor of England under Henry III. and Edward I. He founded Merton as a refuge for the secular clergy, and to protect them against the puffed-up regulars. His shield must have been the very pole-star of a tournament, with its glittering gold field and its bars of ultramarine and vermilion. Oriol College is said to have been erected in pursuance of a promise made by Edward II. to the Blessed Virgin, when flying hot and scared from the red sodden field of Bannockburn. The college bears still the arms which he bore on his cloven shield—gules, three tabards passant, *or*; the difference being a bordure engrailed argent. The crimson shield, with its silver border and elongated golden leopards, is the shield Bruce must have frowned on when he broke his good mace on De Bohun's worthless head.



### Cathedral Illustrations.

DEAR SIR,—It would be nothing short of ingratitude on my part (as a groveller amongst our grand cathedrals and a collector of all sorts of pictures of them for many years) not to thank you for the magnificent photogravures you are now publishing. I and some others are perfectly delighted with them. I had started remounting my collection, but you have stopped me short; it will be incomplete without your set, although I have Mr. Herbert Railton's opinion that "it is the finest he ever saw." Would it be too much to ask you in what order the remainder of them will be published?

But I must add a serious protest. Do, for mercy sake, print all of them on the thick paper, and not back to back; and if possible keep the most interesting letterpress in one or two pages, so that it can be preserved as well, as I am of opinion that it will be still more interesting. I hope you will not be offended with me for these few remarks. With best wishes for the greater success of *The Architect*, to which I have been greatly indebted for many years—in fact, for its commencement.—Yours truly,

HENRY EWD. JOHNSON.

34 Fairfield South, Kingston-on-Thames:

February 3.

[We are much obliged to Mr. Johnson for his good opinion, but if he will purchase a second copy weekly he will find he can mount all the views and their ample descriptions, while the expense will be less than is generally paid for a small photograph.]

### GENERAL.

**Bow Church** in Bow Road is not to be removed by the London County Council, as the scheme for the widening of the road has been abandoned.

**The Secretary of the Treasury** announced on Monday that it is not the intention of the Government to ask Parliament

to provide funds for completing the frontage of the South Kensington Museum.

**The Zochille Collection of Armour**, which was sold by Messrs. Christie, Manson & Woods, realised 11,257*l.* for the 862 lots.

**A Meeting** of subscribers to the purchase of the Churchyard Bottom Wood, convened by Mr. C. F. Cory Wright, the chairman of the Hornsey Urban District Council, was held at the District Council offices, Highgate, last week, when local subscriptions to the amount of 2,051*l.* were announced. A general committee and also an executive committee were formed. The price to be paid for the wood, which comprises about 50 acres, is 25,000*l.*, and of this sum the Hornsey Council have undertaken to provide 10,000*l.*

**The Wesleyan Chapel Committee**, in their annual report, state that they have sanctioned during the year 393 cases in all—new chapels, ministers' houses, schoolrooms, alterations, enlargements and improvements—at an estimated outlay of 262,208*l.* The entire debt remaining is 70,852*l.* The net amount actually contributed in Great Britain as reported this year is 230,928*l.* The total of ascertained outlay and expenditure on new erections and in reduction of debt is 310,461*l.*

**The Lords of the Admiralty** have charge of the following historic buildings:—Greenwich Hospital, Greenwich Hospital School, Royal Observatory, Greenwich, and Upnor Castle.

**The Executive Committee** of the Archbishop Benson Memorial have decided to recommend to the general committee, at a meeting to be held shortly, that a sum not exceeding 2,500*l.* be set apart for the Canterbury monument, and that the balance of the fund should be devoted to some definite portion of Truro Cathedral.

**The Next Ordinary General Meeting** of the Surveyors' Institution will be held on Monday, February 8, 1897, when a paper will be read by Mr. J. W. Willis Bund (Associate) entitled "Allotments and Small Holdings." The chair will be taken at eight o'clock.

**A Sessional Meeting** of the Sanitary Institute will be held at the Parkes Museum, on Wednesday, February 10, when a discussion will be opened by Mr. F. J. Waldo, M.A., M.D., D.P.H., barrister-at-law, medical officer of health, St. George the Martyr, Southwark, and Inner and Middle Temple, on "Sanitary Supervision of Shelters for the Homeless." The chair will be taken at 8 P.M. by Mr. Robert Farquharson, M.D., F.R.C.P., LL.D., M.P.

**The Society of Architects** will have their annual dinner at the Hôtel Cecil on the 23rd inst.

**The Annual Exhibition of Paintings** in Antwerp will be opened this year on March 12.

**Jules Simon's Monument** is to be designed by M. Scellier de Gisors, the architect having charge of the Luxembourg. The sculpture will be M. Fremiet's work.

**M. Auguste Riden**, the French sculptor, has presented to the Musée of Geneva his *Podte* and *Femme accroupie*.

**M. Frantz Jourdain**, architect, has arranged to deliver a course of lectures on the history of architecture for ladies at a school in Paris.

**M. Paul Sédille** has published a small volume of his poems, which is dedicated to his friend, M. Sully Prudhomme, the Academician. The title is "Rayons d'Automne."

**The Site** of the Hanover Chapel, Regent Street, was let on a building lease of eighty years on Tuesday, at a yearly rent of 2,120*l.* As the frontage is 75 feet and the area 6,666 square feet, the rental value is 6*s.* 4*d.* per square foot, and this ground-rent, capitalised at thirty years' purchase, comes out at 415,000*l.*, or approximating to half a million per acre.

**Mr. George McCulloch** will on Tuesday next read a paper before the Applied Art Section of the Society of Arts on "Lithography as a Mode of Artistic Expression."

**The Next Ordinary Meeting** of the Institution of Civil Engineers will take place on Tuesday, February 9, at 8 P.M., when a paper will be read, with a view to discussion, on "Cold Storage at the London and India Docks," by Mr. H. F. Donaldson, M.Inst.C.E.

**Sir Henry Doulton**, on his re-election as president of the Pottery and Glass Trades Benevolent Institution, has given a donation of fifty guineas for the initiation of a special fund in commemoration of "the Diamond Jubilee."

**Two Lectures** on "Why Buildings are Interesting" will be delivered by Mr. F. Herbert Mansford to the South Place Ethical Society on Mondays, 8th and 15th prox. The chair will be occupied by Mr. Alfred Preston, past master of the Carpenters' Company.

**The Foundation-stones** of a new Salvation Army barracks were laid last week at Harrogate on a site at the corner of Chapel Street and Beulah Street. The estimated cost of the building is 7,150*l.*



# The Architect.

## THE WEEK.

MR. WHISTLER should be grateful when he learns that the purchase of his portrait of THOMAS CARLYLE for the Glasgow Corporation gallery is considered by ex-Deacon Convener TULLIS to be "the most creditable purchase that was ever made for any public gallery." Perhaps Mr. WHISTLER will now consider he ought to have received a higher price for the work, but to be placed above RAPHAEL, MURILLO, TITIAN, VELASQUEZ and other painters of costly works is surely equal to the receipt of a large sum of money. On the occasion when the opinion was pronounced—that is, the banquet of the Royal Glasgow Institute of Fine Arts—Mr. McWHIRTER, R.A., was the chief orator. In referring to the changes in the Royal Academy, he said that "if the old institution should go a little slow at times, a sure remedy was to look out for another Scotchman; it had been tried before with success." What does Mr. McWHIRTER mean? Scotsmen have power in the Academy, but only one of their countrymen has reached the President's chair. REYNOLDS, WYATT, LAWRENCE, EASTLAKE, LEIGHTON and MILLAIS were English; WEST was an American, SHEE was an Irishman. The Scottish representative was Sir FRANCIS GRANT, and it could not be said of him that he was a go-ahead president, or introduced more expedition into the proceedings.

It would appear as if MEISSONIER was likely to be the favourite of the auction-rooms in Paris for some time to come. At a sale a few days ago one of his small works was sold for 94,100 francs, and another for 72,000 francs. But the Barbizon school still has admirers who can pay good prices. A picture by DAUBIGNY brought 78,000 francs, one by ROUSSEAU 77,500 francs, and five by COROT found purchasers at 26,800, 17,800, 30,000, 32,000 and 35,000 francs respectively. Three drawings by J. F. MILLET were sold for 16,200, 20,200 and 27,000 francs. One of DAUMIER'S pictures realised only 1,850 francs and another 5,200 francs, but the artist was never sufficiently appreciated. The prices may appear low if compared with those which are given in the King Street rooms, but they are much more generous than was anticipated.

OWNERS of gardens which are surrounded by old brick walls would do well to take warning from a fatal accident which occurred a few days ago in Birmingham. A watchmaker was passing along Varna Road when a wall suddenly collapsed and fell on him. He died immediately afterwards. The owner of the house said it was in his possession for a year. The premises were examined by a builder, who said the wall was sound and plumb. Mr. PEMBERTON, the building surveyor of the Corporation, said the wall was 9 inches thick, 8 feet high and 42 yards in length. Twenty-four yards of the wall had fallen. He thought a wall of that length should have had buttresses every 8 feet apart. He did not think the wall was properly "bonded," and the bricks were not properly backed with mortar. He was told the property was built in 1851. There would be nothing to show that the wall was unsafe. The foundations were most satisfactory. The jury returned a verdict of "Accidental death," but suggested that the rest of the wall should be examined, and buttresses added if necessary. It is remarkable that a larger number of fatal accidents do not occur from defective boundary walls. Too often they are not strengthened throughout a long length by any addition to the thickness, and as foundations are shallow and liable to settlements, walls are often rent in more than one place. All that is done to remedy the defects is to introduce a little mortar or cement, and sometimes the remedy leaves the wall in a worse condition.

ALTHOUGH large sums have been expended in remedying defects in the early Board schools of London, it must not be supposed that there will be no further outlay on the buildings. A case has occurred in Battersea which is ominous. The local managers of the Tennyson Street

school (which was erected in 1876) have found that the corridor is of inadequate width—being only 3 feet—and may become a source of danger if great care is not exercised in dismissing the children. The staircases would also be destructive in case of fire. The works committee, who have investigated the subject, agree with the managers. The improvements do not appear to be extraordinary, but to carry them out will cost not less than 7,000*l*. The school had to be enlarged three years after it was opened, but as no additional provision was made for staircases or corridors the danger arising out of the original plan was increased.

THERE is an old institution in Dublin known as MARSH'S Library, which adjoins one of the cathedrals. It belonged to an Irish archbishop, and contains the greater part of Bishop STILLINGFLEET'S library. Altogether there are between 30,000 and 40,000 books. The Rev. G. T. STOKES, D.D., has been examining the books, and he has discovered an indulgence granted by Cardinal WOLSEY and Cardinal CAMPIEGGIA to all who would contribute alms towards the completion of Hereford Cathedral. It was found pasted in between the binding of one of the books. It was similar to the indulgence granted in connection with the rebuilding of St. Peter's, Rome, and which caused LUTHER'S protest against Papal authority. The Hereford document was issued at least fifteen years before there was the slightest rumour of religious differences in England, and, as such, is a curious and unique possession. There are missals, breviaries, prayer-books, of which copies are not to be found in the British Museum. Although the contents mainly relate to historical subjects, the library is rich in historical works. It is well known that THOMAS MOORE the poet spent a long time in MARSH'S library when he was gathering materials for his "History of Ireland." The library is, however, at present a comfortable retreat for the officers. During the past year only two visitors dared to enter it. When it was less deserted thefts of rare books were so common that an order was made that every reader on leaving was to be searched. The order is still in force and is still exhibited on the walls with the date 1779 attached.

WE cannot say we approve of the verdict of the coroner's jury, which was that the foreman and ganger feloniously caused the death of the twelve labourers who fell from the Coldrenick viaduct, on the Cornwall Railway, owing to the breaking of the platform on which they were employed. The viaduct is of great height, but rather primitive in form, and it was found necessary to increase its strength. The bays were alike in character, and the directions were to complete the transformation of one at a time. The rail-bearers were to be supported during the operations of introducing new steel beams by means of a chain, which had to be tightened by wedges. The chain was supposed to be capable to sustain a weight of three tons. Now every one who has had much experience with chains is aware that one weak link makes them useless, and however sailors may value them, a landsman who is not connected with machine work always has misgivings about the strength of a chain. Unless it was distinctly stated to a foreman or ganger that his life and the lives of the men working with him depended on the tenacity of a chain, we doubt if any ordinary ganger or foreman would be competent to realise the fact. It is a novel means of security, and is always liable to be undervalued. That information was not given. The chain, it is said, was not used, and the accident followed. The ganger has said that "he never had definite orders concerning the use of chains; he used his discretion." The jury recommended that printed instructions should be issued as to the use of chains, but as there were no such instructions and no special discourse delivered, it is hard to cast the responsibility on men for not doing a work which seemed to them to be superfluous. The party of workmen were left to act as they thought best, for it is admitted that less personal attention of the engineers was given as the repairs to the viaduct advanced. The men acted ignorantly and twelve of them paid the penalty, but it is unjust to cast the responsibility for their deaths on the survivors.



## SCULPTORS AND ARCHITECTURE.

ARCHITECTURE has more affinity with sculpture than with any of the other arts which are subservient to it. Whether the building is of marble or of oak, it can be adorned by the sculptor's hand without the introduction of foreign materials. A wall need not be any weaker for containing figures in relief or formed of incised lines, and a column will sustain a weight, although the whole of the shaft appears surrounded with bands of amorini, or is encircled with garlands of flowers. Painting cannot be accomplished without the employment of something that is foreign, and can hardly be said to increase the strength of the material it covers. Fresco is allied to commonplace stucco, and resembles a covering to conceal defects. Paint can offer some little resistance to atmospheric influences, but, speaking generally, its purpose is ornamental.

When the relation between masonry and sculpture was perceived, it was natural that theorists should suppose that the origin of sculpture is not to be traced to idols or representative images of kings and queens, but to the early attempts by which stone walls were supposed to be improved by graving images on them. We may even assume that in a remote age there was no definite division between the stone-worker and the stone-decorator. But as division of labour seems to be a need among men whenever they attempt to co-operate, the carvers of stone would gradually become separated from the men who laid stones in courses, without much squaring. As construction advanced it would be found there was not much analogy between building and sculpture. A power which we now call scientific was required by whoever attempted to make a house that would withstand wind and weather, while it was not essential to the sculptor. Many of the great masterpieces of antiquity reveal a deficiency of that knowledge of gravity which would have enabled their creators to produce figures that resembled natural forms, in standing upright without extraneous support. When we see the trunk of a big tree upholding a horse or a centaur, or attached to the limbs of a god, we may overlook it in the same way as we do the modern devices to cure smoky chimneys in streets; but both are remedies to make up for a want of acquaintance with simple scientific principles. However primitive people might be, they were never likely, out of devotion to the sculptor's art, to allow any of those artists to meddle with the construction or arrangement of their buildings. Tombs in which they imitated buildings alone were tolerated. There is no legend to suggest the contrary, and to suppose that men at any period sacrificed their convenience to art would be like saying they were deprived of shrewdness and self-love.

When, therefore, it is declared that PHIDIAS was the architect of the Parthenon, a conclusion is drawn which is not warranted by anything known about the practice of the Greeks at an earlier time. They were a conservative people, but there was no ancient custom which would warrant a sculptor's assumption of a dual office. We should remember also that PERICLES was surrounded by enemies who were ready to twist all his efforts to adorn Athens into treason against the State. The Parthenon was a Hellenic rather than an Athenian memorial, and it was supposed the great works were intended to aggrandise PERICLES himself. The expenditure was scrutinised the more closely because no control was exercised over the funds by the citizens. To assign to PHIDIAS the least direction of the builder's work would be to give endless opportunities for charges of extravagance. Keen eyes were always jealously watching the operations. The works at the Parthenon were also a sort of battlefield between the representatives of two varieties of art, the ancient and the modern, and it may also have been between the representatives of Athenian and other schools. Incompetence of any kind in building operations would soon be discussed beyond the Acropolis, and news of it would be welcome to the opponents of PERICLES and PHIDIAS. Circumspection was needed by the two friends, and although they were guarded in their ways they were not victorious. The Parthenon was fatal to them. Then, again, those people cannot know much about architectural practice or how a Greek temple was constructed who suppose that PHIDIAS was able to direct the masons as well as the sculptors. Some years ago the late W. W. STORY, after

an investigation of the subject, was able to demonstrate that as PHIDIAS was not a BRIAREUS, he could with his two hands never have accomplished more than a small part of the sculpture. Was he likely to abandon his own art in order to meddle with architectural designing or superintendence?

The most that can be made of the connection of PHIDIAS with the Parthenon was embodied by M. BEULÉ, the French archæologist, in a couple of dramatic essays which, from their form, allowed of the exercise of imagination. He represents the artist as the inspiring spirit of the works, but one that depended on suggestions rather than on commands for his influence. In one scene PHIDIAS asks ICTINUS, who is described as "architecte du Parthenon," whether he is satisfied with the marble, and counsels him to be regardless of expense so long as blocks are obtained without flaw or stain. ICTINUS inquires whether they are to continue the forming of all the lines as curves, for although he was contemplating a treatise on the subject, yet like all who attempted a novelty in those days he feared to excite the criticism and it might be the raillery of the Athenians. The reply of PHIDIAS was that the lines would rather excite admiration, for they would exemplify a new species of beauty. Much as he admired the old architecture, PHIDIAS said it appeared to his eyes as dry and cold. In nature there were no straight lines; the trees that rose towards heaven had rounded surfaces and the mountains themselves were curved. The straight line was without reality; it was a fiction traced by geometricians and applied by architects in buildings. It was the task of an artist like ICTINUS to draw from nature the secret of her curves, and thus to produce exquisite beauties. But will the crowd comprehend these beauties? interposes ICTINUS. If they cannot comprehend them, answers PHIDIAS, they will at least feel them. And he goes on to say that the majority of spectators will be incapable to perceive the subtleties, because they will be too little emphasised, but they would feel the effect just as they did with a beautiful human body. The temple had its own constitution, laws and proportions; it was the duty of ICTINUS to impart the life. ICTINUS then exclaims that PHIDIAS strengthened his courage, and was like a fire which could not be approached without deriving new joy and force from it. In so popular a form did M. BEULÉ express his conclusions; but there could be no question of the scholarship which inspired what he wrote. It was open to him to make of PHIDIAS an universal genius, for by doing so more dramatic effect would be produced; but M. BEULÉ did not exceed the limits which long years of study had laid down. To him ICTINUS was the architect of the Parthenon, a man of genius who was subjected to the doubts and fears which accompany novel experiments, and who would have returned to the system which precedent had sanctioned if he had not the authority of PHIDIAS to support him. Any one who studies such records as time has spared, and who tests them by that probability which is the guide of life, can come to no other conclusion. M. BEULÉ does not even suggest that the Greek architects adapted their arrangements to allow of more display of the sculptors' talents. He makes PHIDIAS declare that the sculptors and painters should consider themselves happy because they are allowed to follow the architects, and to trace the histories of gods and men on the temples.

It cannot, therefore, be said that if people in the Renaissance periods occasionally allowed sculptors to design buildings, they were following the example of the Athenians in the Periclean age. No such authority was ever adduced. It may to an age like ours seem incomprehensible that costly buildings should be confided to men whose credentials were derived from the production of altar plate and tombs, tabernacles, &c. But on inquiry it will be found the custom was only a consequence of the defects of the intellectual condition of the time.

In the first place, it should be remembered that science, and especially constructive science, was confined to very few people. The Mediæval masons guarded their geometry as if it were something which could not be confided to ears of flesh and blood, unless the owner had gone through a sort of initiation which was probably accompanied by religious services. The architects of the Renaissance affected no less mystery, and in truth all learned professions posed alike as the possessors of secrets which ordinary men



were incapable to grasp. The international competition for constructing the dome of Santa Maria del Fiore, in Florence, suggests how little practical knowledge was to be found among men who were in those days accepted as experts. One competitor proposed to cover the cathedral with a sort of colossal umbrella, with a stout central column to serve as the stick. Another would fill the interior of the church with a mound of clay with a domical top, and use it as centreing, quatrini being mixed with the clay to tempt people to remove the stuff without expense. A third plan was to set up many columns from which arches would be turned to support the centreing. BRUNELLESCHI, the sculptor, who had spent about fifteen years in studying Roman vaulting and ancient methods of construction, had satisfied himself, by means of a model which he constructed in secret, that he could surmount the difficulty. But he did not bring the model forward. He preferred to display his eloquence about all he was competent to achieve, and was several times thrust out by the servants of the Syndics as a lunatic. VASARI, when writing about a century and half afterwards, does not condemn such extraordinary tactics. He approved of BRUNELLESCHI's concealment of the model, because in the sixteenth century it was so common for everyone in Florence to profess to know as much about building as the most experienced masters. The astute FILIPPO was acquainted with the ways of his fellow-citizens, and we suppose concluded that a man who would cause some astounding fiasco was worth some encouragement, for he would give occasion to jokes, and in all ages they merit appreciation. The absurd way of demonstrating his ability adopted by BRUNELLESCHI, in anticipating COLUMBUS's experiment with an egg, suggests that humour was at least as much prized as statics in Florence.

The assumption of knowledge was not confined to the Florentines. It was a weakness in many another city of Italy. The people saw a model of a church by a sculptor which resembled a tabernacle or a reliquary by him, and they concluded that if one structure was able to stand, the other was likely to be no less stable. Altars and tombs would also appear to be architectural constructions, and as they were less likely to fall out of repair than the churches containing them, the people who looked on them would be likely to conclude that the sculptors were skilful builders. In all ages, if a design appears on paper there are sure to be men who are willing to take the risk to realise it, and in Italy during the Renaissance there were builders in abundance who were competent to construct from a more grandiose design than PAUL VERONESE has introduced as a background in his *Marriage of Cana*, and without the aid of one working drawing or diagram of a joint in timber, unless of their own preparation.

It must, however, be acknowledged that, in spite of the belief in the versatility of painters and sculptors which prevailed during the Renaissance period, very few building works were directed by artists of either class. A Duke of FERRARA might order the great TITIAN to make a copy of a balustrade or to superintend the baking of majolica, but he was too shrewd a man to risk his money on the painter's experiments in architecture. It is too commonly and erroneously supposed the sculptors enjoyed a monopoly of architectural commissions. That MICHEL ANGELO was entrusted with the building of St. Peter's at Rome after BRAMANTE, PERUZZI and SAN GALLO passed away was owing to the circumstance that he was instructed to execute the monument of JULIUS II., and, as he wished to have a worthy building to contain it, he was allowed to have his own way, just as CELLINI, after making a jewelled ornament, might be asked to prepare a casket also. According to PANVINUS, the Pope "had men of all classes against him, and especially the cardinals," when the destruction of the old basilica of St. Peter was proposed; but JULIUS would not brook opposition. His ambition was to be more memorable in death than any MAUSOLUS. It was an age of topsy-turvydom, and there was some fitness in at one time seeing an old sculptor masquerading as an architect, and at another a young painter, such as RAPHAEL, in the same disguise, first getting the big commission, and then seeking for an instructor in architectural practice.

Afterwards the example set by MICHEL ANGELO, in what FERGUSON calls his "unconstructive absurdities" and

"dreadful vulgarities," was imitated by inferior men, and they occasionally contrived to convince great folks of their ability. In the history of art there is hardly a more ridiculous spectacle than that presented by the visit of BERNINI to the court of LOUIS XIV. The sculptor was invited to Paris in order to create a palace which was to surpass all that existed. His architectural experience was not, however, promising. His staircases in the piers of St. Peter's caused irreparable injuries to the dome. A tower he constructed in order to complete the façade of the building had to be demolished as soon as it was completed. But all his errors were supposed to be compensated by his fantastic figures. BERNINI was treated like a prince from the time he crossed the French boundary. Every city he passed through offered him gifts; representatives of the king were sent to greet him. But he was quickly found to be a fraud; not one of his suggestions was practicable, and although LOUIS XIV. kept up the comedy as became so fine a gentleman, there was no regret when BERNINI departed without giving any return for the enormous outlay on him.

Is it any wonder that since those days the French are not disposed to patronise sculptor-architects, or that it is now the custom when there is a competition for a memorial which is to consist of a pedestal as well as a statue to unite an architect with a sculptor? Without such a partnership the sculptor has no chance of success, for the French are not yet enough advanced to be ashamed of construction in which respect for principles is shown. Everybody knows that French sculptors are compelled to receive instruction in architecture, but although they may have that little knowledge which is often so dangerous, they cannot become owners of that wondrous "log-book" which, according to poor Mr. GILBERT, contains all the mysteries of construction worked out for the sole advantage of architects, and hence no doubt the fear of allowing a sculptor to set up any work of masonry in a French street. Neither sculptor nor architect suffers by the partnership, and it cannot be said the memorials produced by them exhibit any deterioration from the time when the sculptor, like his Renaissance predecessors, attempted to employ architectural forms which he did not understand, but dare not abandon.

## ELECTRICAL INSTALLATIONS.

BY F. J. WARDEN-STEVENS, A.M.I.E.E.

IN the previous articles\* motive-power was only briefly commented upon, and as this part of the plant for a private installation is of great importance, it may be advisable to go more fully into the matter.

### Boilers.

There are two chief classes of boilers—(1) fire-tube; (2) water-tube.

*The Fire-tube Class.*—The fire-tube boiler is one in which the water surrounds the flue or tube through which the hot gases pass. In this class are the Cornish, Lancashire and locomotive types. The Cornish and Lancashire boilers are identical, with the exception that the Lancashire boiler has two flues, and the Cornish only one.

Lancashire boilers are not very suitable for private plants, where, especially in the summer, they are only required one or two nights a week, the load being taken for the rest of the time by the accumulators. A Lancashire boiler has to be banked when not required, as the pressure, and consequently the temperature, must not be allowed to vary rapidly, as strains are caused due to unequal expansion or contraction. The coal and attention required while standing under pressure thus become of considerable importance.

A combination of the fire and water-tube boiler is the Galloway. With this boiler there are the internal flues, but in addition there are cross-water tubes in the flues which greatly increase the quantity of water that can be evaporated in a boiler of given size. The objections to this boiler when used for irregular work are the same as with the Lancashire.

The locomotive or multitubular boiler in its various

\* See *Architect*, vol. LVI.



forms is the most suitable of this class for irregular work, although the firebox, which is usually made of copper, is not placed so favourably with regard to evaporation as it is in the Lancashire boiler. The hot gases pass through a large number of parallel tubes, which, as it were, correspond to the two flues in the Lancashire. There is, therefore, a very large heating surface, and this boiler is not damaged easily by rapid steaming, and the fire need not be banked when standing idle. These qualities are all very favourable for a private plant. The only objection to these boilers is that the firebox is so constructed as to render the operation of removing clinkers very difficult without allowing the pressure to fall seriously.

*The Water-tube Class.*—To this class belong all those in which the tubes contain the water and round which the flames or hot gases pass, this being the reverse of the fire-tube type. There have been many kinds of these boilers introduced, but the difficulties have been chiefly the question of the circulation and that of unsuitable water, and the difficulty of cleaning out deposits of carbonates, &c. The best known water-tube boiler is the BABCOCK & WILCOX, although there are now several kinds which are very satisfactory when worked under suitable conditions as to water, &c., but they all require a considerable amount of attention while working. Some types can be steamed up from cold in half an hour, but for a private plant one should be chosen which has a large water and steam-space, as it is not necessary that it should be steamed up in such a short time as is possible with some water-tube boilers.

The water-tube boiler is, generally speaking, much safer than the fire-tube, as the tubes are smaller and stronger and there is no need for an outside shell, as is the case with the latter. The difficulties of working are not so great as with Lancashire boilers when under inexperienced hands, as they cannot be easily damaged.

The water available should be tested by an engineer to find the proportions of carbonates, &c., which are in the water, and if high, a Lancashire or Cornish boiler should be used.

#### *Steam Turbines.*

The steam turbine is coming into use for private plants where economy of space is of importance, and it is to be recommended on the ground of compactness, freedom from vibration and cheapness. They need no foundations, and are used when placed (not bolted) on rubber blocks.

There are two types of turbo-generators, as they are sometimes called—the reaction and the impulse. The reaction turbine has been developed by the Hon. C. A. PARSONS, of Newcastle, and works exactly in the same way as a reaction water turbine. They are made both parallel and radial flow, the steam expands in a series of small turbines and economy is attained with a comparatively slow speed. It is, in fact, similar to a multiple expansion water turbine; the speed of a 50 horse-power turbine is about 8,000 revolutions per minute, and the dynamo is direct coupled.

The disadvantage is that the blades on the revolving wheel sometimes come off and the steam passes only through the wheel. If the clearance allowed is too great the turbine works uneconomically, and if the clearance is too small the revolving and fixed blades are apt to scrape, and one or other is torn off. The governing is perfect, and the whole machine is very ingenious and of high-class workmanship.

The impulse turbine is a development of the first steam-engine, HIERO's wheel, and again is similar to the impulse water turbine, and very similar to the Pelton wheel. A small wheel revolves at a high rate of speed, it has channels cut on its periphery, and steam nozzles are arranged to play on to these. There is only one wheel, and the steam is under atmospheric pressure when it leaves the nozzle. The whole of the energy of the steam is kinetic (or the energy of motion), and a great part of this is given up to the revolving wheel. The economy of this turbine is about the same as that of a reaction turbine. This turbine has been developed by DE-LAVAL, of Stockholm. It runs at a speed of about 25,000 revolutions per minute, and, as this speed is considered too high for electrical machinery, a very efficient helical gear is used, which appears to work noiselessly at this tremendous speed. The steady, smooth

running is attributed to the flexible steel shaft on which the wheel runs, and to perfect workmanship.

#### *Gas-engines.*

The horizontal type of gas-engine has been most frequently adopted, but vertical high-speed gas-engines directly coupled to their dynamos are now being used to some extent, and the unsteadiness in the light is so far removed in at least one type of engine that, it is claimed, accumulators may be dispensed with. The advantages of a high-speed gas-engine are compactness, possibility of direct coupling, greater economy of gas owing to more frequent impulses, and consequently more steadiness of light. The faster a piston moves immediately after the explosion the greater the economy of the engine. There is also less need for a water-jacket in consequence of the more frequent impulses, as there is a greater proportion of energy utilised as work, and less heat is transmitted to the cylinder walls. In a vertical engine the cylinders have not the tendency to wear oval, as is the case in a horizontal engine.

#### *Water Turbines.*

Where the fall is low it is of importance to have a turbine which will run at as high a speed as possible. This often allows of a direct belt or rope drive without the intervention of countershafting. The turbine for a given power is smaller, and in consequence less costly, and the size of wheel-pit, &c., can be less. The most suitable class of turbine for such a case is the inward and downward flow type which has a vertical shaft.

The belt will not leave the turbine pulley or the dynamo pulley if the following condition of running is complied with, *i.e.* that the belt shall feed on to each pulley at a right angle to its axis. By this means the expense of bevel gearing, countershafting and clutches is avoided, while there is much less loss in friction.

### THE GIZEH MUSEUM.

A CORRESPONDENT of the *Leeds Mercury*, writing from Cairo on January 23, says:—

Four hundred and fifty-six years before the birth of Christ Herodotus wrote of Egypt:—"I shall now speak at greater length of Egypt, as it contains more wonders than any other land, and is pre-eminent above all the countries in the world for works that one can hardly describe." That is true to-day. At every step we encounter venerable monuments which have survived the destructive influences of thousands of years better than the vandalism of the invaders and conquerors whose religion has been at variance with that of the ancient Egyptians. In spite, then, of time and of other influences tending to destruction, there are works still remaining which have existed for forty or fifty centuries in comparison with which the works of all other nations are modern. The skill displayed in their execution is still more marvellous, and would indicate that they were the outcome of antecedent ages, all memorials of which are now buried in the obscurity of the most remote antiquity. I do not propose to write at length upon these world-famed monuments, but of a collection of antiquities gathered together in one building within the lifetime of many still living. I should like to attempt something of a description.

As I may have to speak of the disservice of France and Frenchmen to this country in a later letter, I wish here to pay my tribute of thanks to two Frenchmen, namely, M.M. A. Mariette and M. G. Maspero, who must have all the credit of the founding of a museum which is, without doubt, the largest and richest collection of antiquities in the world. These two men gave their lives to the formation of this most valuable collection. Mariette and Maspero sought and found hidden treasures, and Maspero organised a system of encouraging others to go and do likewise, with this proviso, that the half, at least, should remain for the enrichment of the museum now in the Gizeh Palace. Further, it was within the knowledge of the Department of Antiquities, of which Maspero was the head, that valuable relics of bygone ages were finding their way to London, Paris, Berlin and Vienna. They determined to stop this, and were also wishful to know whence such treasures were obtained. To the authorities, inspired by the chief, it was all important that this should be ascertained, for they knew they belonged to the Nineteenth Dynasty—the time of Rameses II. and of Seti I., his father, and of Rameses I., his grandfather. Even scarabæi, bearing the cartouche of the greatest of all the Pharaohs, Rameses II., were displayed by the innocent but lucky purchasers. This being so, argued Maspero, the mummies of those royal personages must have been discovered by



someone. By whom? A detective force, spies in fact, was organised to help in the solution of this interesting question. At Port Said, an Arab was negotiating for the sale of the "Book of the Dead," from one of the mummy cases of a Pharaoh of the Nineteenth Dynasty—that is fifteen centuries before Christ. He was arrested, the bastinado was applied almost daily for three months, when the Arab informed the authorities that it was quite true what he had all along declared, that he did not know where the papyrus was obtained, but his brother knew. This famous brother was Abd-er-Rasoul, who supplied guides and donkeys to tourists visiting the ruins of Thebes. He was arrested and imprisoned, and finally "bakshish" brought out the confession that he would show the authorities the tombs from which, as it proved, his family and that of his ancestors had abstracted the plunder on which they had been living for five or six generations.

Let me tell the story of the finding of Pharaoh as it was told to me by Brugsch Bey some ten years ago:—"One of the brothers accompanied me to the tombs at Deir-el-Bahri, and pointed out an opening in the ground, a square shaft, filled up with loose stones, evidently placed there by the owners of the secret. We procured a staff of labourers and cleared the shaft, some 40 feet deep. From the bottom of the shaft I proceeded along a subterranean passage directly into the heart of the mountain. This passage terminated in a mortuary chamber about 13 by 23 feet, and not quite 6 feet in height. I soon satisfied myself that we were on the eve of an event even in the annals of discoveries in Egypt. Pieces of broken mummy cases and fragments of linen bandages strewed the floor. Against the walls were statuettes, libation jars of bronze and also of terra-cotta, canopic vases of precious Lycopollitan alabaster, and in a tumbled heap lay the funeral canopy of Queen Isi-em-Kheb. There were some beautiful mummy cases, entire, fashioned in human form, with folded hands and solemn faces with ever wakeful eyes, each emblazoned with the name and titles of its occupant. My first reading, by the flickering candles, was that of Queen Hathoc Houttani, wife of Pinc-tein I. My sensations in that moment it is impossible to describe. Then came Seti I., the father of Rameses the Great, and finally Rameses the Great himself—the undoubted Pharaoh of the Oppression. This was too much for my nerves, and I literally fainted."

Can you imagine it? A man of the nineteenth century, learned in the mythical, symbolical and mysterious characters of thirty centuries before Christ, brought face to face with the greatest of the great kings of Pharaonic Egypt, was more than bewildered. When Brugsch Bey came round from his faint he told me he was impressed with the idea that he had been dreaming, and requested his men to retrace with him their steps and return to the light of day. The brother-in-law of Brugsch Bey was at the surface when the party came out, and he assured me the face of his brother was white, as he thought with fear. The whole find was finally removed to the museum in Cairo, where they now lie in state for the tourist and the student to gaze upon. Bewildering to both the sight must for ever be.

I mentioned the funeral canopy of Queen Isi-em-Kheb. It is a magnificent and unique specimen of appliqué embroidery in cut leather, made some 3,000 years ago, the rich colours quite fresh and rich in their blendings and contrasts. This lady, when buried, was provided with a sumptuous repast, consisting of gazelle haunches, trussed geese, calves' heads, dried grapes, dates, nuts and the like, all being mummified and bandaged, the whole packed in a rush hamper which would not disgrace the best-equipped drag that ever went on to the course at Epsom, and sealed with her husband's unbroken seal. Her toilet was not forgotten, for with her were found her ointment bottles, a set of alabaster cups, some goblets of exquisite variegated glass, above all her mirror in oval disc of copper—once polished to such perfection as to reflect the face almost as well as the modern mirrors—all for her use and adornment beyond the grave, or at that supreme hour of bodily resurrection when, clothed in regal pomp, fed and anointed, she should go forth from the dark sepulchre into the glorious light of everlasting day.

It is almost past belief that within a palace mostly constructed of lath and plaster, containing nearly 500 rooms, and built by the grandfather of the present Khedive, Ismail Pasha, for his women, there should be gathered together the mortal remains of kings and queens and priests, rulers of this land thirty and forty centuries ago, with statuary of far older date, affording ample proof of the capacity of Egyptian sculptors to execute really artistic work. The golden ornaments of the Princess Hathor, found by Mr. De Morgan in March, 1894, in the north pyramid at Dahshur, are a proof of the high pitch attained by the Egyptian goldsmiths two thousand years B.C. They form one of the chief attractions of the Gizeh Museum; and the find, being of very recent date, gives one hopes of further discoveries in the near future under the guidance of the present energetic director of the Museum of National Antiquities.

In 1893 the tomb of Mera was discovered and opened out. It yielded very little for the museum, but the tomb itself is at Sakkarā, quite near to the famous Tomb of Ti and the equally famous Tomb of the Bulls. It consists of thirty-one chambers and passages, all adorned with highly interesting and diversified reliefs, some of which show representations not found elsewhere. There is now no difficulty in entering either the Tomb of Ti or that of Mera, as inclined roads have been made to the underground chambers with a proper door, with lock and key, and every care is taken of the interesting representations of the past times and occupations of the ancient Egyptians. The hieroglyphical scenes which cover the walls of all the chambers are in delicate bas-relief, the outlines being sharp and distinct, while the projecting parts are at the same time subdued and harmonious.

It is conjectured that every Egyptian of the Ancient, Middle and Modern Empire, of moderate means, and particularly the great and wealthy, began during his lifetime to plan the construction of a tomb worthy of his position. When the architect had lined the interior with faced lime, stone, or granite, the artist commenced to draw upon the walls the various groups of men and animals. Hunting, shooting and fishing scenes, boat-building and pastoral life are the most prominent in the tombs I have seen. The owner of the tomb would spend days in it, in a chair of state, watching and directing the progress of the work. After his death his remains would be deposited in some suitable sarcophagus, and the tomb, even in its unfinished state, would be closed, and thus it is that the most perfect sculptures are to be seen in close proximity to the designs, only in red chalk. It is from such tombs that the collection at Gizeh has been made. The statues of the owners have been removed to safe keeping under the watchful eyes of the authorities, although the intention of the pious founder was to lie in the position and amid the surroundings arranged with such care during his lifetime, until the day when the soul would again inhabit its frail body and put on immortality.

I am glad to find that it is the intention of the Government to build a museum of stone and iron fitting the importance of the collection. A fire at Gizeh, such is the flimsy character of the material used in the construction of the present building, would speedily destroy it, and thus its treasures, which have defied the hand of time, would become a mass of worthless burnt stone, whereas, if preserved, it is a collection of the most ancient and interesting character in the known world, and well worth a journey to Egypt even if that was all the traveller could see.

## BILLS OF QUANTITIES IN AMERICA.

IF a national system of estimating on bills of quantities or some equivalent be recognised by leading architects and contractors, says Mr. G. A. Wright in the *American Architect*, this matter will adjust itself. If architects point out the necessity for quantities and contractors decline to estimate without them there will be no difficulty, but we cannot expect this at the outset, although, if once adopted, it will eventually come to this. One point for the owner's advantage is that they pay for no more material than their buildings require, and in cases of changes or variations in contracts they can easily know definitely beforehand what the cost of such changes will be.

The architect would have in his possession the builder's original bill of quantities, priced in detail, each item, this document having been sealed up and handed to him by the contractor when signing the contract, the practice being that it should only be opened in the presence of the contractor and immediately sealed again.

The quantity surveyor having prepared what is known as a "variation" bill of quantities, the items would be valued at the original contract prices, and the cost of such contemplated changes would immediately become known.

A certain class of contractors are ever ready in these days to have changes made—originate them if they can—knowing that, as a rule, an owner would prefer to pay a good price rather than go to law when the bill for "extras" comes in. Such men make more money out of the changes, perhaps, than out of the original contract, but by the quantity system the owner is protected and his changes are paid for at "competition" prices, the same as the balance of the contract, and this is an advantage to the owner and a saving of some trouble to the architect. And here is another point—Is it fair to the architect that he should have to measure and value variations in contracts, and have his time taken up in settling disputes with contractors? This work might well be relegated to surveyors whose special business it is, and who would give it special attention; and experience has taught me that it would be to an owner's and to an architect's advantage to have their extras and omissions accounts settled in this way.

But, to return, if quantities be furnished, I believe lower bids would be received from the competent and honest contractor;



the incompetent and irresponsible ones would immediately recognise from the very wording of the quantities that they would have to "toe the line" or not bid at all. What the "quantities" say would control the character of the work done. Good work would be easier to obtain because everything would be plainly stated in black and white and by sketches where necessary, and can it be denied that this would benefit the owner and make the architect's work run more smoothly?

Again, the estimate is more accurate, and so there is less inducement for a contractor to withdraw a bid or to scamp his work.

All such points as I illustrate are benefits to the owner. I think the owners would see the advantages if put before them fairly. I once heard it remarked by perhaps the cleverest quantity surveyor in his time (H. P. Foster, of the Adelphi, London), that a correct estimate is first cousin to a correct design, and I believe he was right, for when an owner wants an estimate he wants a correct one (assuming he is honest), and the design and its cost are closely related, if both are correct.

Now a correct estimate without correct quantities is an absolute impossibility. Contractors cannot reasonably be expected to make such quantities; they may get something on paper, but such work would oftentimes fall very short of accuracy. As it is now, owners are usually none the wiser; but that does not justify a continuance of the practice.

It is unreasonable to expect accurate quantities of all trades from a contractor unless he has had training essential to such work, and so the owner, if only for his own personal interests, should come out and say plainly, "I want so much work done, what will it cost?"

The combination of trades called the building business is entirely different from any other business. There is no other business like it, or that calls for such a diversity of craftsmen as it does, and its complexity where "estimating" is concerned is not to be found elsewhere, so far as I know; and so when an owner says, "What will my building cost?" without giving particulars of how much he wants put into it, he is asking a great deal, although it is quite possible that this never occurs to him. But he should be told, and moreover should bear some of the responsibility by stating, as I say, how much of each material he wants used, without throwing all the onus upon the contractor, for this is no more the contractor's duty than it is the architect's.

An owner may decline to build on receiving bids upon any pretence; he may in his heart never have intended to build at all unless he saw a chance of getting two dollars of a builder's money for one of his own, and yet he now gets his estimate for nothing. This does really seem absurd. An owner pays (or should pay) his architect for what work he may do, and if owners can be made to see the advantages to themselves of the quantity system, they should be willing to pay for the quantities also. Such a practice, when the justice of it became understood, would not prevent honest owners from building, but it might deter the "grasping" owner (the man who imagines the architect's special duty is to help him to rob the builder); it might deter these men from defrauding builders out of their time and experience, as is often the case under present conditions.

If an owner obtains bids in competition, I maintain that he does get information which is necessary and of value to him or he would not try to get it. The fact that he himself has not sufficient means (or is otherwise unable) to put up his building is no justification for not accepting his proper share of the responsibility, and this share is to pay for the quantities if the builders are willing to give their time and experience in figuring them out. Surely that is sufficient for them to give.

Let me add a word about the English practice.

The courts recognise this fact, that when an owner instructs an architect to obtain estimates from contractors, the architect, as the owner's agent, has an implied authority to employ a quantity surveyor to prepare bills of quantities, for the reason that without these, it is impossible to obtain a proper estimate. Such is the "custom" of the architectural profession. I have in my practice had cases where an owner did not want to pay my fees because he did not build, but in view of the many precedents established by the courts there was never any difficulty in successfully establishing my claims.

Quantities are a necessity. Without them, the best firms of English contractors always refuse to bid. It is, in fact, quite the exception for them to be asked to do so, and then it would be for small jobs only. I will not be positive, but I believe one of the rules of the Master Builders' Association of Great Britain is, that members are not to submit bids unless owners furnish quantities. You would not see these men wasting their time "figuring," as builders do here, or as I have seen them doing the last six years; yet I firmly believe these very men would be the first to realise the immense advantage the system would be to themselves, if the subject were only properly ventilated by the Institutes of Architects and the builders' exchanges of this great country.

## NORTHERN ARCHITECTURAL ASSOCIATION.

A MEETING of the members of the Northern Architectural Association was held on the 3rd inst., at the Art Gallery, Newcastle, Mr. F. W. Rich in the chair.

The Chairman proposed the following resolution:—"The Northern Architectural Association, looking to the amount of public interest and criticism that has arisen respecting the proposed restoration of the western front of the cathedral, Peterborough, desire to convey to the Dean and Chapter their appreciation of the course pursued by them in upholding and carrying out the advice of their architects—Mr. J. L. Pearson and Sir Arthur Blomfield—and however much the Northern Architectural Association may regret the circumstances that necessitate the pulling-down part of the work, yet feel sure that in the hands of such an experienced and able man as Mr. Pearson there will be nothing done without cause." He said there had been a great deal of amateur criticism on this matter, and the more architects stood up against these innovations on the part of amateurs the better it would be for themselves.

Mr. Reay seconded the motion, which was cordially agreed to.

Mr. Frank Caws, F.R.I.B.A., of Sunderland, read a paper on "The Probable Influence of the Technical Education Movement upon the Architect and his Work." Mr. Caws began by pointing out that his profession could boast of many noble achievements, but as to whether its future would eclipse its past depended upon whether it will or will not continue to advance on the crest of the unrelenting wave of human progress. Others, from princes of the royal blood downwards, had been more or less active in this great movement for technical education, while architects had scarcely taken a place in their counsels. This he attributed to declension long continued through recent centuries, slow but sure, on the part of members of his profession who had too much devoted their time to the pursuit of artistic trifles, while the great works of this age had passed from them to the modern race of civil engineers. Yet the blame was not wholly the architects'. In proving this he showed how this mighty movement which they called technical education was started in England by the late Prince Consort (whom Mr. Caws eulogised for the impetus he gave to the industrial arts and sciences in England), who in carrying out his scheme for the exhibition building of 1851 selected not an architect but a gardener—Sir Joseph Paxton. Again, in designing the exhibition of 1862, the Prince Consort passed by the architectural profession and chose Captain Fowke of the Royal Engineers. This neglecting of the architects was not because there was any lack of ability in their ranks, but because the Prince had formed an erroneous estimate of their readiness to undertake great works, for, as the Prince himself observed, "If I ask an architect to carry out any extraordinary new design, he hums and haws, but if I ask an engineer he at once sets about it." By the opening of the great exhibition of 1851 technical education received its initial impulse in this country, though not then recognised by that name. But to this turning away of the Prince from the architectural profession at the outset of his magnificent enterprise may be attributed much of the subsequent apathy of the profession towards the technical education movement—a fact to be lamented, while giving the Prince every praise for the great work he initiated. The time had now arrived when architects as a body should put aside this lukewarmness towards the great educational movements which Albert the Good, to his everlasting honour, began. Architects should take deep interest in the technical education movement because of the splendid opportunities it afforded for developing the talents of the young, and not from the merely selfish motive that it helped us to remain masters of the markets of the world, but because it tended to increase the happiness of men and women by increasing their knowledge and usefulness, and particularly by giving them a deeper insight and interest in their work, and so minimising the monotonous drudgery of their lives. Technical education could not long continue without thus raising the status and character of the worker, thereby inducing a general gain of intelligence, skill and respectability in all trades and handicrafts. If the architectural profession would not remain hopelessly behind other crafts and professions, if architects would retain the proud position of masters of the technical arts—which the very name of architect implied—then they must bestir themselves and take advantage of the great opportunities the present moment afforded. How to do this Mr. Caws explained by showing how architects' pupils and students should devote the years of their apprenticeship so as to attain to the higher standard of qualification now called for. The dandy and idler who considered it *infra dig.* to spend their evenings side by side with the young artisan in the technical college or art school must disappear from the ranks of the profession, for entire devotion to his art, under certain specified restrictions and conditions, was the only true road to the student's success. He went on to point out that the division of labour which characterised nearly every craft at the present day was a necessity of our increasing



civilisation; but he put this forward as the strongest reason why the architect should take every advantage of the technical education movement, the architect being, as it were, the natural centre towards which the industrial arts and trades radiated. In a word, while others may know parts, the architect must know the whole, for he it was who must guide and control the complicated machine of technical labour, and must arrange the fitting of its human parts so as to produce a harmonious result in every building, great or small, fitly framed together, and compacted by that which every joist supports into monuments of human energy, skill and combination. Mr. Caws closed his paper by specially addressing the students thus:—You who are here to-night who are young, and who have so much to learn and to do, you, by the help of these splendidly-organised schools, may and must increase, while others of us here who are no longer young, and who have learnt and done what we could with the much smaller aids at our command, must decrease. None the less do we rejoice that you young students enjoy opportunities not granted to us, and all the more we urge you to use them well, and in conclusion we would bid you and those glorious institutions which are ready now to help you God speed.

A hearty vote of thanks was accorded to Mr. Caws, after which the meeting terminated.

### ARCHITECTURAL ASSOCIATION OF IRELAND.

A MEETING of the above Association was held on the 2nd inst. at the Grosvenor Hotel, Dublin, Mr. R. Caulfield Orpen, president, in the chair, and among those present were Mr. T. Drew, Mr. W. G. Doolin and about forty members. A very interesting lecture was given by Mr. W. J. Fennell of Belfast, on "Some Old Buildings in Antrim and Down," which was illustrated by lantern. The lecturer gave some detailed accounts of the ruins at Holywood, county Down, the old churches at Newtownards and Movilla, and the very picturesque ruins of the old Cistercian Abbey, known as Grey Abbey, the Castle of Dundrum, the Cistercian Abbey known as Inch Abbey, and thence on to the historic town of Carrickfergus, with its fine old church of St. Nicholas; Antrim, with one of the best preserved round towers in Ireland, 92 feet high and 50 feet wide at the base; Ballycastle, with its old abbey and gate-house, and the extremely interesting stronghold of the McDonnells, Dunluce Castle. Mr. T. Drew having proposed, and Mr. McGloughlin seconded, the vote of thanks, and Mr. W. G. Doolin having spoken and shown a few views by lantern, the Chairman announced the next meeting for the 16th inst., when Mr. F. Batchelor will lecture on "Hospitals and Hospital Construction." The drawings by members of the advanced class of design (the subject being a village public-house) were hung in the room and attracted much attention.

### LIVERPOOL ARCHITECTURAL SOCIETY.

THE fifth ordinary meeting of this Society for the present session, held on the 1st inst. in the Law Library, Union Court, under the chairmanship of Mr. Bradbury, the president, was well attended. The feature of the evening was a paper by Mr. F. I. Thomas entitled "Art Out of Doors," in illustration of which some sixty photographic views were shown by lime-light. These, which were beautiful in themselves as works of photographic art, had been admirably selected so as to indicate the multiplicity of country seats throughout Great Britain in which architectural and horticultural art derive great attraction from their natural surroundings. The lecturer was warmly and deservedly thanked.

### SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE monthly meeting of the members of the above Society was held at the School of Art, Arundel Street, on the 9th inst., when Mr. John Slater, B.A., gave a lecture on "The Buildings of the Ancients." Mr. C. Hadfield (president), occupied the chair.

Mr. Slater quoted the late Mr. Fergusson's remark that beauty in architecture consisted not so much in particular features as in appropriateness of design and elegance of detail. In the present century there had been many changes of style. Each successive period had found ugly and unsuitable what had been praised as fit and beautiful by its predecessor, thus showing the narrowmindedness of those who posed as the directors of the public in matters of taste. It might not be uninteresting to go back to a time anterior to all the recognised styles, and see what kind of buildings were erected by the ancients, when the sole object was to meet the requirements of the people for whom the building was intended, and who obtained architectural effect by ornamenting their construction, and not by constructing their ornament. The

first builders who attained to any great architectural skill were the Egyptians, in whose history four periods stood out as those of great architectural activity. These periods were the fourth dynasty, when the great Pyramids were erected; the twelfth dynasty, to which belonged the tombs at Beni Hassan; the period when Thebes was at the zenith of her power; and the period of the Ptolemies. Details were given of the construction of the Pyramids, showing that the most scientific precautions were taken to prevent the heavy superincumbent mass from crushing in the sepulchral chambers. In the tombs of Beni Hassan it was noticeable how often wooden forms were reproduced in stone. In these tombs were to be found the prototype of the Doric column, as well as of the plan of the perfected Greek temple. The enormous Temple of Karnak, with its hypostyle hall, was described, and so were the different forms of capitals found there. The great feature of the Egyptian temples was their solidity and massiveness, but relieved by the most elaborate and varied system of colouring, the granite columns having been coated with stucco before the application of the colour decoration. Crossing from Africa to Asia different materials and methods of building were found, sun-dried and burnt bricks forming, in the absence of stone, the staple building materials. In consequence of the friable nature of these materials there existed for many centuries nothing but heaps of rubbish to mark the sites of some of the most notable buildings of antiquity. Quite recently the most valuable and interesting discoveries had rewarded the exertions of explorers. No less than seven palaces of the Ninivite kings, whose dynasty lasted from B.C. 1250 to B.C. 625, had been exhumed, the most complete and interesting being that of King Sargon at Khorsabad, which was thoroughly explored by Messrs. Botta and Place. Here were discovered the most magnificent arched gateways of brick, arched covers to sewers and conduits, and enamelled encaustic tiles of different colours and patterns, which were as fresh and vivid as if they had only recently been taken from the kilns. The exact manner in which these large buildings were lighted was largely a matter of conjecture. The third great building people of antiquity were the Persians, whose supremacy in Central Asia dated from about the sixth century B.C. The rocky plateau of Persepolis was the site of the most magnificent palaces of the kings, and the ruins still existed to testify to their grandeur. In the recently-explored Hall of the Hundred Columns, the columns were of marble, the capitals being the well-known double bull's head, between which rested the beams supporting the roof. The height of the columns, 67 feet 4 inches, was more than double the height of the columns of the Parthenon. The bases of the Persepolitan columns were particularly graceful, and it was rather curious that this form had never been adopted by the Greeks. The curious and interesting domed buildings at Feruz-abud and Sarvistan, the dates of which it was difficult to determine, were almost certainly the precursors of the Mohammedan mosques. From the wall decorations discovered by M. Dieulafoy, it was certain that the Persians, like the Assyrians, had arrived at a high pitch of excellence in the manufacture of glazed enamelled tiles. After alluding to recent discoveries in the district anciently called Phrygia, and to some curious examples of the exact imitation of wooden forms in stone, the lecturer concluded by saying:—As the byways of the world become opened up to us, we are continually finding unexpected remains of building nations, and it is not too much to say that wherever over the whole face of the earth explorers have come upon the relics in stone or brick of a remote civilisation, their wonder has been excited at the solidity, and in many cases the high artistic quality, of the work. It appears to me that, despite all our modern resources and all the discoveries of science in these latter days, no one can study such buildings as I have brought to your notice this evening without having a little of his nineteenth-century conceit taken out of him; for truly all the remains testify that in energy and in intelligence and in skill there must have been giants in those days.

The paper was illustrated by a number of large diagrams prepared by Mr. Slater.

### ST. MARY'S CHURCH, WARWICK.

THE cost of the restoration of this church has been greater than was anticipated, and at a meeting under the presidency of the Earl of Warwick which was held at the Court-house last week, the Rev. A. C. Irvine read a report which stated that under the scheme approved in 1894 the galleries and pews have been removed, the new floor laid, the cleaning and repair of the walls and ceiling completed, and structural preparations made for the erection of the organ and parts of the instrument ordered. For the repair and restoration of the church and tower 13,637*l.* 4*s.* 9*d.* has been since 1884 contributed and expended. But an additional sum of 2,550*l.* is still required to discharge liabilities already incurred and complete the work contemplated.



### NOTES AND COMMENTS.

MANY artists and amateurs will hear with regret of the death of M. HARO, who was one of the best known of the experts in all disputes about art in Paris. He died on Friday in his sixty-ninth year. But he was so closely associated with French art, it was difficult to believe that the "good old chronicler" was not in business at the beginning of the century. His shop in the Rue Bonaparte revived associations with EUGÈNE DELACROIX, INGRES and other mighty men of the Quartier Latin. Another on the Boulevard suggested more modern art and fashion. His fine house in the Champs-Élysées, to which an Englishman was always a welcome visitor, suggested to many a millionaire what wealth can do in the accumulation of treasures. M. HARO was an excellent type of the skilled dealer. He was well up in the history of the French school and had a keen eye for the good and weak points in a picture. A thorough man of business, he was selected to be official publisher by the Municipality. He is succeeded by his son, M. HENRI HARO, who has directed the establishments of late years.

THE Boulevard Anspach in Brussels owes its architectural character to the prizes offered by the Municipality to the owners who erected the most handsome buildings. The Paris Municipal Council are not too proud to take a lesson from the Belgian capital. Three prizes will be given for "les plus belles façades" in the new Rue Réaumur. It is not a question of convenience or economy that will be considered, but simply what will most contribute to the amenity of the district. Although the new street was opened on Friday last it was projected in 1851, when two small streets were united and called the Rue Réaumur. A little advance was made in 1854 and 1858, but it was only under the present Republic that the extension to the Bourse was arranged. A sum of 2,000,000*fr.* was voted, but owing in a great measure to the assiduity of M. PIERRON, the architect who had charge of the purchase of property and other works, about half a million has been unused. It is the first time in municipal affairs for so large a percentage to be saved. The street will offer many opportunities to architects and builders, for it will be much frequented when completed.

It has been decided that a section of retrospective art will be one of the features of the international exhibition of 1900. France alone will be represented. The choice and arrangements will be conducted by two special commissions. To some extent the precedent of 1867 will be followed. The first work to be done will be the preparation of a catalogue of the principal works which have figured in Salon exhibitions since the beginning of the century. It will then be determined in what way they can be exhibited, in order to clearly show the progress of French art. When the preliminary work is complete, applications will be made for the loan of those works which have been purchased by the State and are deposited in public galleries in Paris and provincial cities. Private collectors will also be requested to contribute. The arrangement is systematic, and it may be said to be thoroughly French also. It is certain to be successful.

THE Palais de l'Industrie, in which the Salon exhibitions were held since the formation of the Society of French Artists, is now in the hands of the demolishers. M. DAVAL has purchased the materials (with a few exceptions) for 255,225 francs, or over 10,000*l.* The area occupied by the building is 36,000 metres and the whole must be cleared in six months. The work cannot be continuous. A part must be spared during the next Salon exhibition. The cast-iron columns and girders of the great hall are to be broken as soon as taken down in order to facilitate carriage, and the fragments sent direct to the foundry. It is calculated by the contractor that about 350 labourers will have to be employed, and there will also be smiths, glaziers, carpenters, in order to preserve some of the parts which can be sold as they stand. Some of the stone, such as "Saint Maximin,"

which came from quarries that are exhausted, will be likely to obtain a high price from builders.

In the last week of April the French School of Athens will hold a conference at which the following subjects will be discussed:—(1) Methods to be observed in the search for ancient monuments and their preservation when found; (2) means to be employed to facilitate archaeological work and render it expeditious and more fruitful; (3) archaeological teaching. The school was founded by an ordinance of LOUIS PHILIPPE issued on September 13, 1846. It has therefore completed its half-century. The main object then sought was the study of architecture, for as SAINTE-BEUVE said at the time, "Architecture reigns in Athens in its most majestic developments, and if Rome is the home for a school of painting, the most natural centre for architecture is Athens." It was also proposed to send there some students of philology. The dream of SAINTE-BEUVE was to have the choruses of the "Œdipus" read at Colonus and those of the "Ion" at Delphi, the odes of PINDAR studied in presence of the places celebrated in them, a great historian followed systematically over the region of a campaign, and the victorious course of EPAMINONDAS followed through Arcadia with a "Xenophon" for guide. But in those days a Frenchman never thought it was necessary to take part in excavations for the advancement of archaeology. Now the French School is distinguished by its enterprise, and has succeeded in revealing much of the ancient world which is interesting.

In Scotland hydropathic establishments are rivals of the hotels, for they generally occupy picturesque positions and visitors find them to be economical. Some time since one in the Trossachs was destroyed by fire. The owners were bound to erect another of such a value as to produce 15,000*l.* if the building was offered for sale. Plans were accordingly prepared, but the ground landlords considered they were inadequate to the requirements. Application was made to the Scottish Courts, and a report on the plans was ordered to be made by Mr. PEDDIE, of Edinburgh. It stated that the building for which plans had been prepared, and which had been or was about to be commenced, was not a building which would satisfy the conditions, and that therefore the defendants had not commenced the erection of exactly that class of building required by the judgment of the Court within three months of that judgment. Lord KYLLACHY, the judge, said it was suggested that value meant cost or outlay judiciously expended; but he did not understand how money could be judiciously expended if what was produced was worthless, or not worth the money expended. It appeared to him that the terms, and certainly the substance, of the Court's judgment would be satisfied if a building were erected which, if it had been originally built, would have satisfied the ground landlord's obligation. "What's the worth of anything but so much money as 'twill bring" is an old rhyme, and it is interesting to find that the idea has inspired a judgment in the Scottish Courts. Political economists may not agree with the terms; but to make sure of a market value of 15,000*l.* a very much larger sum will have to be expended on the buildings.

It is not always easy to understand in the south all the peculiarities of the Scottish system of measurement and quantity-taking. For example, why should one rule be in force for paying the measuring of masonry and another for woodwork? Messrs. JAMES HAY & SON lately requested the work and paving committee of the Dundee Police Commission to repay them one-half of the fee for remeasuring the joiner-work of the Municipal Buildings paid by them to Mr. CAMPBELL, on the ground that the contractor for the mason-work had received from the Commissioners one-half the fee paid. The committee refused the application as the terms of the contracts were entirely different, and the Commissioners were not liable for payment of any part of the fee for measuring the joiner-work. A bargain is a bargain, but evidently the contractor for the joinery considered that in equity he had a claim on the half-fee.









Wenn nicht voll ihres Wissens



Es soll befolgen die Satz der höchsten





and we come to worship him

CHANCEL PAINTINGS: S.S. PHILIP AND JAMES' CHURCH, UPPER HATHERLEY, CHELTENHAM.

By J. EADIE REID.

Messrs. MIDDLETON, PROTHERO & PHILLOT, Architects.











The Architect, Feb. 12<sup>th</sup> 1897



PHOTOGRAPHED BY S. B. BOLAS & CO

INK PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

THE CRIPPLE GATE INSTITUTE, GOLDEN LANE.  
S. R. J. SMITH, Architect.







The Architect, Feb. 12<sup>th</sup> 1897







INK- PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

PHOTOGRAPHED BY S. B. BOLAS & CO.

CATHEDRAL SERIES, No. 11.—ELY: NORTH AISLE, LOOKING WEST.













PHOTOGRAPHED BY MESSRS. POULTON.

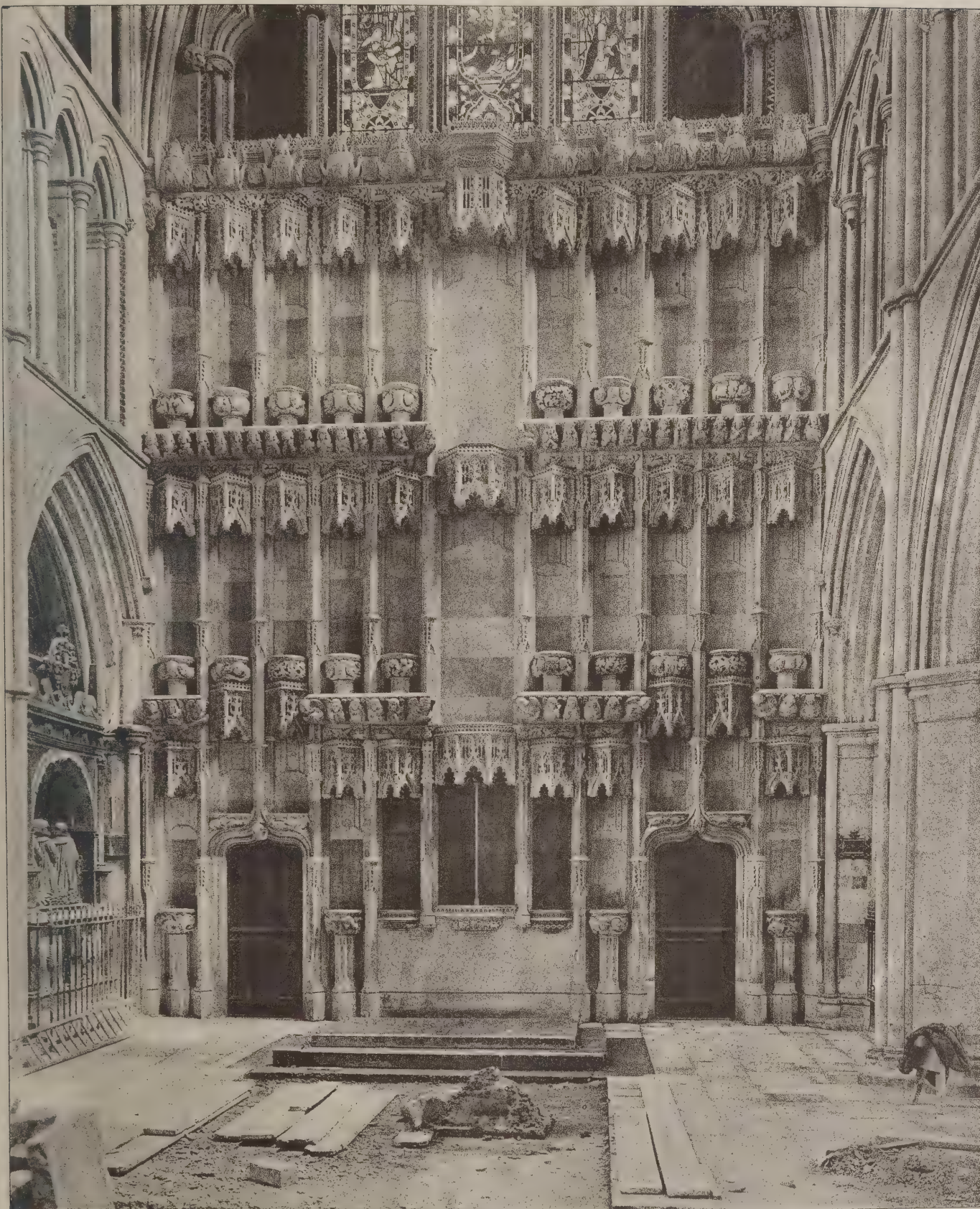
INK- PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

**APSE: CHRIST CHURCH, CHELTENHAM.**

Messrs. MIDDLETON, PROTHERO & PHILLOT, Architects.

Paintings by W. B. RICHMOND, R.A., and J. EADIE REID.





PHOTOGRAPHED BY S. B. BOLAS & CO

INK-PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ALTAR SCREEN: ST. SAVIOUR'S CHURCH, SOUTHWARK.









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FIRE STATION, FULHAM ROAD.  
ROBERT PEARSALL, Architect.







## ILLUSTRATIONS.

ELY CATHEDRAL—NORTH AISLE, LOOKING WEST.

THE APSE AT CHRIST CHURCH, CHELTENHAM.

"Fresco secco" is the method adopted in the execution of this work by Mr. RICHMOND, R.A., and Mr. J. EADIE REID. The CHRIST is seated on a great throne, from underneath which flows the stream of living water. On either side are seated the twelve apostles. Over the richly carved arcade are crowds of adoring angels. Their richly coloured wings interlace until the tips touch the orb of the golden sun. In the soffit of the arch—unfortunately not shown in the photograph—St. MICHAEL and St. GEORGE are seated guarding on either side. The silver moon is here shown as typical of death, in contrast to the eternal life pictured in the half dome. The subjects in the lower panels are "The Annunciation," "The Meeting of the VIRGIN and St. ELIZABETH," "The Presentation in the Temple," "The VIRGIN and CHILD accompanied by St. JOSEPH." The altar-piece illustrates "The Easter Morning." Messrs. MIDDLETON, PROTHERO & PHILLOTT, of Cheltenham, are the architects.

THE CHANCEL PAINTINGS AT SS. PHILIP AND JAMES,  
UPPER HATFIELD, NEAR CHELTENHAM.

THESE paintings are painted in the same medium—fresco secco—as that employed in the work at Christ Church. There is, besides the panels illustrated, a large fresco in the choir—CHRIST amongst the Doctors. The work has been designed and painted by Mr. J. EADIE REID, who has also schemed the decorations of the nave and choir. Messrs. MIDDLETON, PROTHERO & PHILLOTT, Cheltenham, are the architects.

ALTAR SCREEN, ST. SAVIOUR'S, SOUTHWARK.

IF historic, legendary and poetic associations were of any avail, the Priory Church of St. Mary Overie in Southwark ought to be one of the best preserved in England. Its history, as related by JOHN STOW, has a new interest at a time when the building is about to be once more brought into connection with English royalty. In his description of Bridge Ward Without, STOW writes:—

East from the Bishop of Winchester's house, directly over against it, standeth a fair church called St. Mary over the Rie, or Overie, that is, over the water. This church, or some other in place thereof, was of old time, long before the Conquest, a house of sisters, founded by a maiden named Mary; unto the which house and sisters she left (as was left to her by her parents) the oversight and profits of a cross ferry or traverse ferry over the Thames, there kept before that any bridge was built. This house of sisters was after by Swithea, a noble lady, converted into a college of priests, who in place of the ferry built a bridge of timber, and from time to time kept the same in good reparations, but lastly the same bridge was built of stone; and then in the year 1106 was this church again founded for canons regular by William Pont de la Arche and William Dauncy, knights, Normans. William Gifford, bishop of Winchester, was a good benefactor also, for he, as some have noted, built the body of that church in the year 1106, the 7th of Henry I.

The canons first entered the said church; then Algodus was the first prior.

King Henry I. by his charter gave them the church of St. Margaret, in Southwarke. King Stephen confirmed the gift of King Henry, and also gave the stone house, which was William Pont de le Arche's by Downegate. This priory was burnt about the year 1207, wherefore the canons did found a hospital near unto their priory, where they celebrated until the priory was repaired; which hospital was after, by consent of Peter de la Roch, bishop of Winchester, removed into the land of Anicius, archdeacon of Surrey, in the year 1228, a place where the water was more plentiful and the air more wholesome, and was dedicated to St. Thomas.

This Peter de Rupibus, or de la Roche, founded a large chapel of St. Mary Magdalen, in the said church of St. Mary Overie; which chapel was after appointed to be the parish church for the inhabitants near adjoining. This church was again newly built in the reign of Richard II. and King Henry IV.

John Gower, Esquire, a famous poet, was then an especial benefactor to that work, and was there buried on the north side of the said church, in the chapel of St. John, where he founded a chantry. He lieth under a tomb of stone, with his image, also of stone, over him; the hair of his head auburn, long to his shoulders, but curling up, and a small forked beard; on his head a chaplet, like a coronet of four roses; and habit of purple, damasked down to his feet; a collar of gold essos about his neck; under his head the likeness of three books, which he compiled.

The roof of the middle west aisle fell down in the year 1469. This priory was surrendered to Henry VIII., the 31st of his reign, the 27th of October, the year of Christ 1539, valued at 624*l.* 6*s.* 6*d.* by the year. About Christmas next following the church of the said priory was purchased of the king by the inhabitants of the borough, Doctor Stephen Gardner, bishop of Winchester, putting to his helping hand; they made thereof a parish church for the parish of St. Mary Magdalen on the south side of the said choir, and of St. Margaret on the Hill, which were made one parish of St. Saviour.

Finally, STOW gives a list of the principal monuments in the church, among them being one of WILLIAM OF WYKEHAM, bishop of Winchester, who was renowned as an architect. They continued to be attractive to people who were indifferent to the state of the building containing them, as is evident from the entry in PEPYS'S "Diary" under the date July 3, 1663:—"With Mr. CREED over the water to Lambeth, but could not see the archbishop's hearse; so over the fields to Southwark, I spent half an hour in St. Mary Overie's Church, where are fine monuments of great antiquity." There could hardly be a stronger testimony to the interest of the memorials than the fact that they were able to captivate so restless a sightseer for thirty minutes.

It must have been soon after PEPYS'S visit that some architect of the seventeenth century (tradition says Sir CHRISTOPHER WREN was the culprit) was commissioned to encase the beautiful altar screen and to mutilate it, in order that the new structure of wood and plaster might have a more even surface to rest against, and to form, as JOHN CARTER said, "one of those vulgar, clumsy altar-pieces in what is called the Grecian taste." The altar screen, of which we give an illustration, resembles the noble work in Winchester Cathedral which was erected by Bishop Fox. It is probable the Southwark screen was also erected at his expense at a later time, for the London palace for the see of Winchester adjoined the priory church, and some of the predecessors of Fox, notably GIFFORD and DE RUPIBUS, were munificent benefactors to St. Mary's. In one feature the Southwark screen is preferable, for in the Winchester screen the figures of the two upper rows of niches stand on the canopies which are over the figures, whilst in St. Mary's the niches are separated by a band or frieze of angels. The entablature of angels and shields is a modern addition designed by ROBERT WALLACE, who had charge of the restoration undertaken about sixty years ago. The figures in the niches were not likely to have survived the surrender of the priory to HENRY VIII., but the canopies and other delicate parts of the screen which were preserved were ruthlessly broken when it was considered necessary to conceal a shrine which once contained images of saints in stone. A partial restoration under WALLACE was carried out at the expense of a special committee. The incised lines seen in the niches were part of the ornamentation introduced above the heads of the statues. It is not difficult to imagine the appearance of the work in its perfect state. There were few churches in England which possessed a reredos presenting so rich a combination of gilded and coloured sculptures.

The restoration of the altar screen was only one among several attempts which were almost simultaneously made to save the church. Centuries of neglect had produced the usual result. The fall of the building seemed to be imminent, and the authorities of the church appear to have been bewildered at the extent of the operations which were required, and at the outlay which was indispensable. JOHN CARTER relates how in 1808 "the seminary youths at Westminster" were accustomed to amuse themselves by mutilating the mullions and tracery of the windows, and the weapons they employed were fragments of the ornamental masonry. There was no beadle or other officer to prevent such havoc. In the interior "compo" was employed as an universal remedy. The greater part of the nave was "hid in the basements by the accustomed pew lumber, and beyond the great arch under the tower the nave is entirely stopped out with that odious, preposterous and useless piece of lumber, the organ case." But no part of the building was in so dangerous a condition as the tower. It was resolved to call in GEORGE GWILT (the elder brother of the encyclopædist), and under his direction the tower and lady chapel, or retro-choir, were restored. It is to be regretted that more was not done by GWILT, but the transepts and screen were undertaken by ROBERT WALLACE,



and what was practically a new nave was created by a Mr. ROSE.

One remarkable circumstance occurred in the course of the works. This was the discovery of a part of the church which had been concealed for more than three centuries. We give an illustration of the part in question, which is at the west end of the nave and south aisle, from a drawing by JOHN BUCKLER, F.S.A. In his description he wrote:—"It was disclosed to view upon the removal of the masonry

The architectural features in these portions of the church are distinguished from the rest by the general design of the capitals and the detail of the sculptured ornaments, both of which present a near resemblance to the forms characteristic of late Norman architecture, and may fairly be assigned to the reign of King JOHN. It was owing to an unaccountable deviation from parallel lines in the position of the newer pillars in the nave that the groined vault in the western portion of the aisles was constructed in the



THE SOUTH AISLE, NAVE OF ST. SAVIOUR'S CHURCH, SOUTHWARK.

by which it had been concealed in the latter part of the fifteenth century, at which period the west doorway and window were inserted. The arches alluded to in a double tier at the west end of the nave, the clustered pillars attached to the same wall, the arches under the windows in the side aisles, the windows themselves in the westernmost compartment of both aisles and the south porch are all of the same age.

irregular manner shown in the drawing. The bases of all the columns were nearly concealed by the pavement. It was observed, upon their being opened, that they had been carefully restored in cement; but the period of this restoration, and of that when the floor was raised, are unknown."

ROSE's nave was completed in 1839, and it was tolerated for a whole half century. Owing to the increase of



interest in the old church and the more general diffusion of knowledge it was at length felt that such Gothic forms as were presented in the nave were unworthy. On October 15, 1889, Bishop THOROLD, in his quadrennial charge to the clergy of the diocese, which was delivered in St. Saviour's, spoke strongly on the subject of restoration :—

All will agree, said his lordship, that the restoration of one of the most exquisite Early English churches in the country, if worth taking in hand at all, should be done thoroughly. Southwark is full of picturesque history, and St. Saviour's is the centre of it. Great functions have been celebrated within the church walls, state processions have passed it on their way to the Metropolis, fire and decay and stupid vandalism have through long ages wrecked their worst on it. Within its shadows repose the ashes of saints, poets, dramatists, who have made England famous. Here in February 1423 James, king of Scotland, was married with magnificent pomp to Joan, daughter of the Earl of Somerset and niece of Cardinal Beaufort, bishop of Winchester. In March 1352 John de Shepy, thirtieth prior of Rochester, was consecrated in this church forty-fifth Bishop of Rochester by the bishop of the diocese, who had a great house close by. The church where Rogers and Hooper and Saunders and Ridley witnessed a good confession before their death of fire; where Gower, Fletcher and Massinger are buried; where Christians still come to visit the tomb of Bishop Andrewes, and where Dr. Sacheverell was chaplain, claims and deserves a united and enthusiastic effort to make her worthy of her past history, and not quite unworthy of a future which must hereafter be in store for her as the cathedral church of London south of the Thames. Of the sordid nave not one stone shall be left standing if I have anything to do with the restoration. The transept and choir are suffering from damp and neglect, and cannot be left as they are without grave risk. Gwilt's admirable instalment of restoration must be now made complete if the fabric is not to suffer irreparable injury and the Church grave discredited.

The restoration was confided to Sir A. W. BLOMFIELD. On July 24, 1890, the first stone of the new nave was laid by the Prince of WALES, and its sordid predecessor will henceforth be comprised in the list of calamities to which the church was subjected. The restored building will be soon reopened by the Prince of WALES, and it merits to be prized, for it is the most interesting example of antiquity which Southwark contains. Of all the buildings enumerated by JOHN STOW it alone has survived.

THE CRIPPLEGATE INSTITUTE, GOLDEN LANE.

FIRE STATION, FULHAM ROAD.

### ELY CATHEDRAL.—III.

#### *The Octagon.*

THE foundation of the new lady chapel was scarcely laid before, on February 12, 1322, the central tower fell, ruining the adjoining bays all round, and especially those of the Norman presbytery.

Such disasters were not unfrequent. The Norman builders had trusted too much for the strength of their works to mere bulk, and had too much confidence in the rubble with which they filled in the middle of their walls and piers. This was all very well for ordinary positions, and where the cement proved good it was found trustworthy even for the support of concentrated weight; but it was "sailing too near the wind," and, in many instances, where the material was weak or the cement proved unsatisfactory, the piers of their central towers and even other parts of their work gave way. This was the case in the twelfth century with the sister-tower at Winchester (the piers, at least, of the two were the work of the brothers Walkelyn and Simeon); such has been in our own day the case at Chichester, and the same happened in the early days of which we are speaking.

It was not unexpected, for we find that the monks had discontinued the use of the choir, and had their services in St. Catherine's Chapel in the western transept. It was immediately after matins on the eve of St. Erminhilda's festival that the tower fell, with such noise and violence as "to make the whole city to tremble and to cause men to think that an earthquake had taken place."

Happy it was for Ely that she possessed a man, a member of her own convent, who was fully equal to the occasion. The same "venerabilis et artificiosus frater Alanus de Walsingham," who, as sub-prior, had a year before laid the first stone of the lady-chapel, was now at hand, as sacrist, to design and to carry out the great work incident upon this catastrophe.

As the chronicler says:—"The aforesaid sacrist Alan, vehemently grieved and earnestly sorrowful at this disastrous and lamentable event, for a moment knew not which way to turn himself or what to do for the reparation of such a ruin. But, recovering his courage, and greatly confident in the help

of God and of his most pious Mother Mary, and also in the merits of the Holy Virgin Etheldreda, he laid his hand to the work; and first, with great labour and expense, he caused to be removed from within the church the stones and timber which had fallen in the ruin, and also the superabundance of dust which was there, with all possible speed to be cleared away, and having measured out by architectural art, in the place where he was about to construct the new campanile, eight positions in which the eight columns of stone supporting the whole edifice were to be erected, and beneath which the choir with its stalls was afterwards to be constructed, he caused them to be dug out and examined, till he had found a solid place where the foundation of the work could be securely begun. These aforesaid eight places then, having been solicitously proved and with stones and sand firmly consolidated, he then at last began the eight columns and the subsequent stonework, which work, indeed, was completed up to the higher cornice through six years to the year of our Lord 1328."

This simple description records a work of great originality, and standing alone in its design among English Mediaeval structures.

Instead of rebuilding the four great piers of the central tower he wholly removed them, and, stepping backward one bay in every direction, he adopted the eight next pillars as the points of support for his new tower; reconstructing or enlarging them to such size and form as would give suitable supports to a magnificent octagonal central area. He may have been acquainted with the central domes of some Italian churches, such as those at Florence and Siena (the former of which was, however, only half built in his time); anyhow, he struck upon the same noble idea of opening out the intersection of a cruciform church, instead of contracting it by the projecting piers of a tower, and right nobly did he carry out the idea. He did not, however, attempt a dome, which, in a country which had had no experience in their construction, would have been an act of temerity; but, reducing his octagon overhead by timber vaulting to an opening of moderate diameter, he raised on that contracted octagon a beautiful lantern of timber lighted by eight rich windows and crowned again by a second timber vault. The architectural *quasi* construction of this internal design is of necessity distinct from the actual construction, which is effected by a system of vast timbers behind the lower vaulting, by which the weight is conveyed to the eight piers at levels higher than the apparent points of support as seen from within, and above this lantern is a small storey which was used for the bells.

I will not attempt to describe this magnificent design—as you have it before your eyes—further than to say that, the octagon not being equilateral, the four greater sides open into the four arms of the cross by arches commensurate in height with them, while the four smaller sides open by lower arches into the aisles over which, with a small intervening triforium of original design, rise magnificent clerestory windows, opening to the four diagonal quarters of the compass. In the angles at about half height are eight very original and beautiful niches, on the corbels of which are sculptured as many scenes from the life of the foundress, viz. :—

1. Her nuptials with the Northumbrian king;
2. Her taking the veil;
3. Flight from her husband;
4. Her staff budding as she slept;
5. Her induction to the abbacy;
6. Her death and burial;
7. Her translation;
8. A miracle wrought at her canonisation.

The work, though so promptly carried on so far as its stonework was concerned, lingered long in the hands of the carpenters, painters, plumbers and those employed on the fitting-up of the choir, the bell-founders and hangers, the organ-builders, the glass-painters, &c., so that it was not till the forty-eighth year from the commencement of the work than the then sacrist, John of Ely, having mechanically left a place in his annual account for the usual outlay on the "new work," left it unfilled, as having at length no expenditure to record. Strange, however, to say, even the stonework was never fully completed, the eight angle turrets remaining to this day imperfect.

During this long period the accounts of expenses were minutely kept, and contain matters of great interest in the history of Mediaeval building works, the modes of obtaining materials, the terms made use of, and many other matters not possible to be detailed in a comparative sketch like the present.

Walsingham had become prior in 1341, and was elected bishop in 1344, though this election was not confirmed. Thus we find the two greatest English architects whose names are recorded, viz. Alan de Walsingham and William of Wykeham, deemed worthy of the highest rank in the Church.

I have deferred to state that this "new work" was not limited to the octagon. The three ruined bays between it and Northwold's presbytery were rebuilt at the cost of Bishop Hotham, but under the direction of Walsingham. These have



been pronounced to be the most beautiful English works of their period; and unquestionably they stand alone among corresponding works of the fourteenth century, not only in beauty, but in the proportions of their essential parts. The triforium storey had gradually diminished its proportions from the Romanesque period onwards, till we find it in most works of this century (as in the nave of York, the choir of Lichfield, of Selby, of Guisborough and in many other works) reduced to almost a nonentity. Circumstances, however, prevented this waning away at Ely. Northwold, in adding his Early Pointed presbytery, had been held to the horizontal divisions of the Norman work from which it grew; and, in like manner, was Walsingham held to the levels of Northwold's work, so that, whether he would or not, he was compelled, while building these Late Decorated bays, to design them on Norman proportions. This, it must be admitted, gives a grandeur to this work unusual among its contemporaries, though the exquisite beauty of its detail with the advanced but still simple style of its vaulting belong to its gifted architect.\*

The stall-work of Alan de Walsingham, begun in 1338, yet remains, and is of great beauty.

#### *The Lady Chapel.*

Contemporaneously with these great works, however, was proceeding—side by side with them—the construction of the new lady chapel, no doubt designed by the same great architect, though committed to the care of a monk named John of Wisbech, who is recorded to have “continued the work aforesaid with the greatest solicitude through twenty-eight years and thirteen weeks, and to have finished the stone structure with images, both within and without the chapel, in number 147, besides the small images in the tabula or reredos over the altar, and exclusive of the images to the doorway of the entrance to the chapel; also the timber-work covered with lead, and the eastern gable with two windows on either side of the chapel, most beautifully furnished with iron and glass.” He died of the plague in 1349.

The only palpable fault in this building is its undue width. It is a work of wonderful and exquisite beauty, its great glory being the gorgeous and unrivalled series of stone stalls which surround its walls, which are not only worthy of the closest examination, but the more close the scrutiny the more lively will be the admiration excited.

The east window (which is not elegant) and the reredos (which has been very rich, but is much mutilated) are insertions of a somewhat later date; the one given by Bishop Barnet about 1375, and the other being a little later.

I have now brought down the history of the building to another period of truly glorious perfection, and I must decline to chronicle works of deterioration from this condition; indeed, time would fail to tell of the removal of the western spire, the substitution of an octagonal storey which threatened to bring ruin upon it and necessitated costly, and injurious alterations; the changing of the form of the external triforium stage—that of the choir in the fourteenth and that of the nave in the succeeding centuries; the alteration of Northwold's windows and numerous other works of decadence.

It is not easy to imagine the beauty of the cathedral at this period of its perfection. The stern majestic nave, its original design untampered with, the approach to it through the exquisite galilee, and its two unequalled portals, the octagon central space with the gorgeous choir beneath it, and beyond the noble presbytery containing the shrines of the foundress and her relatives, of St. Alban and other saints, glittering with gold and precious stones, while every altar was richly decorated and furnished, every window rich with coloured glass, and the walls and ceilings and pavements harmonised with them by decorative painting, and in all directions the sepulchral monuments of departed bishops, abbots, priors, monks and of pious benefactors, and with no incongruous object to meet the eye at any point.

I will not attempt to go into a description of the sepulchral monuments further than to call attention to the splendid marble effigy of Bishop Northwold, perhaps the finest of its period which remains, and to the gorgeous canopy of Bishop de Luda's tomb, almost a counterpart of that of Edmund Crouchback, Earl of Lancaster, in Westminster Abbey. This has had the central part of the altar tomb cut out to make a passage way, but several of the lost compartments remaining in Bishop West's chapel used to cover the receptacle of the bones of early worthies. The beautiful canopy which, in a mutilated form, had been used for some time to cover the tomb of Bishop Hotham, and which is now restored on the side which had been destroyed, is believed to be the substructure of the shrine of St. Etheldreda, as renewed by Walsingham—and is nearly cotemporary with

that recently discovered and brought back to its place at St. Albans.

The monastic buildings I leave to be explained by my able colleague—only calling attention to the infirmary as a masterpiece of late and refined Norman work, the fragment of the monks' kitchen, also Norman, the beautiful arcading of what was once the refectory, the guests' hall, now the deanery, the remains of the Prior's lodging and its hall, with a beautiful fourteenth-century chimneypiece, and the exquisite chapel of Prior Crawdon attached to it. The latter has been partially but well restored under the direction of Professor Willis and Mr. Stewart, though there is one little blemish I should like to see removed; I mean the stone seat continued behind where the altar stood; a self-evident impossibility for which I was assured by the clerk of the works, the late Mr. Hastie, that no reasonable evidence was found to exist.

*(To be concluded.)*

### THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting of the above Association was held on Friday evening last, Mr. Beresford Pite, president, in the chair. The minutes of the last meeting having been read and agreed to, several nominations were announced. The following gentlemen were elected members:—Messrs. P. T. Chew, F. J. Corfield, O. D. Doll, S. A. Heaps, R. H. Whithall, J. A. R. Inglis, G. L. O'Connor, J. Ormrod and W. N. F. Woodland.

Mr. G. H. Fellowes Prynne was duly elected vice-president in place of Mr. J. Begg (resigned), and Mr. Cecil Claud Brewer fills the vacancy on the committee caused by Mr. Prynne's promotion.

It was announced that the following new classes are commencing:—Perspective, Specifications and Estimates, and Elementary Physics.

Mr. A. S. Flower read the subjoined paper (with lantern illustrations) on

#### **An Unwritten Chapter of English Architectural History.**

As the history of English architecture has not yet been written no apology is due to any particular author for venturing to suggest a few unconsidered trifles, for which room might perhaps be found in such a work. But to an audience of architects an apology for introducing a subject of this kind at the present day seems very much needed. One is confronted at the outset with the question, Are not all such studies wholly useless and pernicious? Leaders of opinion confidently assure us that they are; and knowing quite well the disesteem into which historical studies are at present fallen, I hardly dare to occupy your time with matters which so many architects desire to see not merely “relegated” but eternally confined to limbo. It is simply in obedience to the request of the honorary secretaries, binding as a command on every loyal member of the Architectural Association, to provide a paper, which they specified to be “on a historical or scientific subject,” that these notes are offered. I could think of no other subject but my own out-of-date and very unfashionable hobby of English Gothic architecture; but as shirking the duty, or, as I think I ought to say, declining the honour seemed out of the question, I took encouragement from a passage in the President's opening address, when he bade us, “study the mind in the building, through painstaking measurement and logical reasoning. Find out how and why every joint and form was made. The answer lies hidden in the building.” This is just what for a long time I have been trying to do, and I am therefore at least acting on our President's advice in bringing before you the results of some independent research into the history and characteristics of the Mediæval architecture of England.

Waiving then for the present the great question as to whether any such studies are to be recommended at all, and assuming, merely as a premise (let us say nothing of examinations), that a young architect wishes, for some reason or other, to learn something of the old architecture of his country, how can we best assist him? I should first like to quote some old advice given on this subject, which no one here can ever have seen in print. The extracts are lengthy but have a bearing on what is to follow.

If you ask how you are to study architecture, you will probably be told to read up the whole history of the art in all countries, with formidable lists of names, dates and dimensions. You will have recommended to you treatises on the orders and styles, on rules of proportion and other arithmetical niceties; and will be further advised to read books on the principles of beauty and taste, and probably much poetical extravagance in addition. . . . However we may define architecture, we must agree that it is a practical art, confined by the requirements of utility, the properties of materials and the laws of mechanics. Therefore in studying it be practical; put aside all considerations derived from archaeology, sentiment or association, and simply use your own eyes and your own common sense; learn by

\* It will be observed that a large shaft separates Bishop Hotham's three bays from the work of Bishop Northwold. This is the pier of Abbot Simeon's apse. It remained attached to his four presbytery bays after Northwold had added his six bays to it; and when Hotham rebuilt Simeon's presbytery, he left this little relic of it between his own work and that of Northwold.



observation and by reasoning. Ask the buildings themselves why they are as they are, and what is their meaning. Imagine yourself with the builders, asking what they are going to do, and wherefore. . . . So when you criticise, you will neither praise a building because it is correct or classical, or reminds you of something which you have admired elsewhere; nor will you condemn it because it appears new and strange, or, on the other hand, familiar and unoriginal; you will simply consider, is it good in itself, that is, is it well fitted for its purpose and well adapted to its position, are its materials well chosen and well put together, is it expressive of its object and its construction, does its design show everywhere a striving after beauty? If all this is the case, it is good architecture; but if one of these qualities be lacking, though the building may display the most costly and splendid materials, the highest mechanical skill, the most careful workmanship, the most accurate copying of some acknowledged masterpiece, the result, as architecture, is bad. . . . To criticise buildings, you must try to grasp the circumstances of their erection, and look at them from the point of view of a constructor. The disposition must be encouraged of thinking of a building as a thing composed of stone, brick, timber and iron, erected for a definite purpose and under particular conditions, and not, with the architectural writers of the last three centuries, as merely an affair of lines and conventional proportions and ornaments, quite independent of materials, use or position, just as if it existed only on paper; nor, with some of our own day, as a thing whose essence is accidental picturesqueness, historic or romantic associations, or the superficial decoration of sculpture, painting or heraldry.

This almost anticipates the new philosophy of architectural materialism, and, as we hear so much nowadays against even the use, and not only the abuse, of books in connection with architecture, I quote these passages from an unpublished paper which I read to an amateur society many years ago. The present subject obliges me to make many references to books, so I wish just to clear the ground, and put myself in order, so to speak, by explaining that, having gone through the phase myself, I quite appreciate the standpoint, and can thoroughly enter into the feelings of certain good friends of mine, fellow members of the Architectural Association, who not only object to any form of book-learning, but even declare, as one quite lately did, that all architectural books ought to be burnt. There is truth, of course, in the idea underlying this—all the books in the world will not make one architect; but the easy proof of this proposition does not negative nor even weaken another one, namely, that books may be useful to architects.

Returning to our imaginary student we tell him, of course, to go out sketching and measuring, and not to neglect to take notes of construction and materials; every one will agree in this advice. He then surmounts, let us suppose, every technical difficulty, until we find him able to draw with the utmost accuracy and most thoroughly artistic touch any subject he may meet with; he has seen and sketched hundreds of buildings and acquired quite a respectable acreage of details; he can freely reproduce from memory any portion of his sketch-book; he is, in short, a consummate draughtsman, but there is still something wanting. I am not speaking now of the faculty for design, but simply of that knowledge of the architecture of the past which we are presuming that he desires. Does he really understand these buildings? For all that he has done so far he may be no more capable of seeing into the ideas and motives of the men who built them than the most prosaic and mercenary photographer. The difference between the two is not necessarily more than one of manual process, the mental attitude of each may be substantially the same. Unaided observation, accompanied by however great technical skill in recording, will not enable a man to read the riddles of ancient buildings. Whenever curiosity begins to be aroused as to how, or when, or why some particular work was built; whenever, in short, the student wishes to go a stage further and to know all about what he is sketching, he comes to feel the need of definite guidance; in fact, he has recourse to books. He requires them for several reasons: to learn methods of arranging, connecting and utilising his own disjointed memoranda; to obtain many indispensable facts which he could not possibly discover for himself; to bridge over gaps in his own experience, to become acquainted with principles and theories which may throw light on what he has observed or direct him into fresh fields of inquiry.

Books on the history of architecture are not, as is frequently asserted, fetters forged by malign opponents for the enthralment of art, nor are they simply labour-saving tools to assist lazy men in the mechanical business which they call their art. Rightly used, they are the means by which an architect may learn the true nature of his art, its difficulties, its qualities and powers, its grand possibilities. But architectural books lead us at once to the thorny question of styles. "Read a little history," the student is sometimes told, "but steer clear of anything to do with divisions of styles." All art is one; therefore all Gothic architecture is one, and it is criminal wickedness to attempt to divide it." Advice of this sort in many cases cannot possibly be attributed to any dislike or contempt for the kind of architecture in question. It is principally based, I believe, on a misconception, which it seems worth while trying to explain.

In most branches of knowledge, if not in all others, it is

generally agreed that subdivision and definition are requisite in order to render learning and teaching possible. "The orderly arrangement," I have seen it expressed, "and classification of its material is necessary to the true advance of knowledge." Of course, if it has to be conceded that Gothic architecture is a thing by itself, not subject to the common rules of human experience, the argument that methods like those found necessary in other arts and sciences can be successfully applied to it falls to the ground at once. But this those who talk about a one and indivisible style have still to prove. In the meantime I prefer to believe in the sound old Roman maxim, "Divide et imperia," which may be freely rendered, "By division you will become master."

If we suggest, then, that for the sake of a more intimate acquaintance with the character of Gothic building, the learner should analyse it, should consider its component parts separately and in their relations to one another, instead of only gazing on it as a whole, beautiful but incomprehensible, we must consider the means at his disposal to enable him to grasp his subject. Directions, guide-posts and landmarks innumerable await him; but unfortunately the greater number of them, and of these the most conspicuous and most generally followed, have been set up on the wrong roads. This is, I believe, the real cause of the distrust now so strongly manifested in all definite study of Gothic. Many men have a vague sense that there is something inadequate, something unsatisfactory, in the orthodox teaching on the subject, and jump to the conclusion that therefore all teaching of it must be wrong and misleading. The idea of improving our present methods does not seem to anyone worth a thought. As it is of no material disadvantage nowadays to an architect to know nothing about Gothic, the older men either leave it alone, or go on, content with the notions about it remembered from their boyhood, thinking the whole subject so simple, so easily mastered, that everything which could possibly be known about it was long ago finally settled and laid out, cut-and-dried, leaving no room for further research or progress. But this attitude has had results for the younger generation. There are still men, even amongst the youngest of us, who take an interest in our inheritance from the middle ages, and there is besides a much larger and rapidly growing body outside who do the same and who look to us for instruction and guidance. To these architectural students, craftsmen and amateurs we have nothing to offer but a confused, incomplete and largely untrue account of our ancient architecture. Shoals of books, indeed, there are, but all of them, down to the very latest, are but echoes of the imperfect description of Gothic architecture composed and, to a great extent, invented by the antiquarian *dilettanti* of a hundred years ago. Perfectly true and correct echoes of the old voices they may be, as to that there need be no dispute; but the very important consideration, that in so many ways we have now the means of knowing more than even the cleverest of our great grandfathers could possibly attain to, has, in the general treatment of this subject, been most strangely and sadly overlooked. No wonder is it, then, that an intelligent student, turning to the recognised authorities, and finding himself in a maze of unreal and contradictory statements, often quite at variance with the evident testimony of the buildings as well as with the authentic records of history, becomes utterly disgusted and is tempted to say, "These things have nothing to do with architecture." Illustrations, of course, have been immensely improved, many new facts and descriptions have been added; but as to all matters of generalisation of principles and of application to practice, we are still using a system which is demonstrably absurd and which deserves to be obsolete.

I speak from a considerable experience of the actual difficulties found in pursuing this subject, which evidently oppress even zealous and hard-working students, and these remarks are entirely prompted by the desire to do something if possible towards smoothing the path to a reasonable understanding of it. We have stayed marking time, while in every other branch of knowledge a great advance has taken place, and it is quite time that we should bring ourselves up into line. But the remedy is not to be found in general abuse of antiquaries. Their pioneer work has been of indispensable importance. The fault lies in our having yielded up to them the duty of commanding and directing, which we ought to have exercised ourselves. Hence so many of the generally received ideas about Gothic architecture come from laymen, not from architects, with the natural result that they are thoroughly amateurish and completely ignore the one thing which we care most about—design. We have forgotten that the proper function of our antiquarian comrades is merely to heave the lead and accurately report the soundings for our information and guidance, and not in any circumstances to set the course or steer the ship. To descend from metaphor to details the lay mind—even in the case of the best educated and the cleverest men—seems incapable of thinking of architecture except only as a species of superficial adornment applied in an ascending scale of ostentation. Every imaginable question in architectural design is reduced by the average



Englishman to the single, and to him all-sufficient, one of comparative richness or plainness. Thus we hear members of Parliament and other typical exponents of public opinion treating all buildings as necessarily falling under one or other of three heads; they must belong, that is to say, to what they term the "plain" or "cheap" style, to the "ornamental" or "expensive" style, or else to the intermediate one generally known as the "handsome" style. Imbued with such ideas our lay antiquaries, when, unfortunately not content with collecting and verifying facts, they took to formulating systems, naturally classified and described all our ancient architecture according to the increasing quantity of ornament, which they supposed they could recognise in successive periods.

They were practically unanimous in their division of all Gothic work into early or plain, intermediate or more ornamented, and late or profusely ornamented. There was a vast amount of discussion as to the precise terms to be used to express these distinctions, and as to the particular dates at which one should be held to have merged into another, and almost by accident the designation of the latest style, which very nearly settled down into "Flourish," has come down to us as the much more architectural "Perpendicular;" but the method all round was the same; not to study the differences of design in the buildings, and trace thence the divers principles which had governed their builders, not to study the social history of the nation and learn thence the various events which had influenced its modes of building, but to start with a hard and fast, ready-made schedule of three heads, and cut, cram, maim and squeeze so as somehow to get it filled in. It was reserved, however, for a later generation, almost our own contemporaries, to carry this tripartite system to absolutely symmetrical perfection, by overriding clear historical facts, and declaring the existence of three separate styles, each exactly contemporaneous with one century of the Gothic age. Complaints of this kind may perhaps be called unreasonable or hypercritical. The books in common use, one may be told, give us quite as near an approximation to truth as we need either expect or desire.

To try, therefore, how far this easy confidence is really justified, I must ask you to consider, as briefly as possible, just one instance of irreconcilable difference between views generally accepted and plain facts of history. To quote from a very well-known manual:—"The change from one style to another was not immediate; it generally took nearly half a century to effect the transition, and the last half of each of the five centuries was such a period of change or transition. Buildings of the last ten years of a century generally belong in style rather to that which follows." Passing on to particulars our authority further tells us:—"In the fourteenth century the general character is of the style called Decorated; the last half of it is the period of transition from the Decorated to the Perpendicular." Nothing could be more beautifully simple and regular; but nevertheless it used to be a great puzzle to me how, if all this were true, one never met with a "Decorated" building after the middle of the century, while, without any premonitory signs of change, everything after that time was to be found designed on entirely different, indeed almost opposite, principles. No reaction in taste could by itself account for such a startling change, and from no architectural writer nor any general historian could an explanation of the mystery be obtained; indeed, none of them seemed to recognise the fact. Only after a good deal of search in the bypaths of history did I come across the clue, namely, that the "Decorated" style, after an existence of only some five-and-thirty years, was suddenly cut short and literally killed by the Black Death, that awful pestilence which went near to depopulating England in the years 1348-49.

Epidemics are disagreeable and unpicturesque subjects, apt to be avoided or lightly passed over by even the best historians, as this particular one has been until quite within the last few years. The Black Death, though it ravaged every corner of Britain, carrying off in a few months more than half the population—destruction compared with which even the Great Plague of 1665 sinks into insignificance—did not strikingly affect the general course of politics; on the surface the current of affairs appears to flow on unchanged, but in the artistic just as much as in the social history of England it forms a turning-point of immense importance. All the conditions under which building was carried on were suddenly, violently and permanently altered.

Time will not allow, nor perhaps would you care to hear, even a brief description of the effects of this visitation; but I believe that anyone who will take the trouble to study the inner history of these few years will have no difficulty in learning both how it came about that the "Decorated" style never ran its natural course of logical development, and also what were the causes of the special characteristics of its successor.

The chapter of the history of English Gothic architecture which has never yet been written is the one which shall treat of the whole matter on the sole basis of design. No one except an architect can write this chapter, but only one, so far as I can discover, has ever fairly essayed it—I refer, of course, to the late Edmund Sharpe. His description of Gothic building is

the most architectural one which we possess, and is full of valuable suggestions; but hardly anyone regards it as more than a partial success, and it has certainly not succeeded in supplanting, as its author hoped, the popular amateur version. Sharpe made a bold and original endeavour to place the study of Gothic on better foundations, but his work was doomed to failure, because it rested only on one particular section of design, and that not in reality the most important. In seeking a key to the understanding of Gothic architecture in window-tracery alone, and grouping all buildings in accordance with that one standard, Sharpe showed that after all he was, however unconsciously, still under the influence of the amateur school, who saw in tracery, as they do to this day, the principal evidence of that comparative amount of decoration which they denominate "style." But if I rush in where Sharpe failed, if he feared not, to tread I shall be in danger of the apt quotation of an ancient proverb. If anyone is expecting me to say that I have got the missing chapter in my pocket, I fear he must be disappointed. But over there, in the lantern which our kind friend Mr. Wonnacott will shortly bring into action, I have collected some material which may perhaps suggest to some one how it might be written, and will, at any rate, lighten the dulness of this sermon.

This first slide is one which I have just had made from a MS. in the British Museum, and I do not know that the subject has ever been exhibited before. It is taken from Matthew Paris's "Life of King Offa" (Cottonian MS., Nero D i). The author and illustrator of this work was, I may perhaps remind you, a Benedictine monk of St. Albans Abbey, who died a few years before King Henry III., and is said to have been equally distinguished as theologian, historian, artist, poet and mathematician. The original is an outline drawing in brown ink, measuring about 9 inches by 5 inches, so that the large figures are about 4 inches high. The subject is Offa, king of Mercia, directing the building of St. Albans Abbey, and it is hardly necessary to say the drawing illustrates a building scene of the days of its author, and not of the remote period which he is describing. Its main interest lies in the fact that we have here an unquestionable contemporary representation of a Mediaeval architect, together with some important evidence as to his position and methods of work. It is worth while taking note of even the details of this drawing, because some of the most fashionable modern theories about Gothic architecture depend entirely upon the supposed non-existence of architects in the Middle Ages. It has quite recently been confidently stated, though apparently upon no better grounds than an *à priori* assumption, that "there never was no such person," or that if there was, he was quite undistinguishable in any way from an ordinary mason. We have been told that he could never, like a degenerate modern architect, have been seen upon the works with his coat on, because he could not have possessed one, nor even in his shirt-sleeves for a similar reason. Now the man before us, to consider his outward aspect first, is not of this sort. In all particulars of dress and general fashion he bears a close resemblance to the king and his attendant. So far, too, from looking just the same as any one of the crowd of workmen whom we see engaged in their various handicrafts, he is unmistakably a man of learning and culture, whose work lies in designing and directing rather than in simple manual labour. He is discussing on very friendly terms some point concerning the building with the king; the latter apparently has made some suggestion, but the architect is giving his opinion with no undue show of deference, while the courtier keeps in the background till the question is settled. Even were there no other signs to guide us, this drawing is enough by itself to suggest that a great Gothic building was not, as is so often pretended, a mere concretion of material, piled up by the unorganised and undirected labour of many similar units—exactly in the manner of a coral reef—but was, on the contrary, the actual creation of a single intellect as truly and absolutely so as a play of Shakespeare or an oratorio of Mendelssohn. There is not in reality the slightest disparagement of the other workers who took part in raising such a building in saying that their work could not have come into being without an original mind to give the necessary impulse and control; it is no more than saying that the cleverest actors and the most skilful musicians depend after all for the opportunity of exercising their powers on the previous labour of the individual dramatist and composer. When we know that Matthew Paris not only witnessed important building operations in his own abbey, but was in great favour with Henry III., and present at his court during the erection of the Abbey Church of Westminster, we may readily imagine that in representing the legendary scene of Offa's foundation of St. Albans, Paris drew upon his recollections of the frequent interviews he must have witnessed between Henry and the architect of the great church in the building of which the king took such deep and constant interest. But notice also this architect's compasses and square—they denote more than that he is merely an expert in building—they mark the geometrician. This is a point we must return to, after looking at the other slides, views and details of build-



ings selected for special reasons, which, for convenience sake, must be shown now.

The views on the slides then exhibited comprised Whitby, Fountains, Rievaulx, Lincoln and Beverley, illustrating the first group. The second group was represented by the shrine of St. Alban at St. Albans (a piece of legitimate restoration); gate of St. Augustine at Canterbury; chapel of Merton College, Oxford; the eastern window of Tintern, and Lichfield. The third group included the abbey gateway, Bury St. Edmunds; the screen at Winchester, Selby, Beverley, the east window of Carlisle Cathedral, and window from the church of Holy Trinity, Hull. All these were executed prior to the fear of the Black Death. Examples of work after 1349 were taken from the extreme east end of York, said to be about 1560; Winchester, the later part of Merton, Manchester Cathedral, St. Cross, near Winchester; the west front of Norwich; Canterbury; the west end of Holy Trinity, Hull; St. Mary's, Beverley; and the Beauchamp Chapel, at Warwick.

To come back now to Matthew Paris's drawing. Here we may find the clue, without which we can never learn to see the mind of the Mediæval architect in his work. He was essentially a geometrician. In the great intellectual movement of the thirteenth century, no branch of learning, except theology, was more widely cultivated than geometry; and this science, both then and for long afterwards, occupied an altogether higher position relatively to other intellectual pursuits than it does at the present time. Among the many side-lights which the recognition of this fact seems to throw upon the development of English architecture is one with regard to the vexed question of influence from the East. Most people have at some time felt, if they have not, through lack of tangible proofs, actually allowed, that Oriental suggestions must have played some part in the formation of English Gothic architecture. As an explanation of this, it has generally been loosely asserted that the English Crusaders tried to reproduce at home the Saracenic architecture which they had seen and admired in the course of their campaigns; a supposition which, besides being unsupported by a single evidence, must seem to anyone acquainted with the average military mind absolutely incredible. But when we think of the highly prized Arabic geometrical treatises then finding their way into every monastery and university (the latter being at the time thronged by lay scholars, in numbers almost impossible to realise), there is little difficulty in imagining how the subtle influence of books, written by men whom the most learned of Europeans revered as their intellectual masters, became the means by which Oriental inspirations were grafted upon the rising tree of English architecture. Until we can form some idea of the influence of geometry during the Middle Ages, nowhere stronger I believe than in our own country; until we can partly realise the fascination in the study and exercise of it which then possessed every educated mind, lay and clerical alike, we shall never be able to understand the conditions under which our Gothic structures were designed. Geometry is the indispensable key to the thoughts of the men who built them; indeed, I will go so far as to say that, were I asked to define English Gothic architecture in the fewest possible words my definition would be:—"A species of building wherein every part, from the greatest to the least, is dominated by the same geometrical motive." I beg you to notice, however, that I do not say, simply, "dominated by geometrical motives," nor "by a motive," but "by the same motive." A great deal turns upon this. It will not be at all surprising to hear this definition objected to as being nether new nor true. It may be contended, on the one hand, that everything possible to be said about the connection of geometry with Gothic architecture has been already said; and, on the other, that true art soars far above the trammels of such a cold, hard, prosaic science. Both objections cannot be dealt with together. The former, of course the less important, may perhaps be sufficiently answered in a few words; but, to establish a case to meet the latter, which I expect would be fervently urged, would require the production of a large body of pictorial and other similar evidence, such as, unfortunately, I am unable to bring before you in the limits of the present paper.

But there may still be time to say a little about previous references to the relation of geometry to Gothic design. The mention of it at once calls up visions of plans and sections of churches, crossed over like maps by squares and triangles, with arguments on the supposed rules of their setting out, which have rarely succeeded in carrying conviction, chiefly on account of the apparently arbitrary and usually contradictory systems of measurement adopted by rival theorists. It suggests also that much ingenuity has been devoted to one particular class of geometric design by the illustration of the infinite variety of patterns producible from contained and intersecting circles. Nor will it be forgotten that some authorities have gone so far as to speak of a "geometrical period," though only as a short-lived minor division of English Gothic. We may be grateful for hints from all these sources, but they neither exhaust the subject nor give us the information for which we

seek. It should be remembered that, owing to the general destruction of our own ancient libraries, and the consequent dearth of direct home evidence, people have been implicitly relying upon certain works on proportion, which happen to have come down to us from German and Italian architects of the latter part of the fifteenth and of the sixteenth centuries, to explain the principles of English architecture in the thirteenth and fourteenth centuries. To arrive at an understanding of the actual manner in which Old English architecture was influenced by geometry, not for a limited time only, but from its birth to its decline; not through any one form or figure only, but through many; not vaguely and at random, but with a single order of forms dominating, as a keynote, each particular era in succession, and quickening inert matter by the inspiration of an intellectual force, we must discard many old methods, old prejudices, old associations. We must look for new facts in our own buildings, and for new light upon them from increasing knowledge of our own social history. We must establish our principles solely upon the firm base of observations, instead of stubbornly dogmatising in the old, vicious manner, and mangling facts to make them square with unwarrantable theories. In doing this we may gain even more than truer and fuller knowledge of the past, we may find sure helps and great encouragement for the future.

Mr. Paul Waterhouse said it would be difficult to append a discussion to such a paper, as it was the work of a specialist. When the student first studied Gothic architecture it was like looking at chaos. The divisions could never of themselves have served their purpose, and it was these very divisions which made the subject so complex and helped to obscure it. He proposed a vote of thanks to Mr. Flower, which was seconded by Mr. Seth-Smith.

Mr. B. F. Fletcher entirely disagreed with the notion that the military men could not understand architecture. The Crusaders were intellectual men and the most likely people to understand it.

Mr. Flower having replied, it was announced the next meeting would be held on February 19, when Mr. W. H. Bidlake will lecture on "The Architect and the Public."

## TESSERÆ.

### Henry III. and Sanitation.

IT was during Henry III.'s reign that perhaps the first attempt at underground drainage was made. The refuse and dirty water from the royal kitchens had long been carried through the great hall at Westminster, until, according to the language of the king's writ, the foul odours arising therefrom seriously affected the health of persons congregating at court; to remedy this evil a subterranean conduit was devised, which conveyed these offensive matters into the Thames. Indeed, if a complete collection were made of all the sanitary regulations and provisions issued in the times of Henry and Edward I., it would be found that we have not made any great advance on the notions then prevalent respecting public nuisances. It was in the thirteenth century that a conduit of water was first established in London; the earliest was probably made by the monks of Westminster, and the precincts of the abbey are to this day supplied from the original sources. The next was constructed by the citizens of London. Henry had water conveyed underground to his palace at Westminster, especially to his lavatory; his conduit may have communicated with that of the monks. The king granted as an especial favour to Edward FitzOtho, architect of the abbey, who had lodgings at the palace at Westminster, that he might have a pipe, of the size of a quill, to convey water from the royal conduit to his own quarters. Before and after the establishment of a conduit, water was hawked about the streets of London, as it recently was in suburban districts, by "water carriers" (*aque portarii*), who appear to have formed a considerable body in the twelfth century; the names frequently occur as witnesses of deeds in the thirteenth. The ordinary resources of the citizens, when distant from the river, were wells. The few coroners' rolls of this date remaining in the possession of the Corporation of London show that many fatal accidents happened in attempting to cleanse wells.

### Origin of Tontines.

In the year 1644, a Neapolitan, named Lorenzo Tonti, came to Paris, and, during a scarcity of money which then prevailed, proposed the formation of a kind of life rents or annuities, which subsequently were designated, after him, Tontines, although the principle itself was in operation in Italy before his time. The tontines so proposed differed from the afterwards ordinary popular lotteries in the contingency of the increasing and maximum advantage being deferred for many years, with the assurance only of a moderate profit beforehand, beginning at a definite rate. After tedious disputes, in regard to his original proposal, which was at length rejected for a time, he substituted in its stead a new plan for a large *blanque* or lottery,

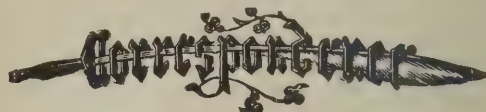


which, in 1656, obtained the royal approbation. It was to consist of 50,000 tickets, each at two louis d'ors, so that the whole receipts would amount to 1,000,000 livres (the louis d'or at that time being only eleven livres); from this sum 540,000 livres were to be deducted for building a stone bridge and an aqueduct. The expenses of the blankie were estimated at 60,000 livres, and the remaining 500,000 livres were to be divided into prizes, the highest of which was 30,000 livres. This lottery was never carried out. After some delays, by which the matter was retarded until after the peace in 1660, a lottery was finally opened, and the tickets, at a cost of one louis d'or, were drawn publicly under the inspection of the police. The highest prize was 100,000 livres, and was won by King Louis XVI. himself, who objected to receive it, and left it to the next lottery, in which he had no ticket. Several other lotteries followed, to such an extent that in the year 1661 it was ordered that all private lotteries should be forbidden under severe penalties, and this prohibition was repeated in 1670, 1681, 1687 and 1700. Since that time no other pure money lotteries have been allowed, but the "Loterie Royales," the profits of which were, in general, nominally applied to public buildings, as was the case in regard to the magnificent church of St. Sulpice in Paris. The first actual tontine upon lives was created in the month of December 1689, and was practically an annuity association. It was divided into fourteen classes of an annual revenue, in all, of 1,400,000 livres. The shares were 300 livres a piece, and the proprietors, without regard to sex, were to receive a yearly dividend, commencing at 10 per cent., with benefit of survivorship by way of increased income in each class. The first class contained children under five years of age; the second was composed of others between five and ten; the third from ten to fifteen, and so on for the other classes. This tontine was very imperfectly filled up; for into the first class there entered only 202 members, and equally few persons into the others; yet many other French tontines were formed subsequently, in 1696, 1709, 1733, 1744. In the year 1726 the French king united the thirteenth class of the first tontine with the fourteenth of the second, all the shares of which were possessed by one person, Charlotte Bonnemay, the widow of Louis Barbier, a surgeon of Paris, who died at the age of ninety-six; this lady had ventured a stake of 300 livres in each tontine, and in the last year of her life she had for her annuity 73,500 livres, or nearly 3,600*l.* a year for about 30*l.* The last state tontine in France was in 1759; after which an impression arose, very justly, that as the lives did not die off so speedily as was expected, the rate of annuity allowed, in redemption of the capital subscribed, with interest thereon, was very onerous; hence, in 1763, the Council of State decided that this sort of financial resource for the creation of capital for governmental purposes should not again be resorted to.

#### Scene Painting.

It is evident that the stage, in the time of Shakespeare, had no scenes, or at most perhaps but one, and that standing for all, for Sir Philip Sydney says, speaking of tragedies and comedies, as exhibited at the public theatres:—"Now you shall have three ladies walk to gather flowers, and then we must believe the stage to be a garden. By-and-by we hear news of shipwreck in the same place, then we are to blame if we accept it not for a rock. Upon the back of that comes out a hideous monster with fire and smoke, and then the miserable beholders are bound to take it for a cave." There seems to have been almost as great a scarcity of supernumerary actors; for, he adds, "while in the meantime two armies flie in, represented with four swords and bucklers, and then what hard heart will not receive it for a pitched field?" The Scotch used painted scenes, for the royal stage at least, before they appeared in theatrical representations in London; for some dramatic pieces, performed at Holyrood House by order of James I. before his accession to the throne of England were enlivened by scenes upon the stage, designed by Mytens and painted by some foreign artist. In the dialogue between Lovewit and Truman, the latter says, "What if there were five theatres then (before the civil wars), the town could maintain them, the prices being small, there being no scenes." He proceeds, "It is an argument of the worth of the plays and actors of the last age, and easily inferred that they were much beyond ours in this, to consider that they could support themselves merely from their own merit, the weight of the matter and goodness of the action, without scenes and machines; whereas the plays, with all that show, can hardly draw an audience, unless there be the additional invitation of a Signior Fideli, a Monsieur l'Abbé, or some such foreign legate expressed in the bottom of the bill." The introduction of stage scenery in England is to be ascribed to King Charles I. when he and Queen Henrietta, the handsomest royal couple then in Europe, played in the masques at the palace of Whitehall. The first scene painter was the renowned architect Inigo Jones, who was also machinist for this stage. This great man had studied as a landscape-painter in Italy. We may reasonably suppose, then, that with his knowledge of the picturesque, united to his elegant taste for Grecian architecture, and painting for such a connoisseur as his royal patron,

that the scenery and machinery must have been delectable to behold. Ben Jonson wrote the masques, and the music was composed by Lanieri. The beautiful masque of Comus, written by Milton, was exhibited with all the decorations that could be given by painted scenes, dresses and machinery, to render the spectacle as illusive as art could make it. Henry Lawes, composed the music for this masque, and played the character of Thirsis, the shepherd. The children of the Earl of Bridgewater also performed in the piece, as it was represented before his lordship and his friends, the neighbouring nobility and gentry, at his seat, Ludlow Castle, on Michaelmas night, 1634. The improvements which were designed for the public theatres under the auspices of the king were suspended at the commencement of the troubles which drove Charles to take the field; and the subsequent Government of the Commonwealth, holding play-houses and players in abhorrence, as schools of Satan and scholars of perdition, shut up the theatres, and suppressed the drama altogether.



SIR,—As a subscriber to your valuable paper for some twenty years, I am sure you will pardon my taking up my pen to plead the cause of your illustrations of "The Cathedral Series." They are so very superior to anything that has yet been brought out, that I am sure you will find it well repay you to print them separately, and not in the text, as at present. I purchased two copies extra last week, from January 1, to send to some friends abroad, but you can, I am sure, understand how very disappointed I was at those which appeared in the letterpress. Do, for the sake of lovers of our grand old cathedrals, seriously consider the appeal made to you by Mr. Johnson, and yours truly,  
AN OLD ADMIRER.

Birmingham: February 9, 1897.

#### GENERAL.

**Mr. W. J. Evelyn, J.P.**, of Wotton, Surrey, has appointed Mr. Reginald St. A. Roumieu (Roumieu & Aitchison) as surveyor to his Deptford and Rathbone Place, W., estates.

**An Architectural Draughtsmen's Society** has been founded in New York with the title of "The Acropolis Club." Mr. T. Eagleson was elected as first president.

**M. Ulmann**, architect, who was one of the assistants of the late M. Alphand and who is largely engaged in Paris, has been made a Chevalier of the Legion of Honour.

**The Skinners' Company** have granted 100 guineas towards the building fund of the Working Men's College, Great Ormond Street.

**The Walsall Town Council** have decided to purchase from Alderman Holden a freehold site for the erection of municipal buildings. The ground will cost 6,000*l.*, and lies between the public baths and the county court.

**M. A. Dubois**, the medallist, has been commissioned to execute a medal at a cost of 6,000 francs to commemorate the opening of the mairie in the tenth arrondissement of Paris.

**An International Exhibition** of Fine Arts, under the patronage of the Prince Regent of Bavaria, will be held at Munich from the beginning of June till the end of October. Foreign artists may send their works and compete for the prizes.

**M. Maurice Guillemot** will exhibit in the Salon this year his monument of Alexandre Dumas fils. The writer is represented, at his own desire, lying on a couch in his ordinary working costume, with bare feet. His hands are joined, and a crown of laurels is on the head.

**The Central Society** of Belgian Architecture announces that an international congress of architects will be held at Brussels, under Government auspices, during the Currency Exhibition, to celebrate the twenty-fifth anniversary of the Society's foundation. It is anticipated that the leading countries of Europe, as well as the United States, will send delegates.

**Mr. Frank Matcham** has been appointed architect for the new theatre which is to be erected in Dublin on the site of Leinster Hall. The building is expected to be completed by August.

**Dr. Rowand Anderson** and Sir J. E. Poynter, P.R.A., have been elected honorary members of the Royal Scottish Academy.

**A Paper** on "Architectural Epidemics" will be read by Mr. H. Barnes at the meeting of the Northern Architectural Association on Wednesday next.

**Mr. Henry Kerr** will read a paper on Elgin Cathedral at the meeting of the Edinburgh Archaeological Association on Wednesday. The building is a notable example of the abandonment of the triforium in Scottish architecture.



# The Architect.

## THE WEEK.

A PREMIUM of 10*l.* offered for the best design for a poster to advertise the Building Trades Exhibition in March attracted the attention of about thirty competitors. After careful consideration, the premium has been awarded to the design marked "Simoun," which was sent in by Mr. J. HOURV, 9 Hatherley Road, Bristol. The following competitors were highly commended:—"The Master Builder," Mr. MUIRHEAD BONE, 7 Jane Street, Blythwood Square, Glasgow; "Sphinx," Mr. ALFRED MORGAN, 89 Albert Road, Battersea Park, S.W.; "Bis," Mr. ROBERT F. SHERAR, 13 Maxwell Street, Edinburgh; "L'Elephant Blanc," Mr. DAVID PEARE, 167 St. Vincent Street, Glasgow.

IT is ordered by the Factory and Workshops Acts that all interior wall-surfaces and ceilings, whether plastered or not, and all stairs and passages, shall be either lime-washed once at least within every fourteen months or painted in oils or varnished once at least within seven years. A case was heard a few days ago at Hyde, in Cheshire, which suggests that what "lime-washing" signifies is not clear to all factory owners. A firm of cotton spinners were summoned by the local inspector of factories for non-compliance with an order to lime-wash the ceilings of the rooms. The defendants stated, they had applied limewater to the ceilings, which was all the Act required. At the hearing it was contended on their behalf, and also for the masters' federation, that limewater was sufficient for cleanliness and sanitary purposes, and therefore complied with the Act of Parliament. Lime applied in the old-fashioned style dropped on the machinery and was injurious. The Mayor said the bench had come to the conclusion that a breach of the Factory Acts had been committed. A nominal fine of 5*s.* was imposed, with costs. The decision is important. The Legislature believed in the virtues of lime when applied of adequate thickness. As to the falling of lime, that indicates vibration of the surface to which it is applied, for without an unnecessary quantity of size whitewash can be made of sufficient endurance.

EVERYONE who is eager for the enrichment of the national collections must be in suspense until the will of the late Lady WALLACE is read and it is ascertained what will be the fate of the invaluable collections which were in Hertford House. They were mainly purchased by the late Lord HERTFORD in Paris. The late Sir RICHARD WALLACE was desirous that they should become national property, and he allowed many of the pictures and other works of art to be exhibited at South Kensington and Bethnal Green. All who saw the treasures must have felt it would be an advantage if they could be possessed by the public. But the authorities could not agree to the proposal to have them preserved in the house in Manchester Square, although the collections are never likely to appear to so much advantage in any other building. It is difficult to say in what department the HERTFORD-WALLACE treasures are richest. Many judges consider the small paintings by MEISSONIER are unrivalled. There are works by DECAMPS, DELACROIX, COROT and others of the advanced French school, which are no less characteristic than those by MEISSONIER. The Louvre possesses only one picture that is worthy of WATTEAU, and, in spite of the strain on French finance, an enormous sum would gladly be paid to acquire the examples which are now in Hertford House. The Italian, Spanish and Flemish schools are also represented. REYNOLDS's most fascinating *Nelly O'Brien*, and *Mrs. Bradyl*—who seems a type of Eastern languor—are there, and GAINSBOROUGH's *Perdita*, which, although unfinished, is the more valuable as indicating the method adopted by the master. But art is not confined to pictures. It would be vain to seek in any public or private collection for such pieces by CLODION and GAUTHERIN as Sir RICHARD WALLACE owned, and, as suggesting the comprehensiveness of the objects, we may say neither the Dublin nor the Edinburgh Museums contain more delicate specimens of

Celtic metal-work than now await a change of ownership. Then there are miniatures, jewellery, ceramics and tapestries; and there is hardly a section of art which cannot be studied in Hertford House. It is to be devoutly desired the intentions of Sir RICHARD WALLACE will be realised, and that the country will be fortunate in gaining a collection which is entitled to be considered unique. If England has the good fortune to obtain such countless objects we suppose they will be kept together, and South Kensington would become the most suitable home for them. The legacy would therefore have the further advantage of putting an end to the extraordinary delay in enlarging and completing the museum. A national laboratory is desirable, but a work which is entitled to precedence is that at South Kensington. The collections attract more visitors than any others, and strangers are not in a fit mood to enjoy them after they have contemplated the exterior of the museum and its neighbour which is devoted to patents.

THE subject of the restoration of St. Mary's Church, Oxford, again came before Congregation on Wednesday. The question to be considered was whether 1,750*l.* should be expended on the restoration of the pinnacles and battlements on the clerestory of the nave, and whether such repairs as may be considered necessary by Mr. JACKSON, R.A., should be carried out in the timber-work of the roof of the nave. The present parapet was the creation of Sir GILBERT SCOTT; the previous parapet had been blown down between 1500 and 1520. The President of Trinity defended the amount of the grant, and pointed out that it covered a contingency which was only possible, not probable. Both he and Professor CASE observed that Mr. PARK HARRISON and others deserved the greatest credit for unearthing details of the old work from Sir GILBERT SCOTT's office. Mr. JACKSON had also consented to modify his previous design, and to follow in the traces of the original work. The President, however, gave notice of an amendment relating to the proposed thickening of the parapet and other details of work on the cornice. In reply to the President of Corpus, who urged the poverty of the University chest, the President of Trinity admitted that the work might be postponed for a few years, but said it was most desirable to complete the restoration without further delay. Mr. DODD expressed the hope that the architect had himself in person inspected the roof timbers which were reported to be decayed.

A PAPER on "Hospitals and Hospital Construction" was read by Mr. F. BATCHELOR at this week's meeting of the Architectural Association of Ireland. An account was given of the earliest recorded hospitals, showing that as early as the third century before the Christian era institutions which were kindred in object to their present hospitals were in existence. In Ireland, too, hospitals were in existence as early as the third century of the Christian era. The author said it was a fact of which every Irishman should be proud that Ireland had always led the way in the founding of charitable institutions. Their own city of Dublin was the second city in the United Kingdom in the proportion of hospital beds to the population, being second only to London. Afterwards a detailed account was given of the most approved methods of hospital construction.

WHEN the old Chain Pier at Brighton was threatened with demolition several inhabitants of Brighton uttered a wail at its fate. They wished to have it preserved as a memorial of happy hours spent upon it. The November storm was not sympathetic, and the pier quickly vanished. The Brighton people can, however, possess a memorial of the structure in the drawings which Mr. J. AUMONIER has executed. In the whole history of engineering we doubt if one work has ever before been so completely illustrated. There are fifty-seven drawings, and they all are more or less interesting. With them are some examples of the artist's latest work in Lincolnshire and Sussex. They are bold examples of modern handling, and as such would gain admittance into any Paris exhibition. They are suggestive of local characteristics, and appear to be entirely produced in the open.



## WORKMEN AS CONTRACTORS.

EVERY student of political economy knows there have been fashions in the science as well as in most other things. From time to time several remedies for poverty are introduced which gain universal favour, but after a longer or shorter time they decline and disappear, as if they were of no more importance than gowns or bonnets. Although there are enthusiasts for these remedies or systems, yet, as they are not endowed with permanence, the best way to deal with them is to seize any advantage they may offer, but to remain rather sceptical about their power to bring back the Golden Age.

What is now called Co-operative Trading, the Co-operative System of Constructing Public Works, Co-operative Building and Contracting, Co-operative Manufacturing, Industrial Co-operation and so on in England, and in France is known as Association Corporative, Société Coopérative Ouvrière, Syndicat Professionnel, and by corresponding terms among the Italians, may be no more than one of those temporary expedients to settle economical problems, but it cannot be denied that it has come into favour with unusual expedition. Whether the word "co-operation" is a right designation for the new enterprises we need not inquire, but it was not used in the sense which is applied to it nowadays by economists who might claim to be so modern as to be almost contemporaries. Co-operation has long been a favourite word, but it signified combination of labour. E. G. WAKEFIELD, who gave much attention to the subject, divides it into two classes, simple and complex. As the most elementary example of it he refers to two greyhounds, as they can kill more hares when running together than four hounds when running separately. The combination of eighteen men to produce a pin was considered by ADAM SMITH as a triumphant instance of co-operation. J. B. SAY went further, for according to him the manufacture of one playing-card was incomplete in an economical sense so long as seventy men were not employed in the operations. The French economists, indeed, followed MILL in defining co-operation as "la participation des industries différentes dans la confection d'un produit." At one time political economy was supported by co-operation or the division of labour as one of its columns, and if that were removed there would be no science of economy and no civilisation.

But it is not in the sense of increased or improved production that the word co-operation is understood in modern workmen's societies. Among them it signifies an union for dispensing with the capitalists, employers, middlemen, or other industrial chiefs, and the distribution of the profits formerly claimed by them among the members of the union. This is an extension or development of a custom which was long practised on a small scale in some English occupations. The Cornish miners were able to enter into contracts with the agents; the fishermen along some parts of the coast and the crews of whalers were also able to claim a share in the profits. But the cases were few, and CHARLES BABBAGE was perhaps the first who maintained there would be an advantage if the principle were extended to all branches of manufactures. M. LECLAIRE, a house-painter in Paris before 1842, shared the profits with his workmen, and his example was followed in 1847 by M. DUPONT, a printer, and some other employers. In England, MESSRS. BRIGGS, the colliery owners, agreed to allow one-half of any profit exceeding 10 per cent. to the workpeople and employés, whether shareholders or not, in proportion to their earnings. But it was given in evidence before the Trades Union Commission that there was great difficulty experienced to prevent the working shareholders withholding the bonus from the men who did not hold shares.

In England an engineer might offer occasionally a small contract on a railway to a ganger and a few men, but in engineering as in building the system of having a responsible contractor was always preferred. The French practice of having separate contracts for the different trades was more favourable to workmen's associations. In 1882 the Municipal Council of Paris agreed to an arrangement by which such associations were allowed to tender, on the understanding that when a contract was given representatives of the men (not exceeding three in number) agreed to direct the execution of all work subject to the orders of the engineers and architects, and to accept the usual re-

sponsibilities of ordinary contractors. It was also necessary that an accident fund be provided or an engagement for that purpose entered into with a solvent insurance company. At a later time the workmen's associations were declared to be competent to undertake contracts for Government works throughout France. In order to get over the difficulty arising out of want of capital, as much as one-half of the estimated value of the work to be executed could be advanced by the Government office concerned in the operations. In Paris a large sum bequeathed by RAMPAL, the economist, is available for loans to the associations.

One of the supporters of the principle of association was the late M. ALPHAND, the director of the municipal works of Paris. Under him societies of carpenters, joiners, house-painters, paviors were employed. He said of them:—"We have workmen, associated together, who have done an enormous amount of hard work in carrying out certain contracts—contracts given to them at prices in no way higher than those at which such contracts are given out to the ordinary contractors. These contracts, I repeat, have been carried out with a remarkable degree of expedition, and the Corporation have had a substantial profit." The Department of Public Instruction and Fine Arts also testifies to excellent work executed in twenty-two contracts for the construction and repair of school buildings. The Co-operative Carpenters of La Villette were entrusted with the erection of the scaffolding for the restoration of one of the spires for the cathedral of Coutances, the contract amounting to about 570*l.*, and another Society of Stonecutters and Masons in Cahors obtained a contract for work in the apse of the local cathedral. In the latter case the rebate offered from the official estimate was 38 per cent., and therefore it is no wonder the society no longer exists. The French War Department considers that owing to the societies there is closer competition. But experience in Paris tends to show that whatever may be the impulse among ordinary contractors, there is no effective competition among the co-operative associations, as they agree not to underbid each other. The managers, on the other hand, say they are often compelled to accept prices for municipal works which are too low. In general, we believe the rate of wages for members of the associations is slightly higher than with ordinary contractors; but as skill in organisation is not a common gift, the profits are not extraordinary. M. BOUVARD, the municipal architect, has to admit that the associations do not always survive until contracts are completed, and the managers are too often changed. Weaknesses of that kind are not conducive to satisfactory balance-sheets, and in the long run the ordinary contractors are not likely to lose much by rivalry of co-operators. It is only in Governmental and municipal contracts of a picked sort that the associations have any chance; the unofficial architects and engineers of France appear to avoid them.

In England there is a similar fostering on the part of a few Governmental and municipal authorities, and no less reluctance to employ associations in works belonging to civilians. The Town Council of St. Helens at one time supplied materials for paving and sought tenders for labour alone, but a tender from an associated body of working men was never received. In Nottingham the Corporation also supply materials, and the paving, flagging and kerbing are laid by men who are almost continuously employed in the streets. They work on a sort of contract system, the prices being arranged by the borough engineer. There are weekly payments in proportion to the amount of work executed:—"Each man is paid by the head foreman according to his grade, whether a pavior, flagger or only a labourer; at the end of the special contract the work is entirely re-measured and payment made for the same; if any surplus is left in the hands of the foreman, this is divided equally amongst the men engaged on the work." It is supposed by the officials that the work is executed more cheaply and better than if done by a contractor. But there must be exceptional conditions for paving in Nottingham, for it is declared, "There has been no alteration in the amount, quantity or value of the work done under the system for the past ten years." Such constant immutability is not a common characteristic of modern municipalities.

"The Co-operative Builders of Brixton" in 1891 obtained a contract for enlarging one of the London Board



schools amounting to 2,064 $\frac{1}{2}$ . In 1892 there were two contracts, the total amount being 9,293 $\frac{1}{2}$ ; three in 1893 amounting to 8,871 $\frac{1}{2}$ , and two in 1894 which only came to 2,879 $\frac{1}{2}$ . The Board say "they have no reason to be dissatisfied" with the work done, and the tenders were the lowest submitted. The Co-operative Builders were also able to secure the contract for the Weights and Measures Office in Rosebery Avenue from the London County Council. The amount was 6,838 $\frac{1}{2}$ . It was reported that the work was "in all respects satisfactory."

The Co-operative Builders, it appears, set up in 1888, and at the end of 1889 there were 171 members with a share capital of 1,360 $\frac{1}{2}$  and a loan capital of 1,100 $\frac{1}{2}$ . But the tendency to breaking up or dissolving, which the French architect remarked as inherent in associations of the kind, was soon exhibited. In 1894 the Builders had to be reorganised, and in 1895 they were found to have forty members in all, with a share capital of 47 $\frac{1}{2}$  and a reserve fund of 279 $\frac{1}{2}$ . Yet in 1895 work to the amount of 6,634 $\frac{1}{2}$  was executed. The amount paid in wages to forty-eight men and "one young person" was 3,643 $\frac{1}{2}$ , which would mean an average of 30s. weekly. The profits were 422 $\frac{1}{2}$ , out of which the reserve fund absorbed 276 $\frac{1}{2}$ , the dividend on capital 2 $\frac{1}{2}$ , education fund 14 $\frac{1}{2}$ , benevolent fund 5 $\frac{1}{2}$ , Co-operative Union 3 $\frac{1}{2}$ , manager's bonus 45 $\frac{1}{2}$  and workmen's bonus 73 $\frac{1}{2}$ . The various sums amount to 418 $\frac{1}{2}$ , and it is to be hoped the "young person" received the balance of 4 $\frac{1}{2}$ . Apparently it is preferable to gain employment under the works committee of the London County Council than to co-operate with the Brixton builders, for the wages are higher and the work could hardly be easier. The committee are also inspired by a similar feeling towards ordinary contractors with the Co-operative Builders.

The Kettering Co-operative Building and Contracting Society does not appear to have gained a greater financial success. In 1895 work of the value of 6,793 $\frac{1}{2}$  was performed, and the profits were 484 $\frac{1}{2}$ . But that sum was diminished by 100 $\frac{1}{2}$  paid to "customers." The bonus to employes was 7 $\frac{1}{2}$  per cent. on wages, which in this case also appears to have averaged 30s. a week.

The Sheffield House Painting and Decorating Society obtained work from the Corporation in the latter half of 1895. The most important contract was at the Sheffield Sewage Disposal Works (and the decoration of such a place is a testimony to the influence of Mr. RUSKIN and the St. George's Museum), for it amounted to 157 $\frac{1}{2}$ , out of which sum 134 $\frac{1}{2}$  had to be expended on labour. Another contract was for work at the Ruskin Museum, the amount being 78 $\frac{1}{2}$  11s. 3d., and there was a supplementary contract of 38 $\frac{1}{2}$  16s. 5d. Upon the 117 $\frac{1}{2}$  7s. 8d. thus obtained the profit was 11 $\frac{1}{2}$  7s. 8d. The Corporation also accepted the Society's tender of 1 $\frac{1}{2}$  8s. for one work and 2 $\frac{1}{2}$  10s. for another. The profits were respectively 7s. and 6s. The value of the work done in 1895 was 903 $\frac{1}{2}$ , but it entailed a loss of 15 $\frac{1}{2}$ . The customers are to share in the profits, but judging by experience the amount which will be received by the Corporation for patronage will not greatly diminish the rates.

There is, or rather was, a Woolwich Builders' Society that was entrusted by the War Office with supplying thirty-four small litter sheds with corrugated iron roofs, at a cost of 400 $\frac{1}{2}$ , for the Royal Artillery Barracks, Woolwich. Whether the experiment was agreeable or not to those who had the privilege of co-operating in it we have not discovered. The Chief Registrar of Friendly Societies has had his communications to the Woolwich Builders' Society promptly returned with the inscription, "Gone away," and the place selected for activity cannot be discovered. In Canning Town there was a Reliance Co-operative Painters and Decorators' Society. The West Ham School Board, after a select competition, accepted the Society's tender for cleansing and painting one of the schools. It was necessary to set up a dado. The carpenters rebelled against the undertaking of so important a work by painters, and, it appears, "some friction between the men" followed. The School Board were no less dissatisfied about the material employed, which was supposed to be wood; but they avoided the friction process with the men, preferring to substitute proper material in the dado. The painters' operations in repairing locks, &c., were not more appreciated, and as a consequence they have vanished as completely as the Woolwich Builders'. Canning Town

also possessed another body, entitled "The London Amalgamated Co-operative Builders of Canning Town." In 1894 the West Ham Town Council commissioned the Society to construct a band-stand, which was to cost 190 $\frac{1}{2}$ . Whether the work was completed, or even commenced, is not known to us; but the Chief Registrar was able to report in the same year that the Society was in course of liquidation, and the process seems to be still going on.

It is a misfortune, perhaps, for the co-operative building associations that they can be tested by simple facts and figures. In Sheffield, Kettering, Woolwich and Canning Town there is apparently an absence of those "public men" who have the marvellous faculty of convincing their votaries that losses are in reality gains, and increased expenditure is only another phrase for severe economy. Now and henceforth the proper duty of a citizen is to believe with MACBETH that "Nothing is but what is not." When, therefore, we find that workmen are unable to make much of a dividend, we are to conclude that the obnoxious contractor out of the same work would secure a profit sufficiently large to satisfy an usurer. The experience of the co-operative builders should, however, be enough to convince people that in our time contractors rarely receive more from works than is their right.

In New Zealand, where there cannot be so perfect a system of contracting as is established in England, it is found there are some advantages in co-operative construction. But it is necessary to adopt tactics which impose additional labour and responsibility on those in charge. At first it was arranged to form parties of about fifty co-operators, and to arrange the railway or other works in sections to suit them. But as it was difficult to find that number of men to agree, the parties were reduced to ten or twelve each, and now the average number is six. But small as the party may be the co-operation is of the Irish variety, for one of the engineers has reported that "the men show no desire to co-operate with or assist each other; each one simply tries to do the best he can for himself by joining in with a stronger and better party than his previous one." In New Zealand, as in Paris or Woolwich, dissolution is inevitable, and there is no hesitation about leaving all who are responsible for the execution of a contract in the lurch. To keep the men in good-humour the prices are on a scale which "should enable a first-class workman to earn an average wage per day of eight hours slightly in excess of what a contractor would pay him for the same work." A rule was also made by the Government "to allow the engineer full discretion in giving a higher price to the weaker or more inefficient (though not to more idle) men, as these also have women and children dependent on them, and if they were to receive the prices paid to the best class of navvies, would hardly earn food for themselves." In another district there is much discontent because married men who are strangers are selected on the public works rather than single men living in the districts. The bachelors state "they do not object to married men who are residents having preference, but many of them say that married men of low repute, or with disreputable families, should not be brought from other parts of the colony and given preference to steady single men who are struggling to build a nest for themselves." Mr. RUSKIN, although he wrote "Unto this Last," never ventured to depart so far from the old principles of political economy as have the New Zealand Government. Yet the public are expected to believe that railways and the various works attempted by placing a premium on incapacity and improvidence are "better done under the co-operative than under the contract system." The contractor, when he comes across such conclusions by men in office at home and in the colonies, may well exclaim with the Swedish Chancellor, "Behold, with what unwisdom the world is ruled." It would now seem from the support given to weakness as if the French enthusiast's maxim is the guide of all in authority, "Aux plus d'ésérités le plus d'amour."

The report issued by the Board of Trade on the contract associations is mainly made up of communications from officials who are in favour of the system. There is little doubt that from a politician's point of view combination of workmen for industrial objects is more satisfactory than any for reforming a state according to immature but dangerous notions. But when it is asserted that, by



giving out contracts to associations of workmen, public authorities are insuring work that is more excellent and more economical than any obtainable from ordinary contractors, we can only consider such statements as among the delusions which it is the purpose of economical science to dispel.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### INCANDESCENT LAMPS.

CONSIDERABLE care should be exercised in the choice of lamps, as upon them depends to a very large extent the economical working of the plant and the satisfaction given.

*Low Voltage.*—Low voltage lamps are always more efficient and last longer than high voltage. For a private-house plant a pressure of 50 volts is to be recommended, although the wiring is rather more costly. The lamp filaments are thicker than for 100-volts, and in consequence low candle-power lamps are efficient and cheap. The thick filaments do not show any small pulsations in voltage when a gas-engine is used, and they can be run at a higher efficiency than 100, 110, or 200-volt lamps. An 8 candle-power lamp should not take more than 30 watts at the outside under any conditions, although it may be noted that lamps of 8 candle-power often take 45 or 50 watts when sold as 4-watt (per candle-power) lamps.

*Long Life.*—With a private plant lamps of long life should be used, as the extra cost of generating current is very little, because the greater portion of the expenses are fixed charges, and independent of the current consumed. It must, however, be remembered that the cost of the plant is greater for low-efficiency than high-efficiency or short life lamps.

No lamps should be bought which have not the makers' name, candle-power and efficiency marked on them; this is an important point, as very many worthless ones are sold, and invariably the information given by the marking on them is inadequate.

*Purchase of Lamps.*—Lamps should not be bought in large quantities. The reason is that even the best makers sometimes turn out a bad batch, and if a great many are purchased at one time a considerable loss may be the result. If, however, they are bought in small quantities at more frequent intervals, the average quality lamp throughout the year is the maker's average, and if the maker is a well-known one, it is almost certain that the quality will be fairly good.

A good lamp cannot be made properly at a price below the average. If every one is properly tested, the cost of testing in the various stages is too great to admit of this; also the difference allowed between the declared and the actual candle-power must be greater if the lamps are cheap, as the maker cannot afford to mark many of them to be run at a little used efficiency or voltage. The result is that cheap lamps are not uniform either in candle-power or current consumption, the filament and bulbs are not finished off neatly, and they have a distinctly inferior appearance. German lamps are not all as bad as the name perhaps infers; in fact, some of the English lamps are far worse than the average German ones.

*Diffusion and Reflection.*—The use of frosted bulbs is to be avoided as much as possible, and the lamp should be placed in such a position that it does not irritate the eyes. It is clearly a wrong principle to have a lamp of high candle-power and then to absorb a greater portion of the light with unsuitable shades, &c., in order to tone down the glare. The best shade as regards diffused reflection is one of rough drawing-paper if used suitably. These shades reflect and diffuse about 80 per cent. of the light they receive, and are far superior to the white opal ones sold to such a great extent. The shades can be made as tasteful as desired by the use of silk, &c., without injuring their reflecting properties.

There is at the present time a movement in favour of dispensing with shades, and using lamps with reflectors in very close proximity to the bulb.

These reflectors are very effective, and are no doubt

more efficient than the ordinary shade, when the light is required below the horizon of the lamp. A new class of lamp has recently been introduced, the reflector being a portion of the bulb (which is silvered); the great objection is that the plated or silvered lamp costs nearly double that of an ordinary lamp of equally good make, and when the lamp fails the reflector is also useless. A reflector or diffuser which has to be renewed with the lamp is therefore more costly. Porcelain reflectors are being made which fit the lamp closely, and are nearly as effective as the plated lamp.

Metal reflectors are not so good as a white matt surface, as they are unpleasantly glaring when placed where they are close to the eyes.

*Blackening of Bulbs.*—The blackening of lamps is a fault which has never been entirely eliminated; the carbon of which the filament is made is, owing to its high temperature, gradually deposited on the cooler inner surface of the bulb. This blackening appears to be proportional to the size of the filament, and consequently is worse in the higher power lamps. The blackening is also worse with small than with large bulbs, and the surface of the bulb should increase with the candle-power. This means that the bulb of a 32 candle-power should have twice the area of that of a 16 candle-power lamp, and so on. An 8 candle-power lamp very rarely blackens, and, if it does, it must be a bad one, as the bulbs of 8 candle-power lamps are very large in proportion. The blackening also depends upon the quality of the filament, and again upon the way in which the lamp is used. If the pressure is allowed to rise too high, the lamps blacken very rapidly even when they do not fail.

Unsteady pressure is the cause of the great proportion of the failures, and many complaints may be traced to this cause.

*Efficiency.*—High-efficiency lamps are more easily broken and blackened by unsteady pressure than lower-efficiency ones. The reason is that the filament is already at a higher temperature, and any serious increase is consequently disastrous.

The efficiency chosen for a lamp to run upon any circuit depends upon three factors:—(1) The price of electrical energy; (2) the price of lamps; (3) the steadiness of pressure. With a private-house plant, as before mentioned, a lower-efficiency lamp is desirable, because energy does not cost much per unit, and because the pressure is not, as a rule, as steady as can be obtained from a supply company's mains, where it is the duty of at least one person to watch the instruments and correct any variations of voltage.

As a general rule it may be taken that a 4-watt lamp is most suitable for use with a private-house plant, but where energy is obtained from a supply company and costs, say, 8d. per unit, a 3-watt lamp should be used if the pressure is steady, say within 3 per cent. of the declared voltage.

*Bi-life Lamps.*—These are lamps which have two filaments, but only one is used at a time. When the first filament is broken the second one can be brought into operation by lifting a metal plate on the collar; thus the lamp has a double life. This lamp is very useful when the first filament breaks soon after the lamp is bought, as it is not twice as expensive as the ordinary ones, but it is doubtful if it will come into general use, as the second filament is of very little benefit if the first filament has lasted a reasonable time, owing to the blackening. It is, however, probable that this kind of lamp would be very good with high efficiency, and might make it even possible to use a very much higher efficiency than at present employed.

*Variable Candle-power.*—There are several special kinds of lamps on the market in which there are two filaments, with a switch in the lamp cap. The filaments are of two sizes, say 8 candle-power and 16 candle-power. By manipulating the switch the candle-power may be either 8, 16 or 24, by using either or both filaments. In some of these lamps two of the filaments may be connected in series and a low candle-power obtained. With the low candle-power combination, of course, the filaments are dull, and it is extremely inefficient; but so long as this inefficiency is remembered these lamps may be used with convenience. This lamp may also be used in the same way as a bi-life one. The objection to this type is that the switch is renewable with the lamp, although it may not be worn out, and, in consequence, the cost of using these lamps is rather



high. An arrangement by which old ones could be returned to the makers and an allowance made for the switch would considerably reduce this expense.

**Caps and Sockets.**—There are two common types of terminals—the bayonet contact and the Edison screw. These two terminals have been found to be the most satisfactory in use. The bayonet contact has of late been adopted in most cases. There are on the lamp collar two plates which make contact with two spring plungers in the holder. This terminal is very satisfactory when there is vibration, as it is impossible for it to become loose. The objection to it is chiefly one of appearance, as the holders and collars are usually considered clumsy. The Edison screw terminal is frequently used for candle fittings, and consists of a central contact inside a screw collar but insulated from it. The screw collar is connected to one lamp terminal and the central contact to the other. There is a holder with a corresponding screw and central contact, to which the current is conveyed; therefore when the lamp is screwed into the holder contact is made. This terminal has been much improved of late by making the screw of smaller pitch, and it is now far less liable to become loose. There are several other types of terminals, but they are only rarely used, and are not of sufficient general interest to describe here.

It has been suggested, and I believe carried out, that lamp manufacturers should purchase the caps, platinum wire, &c., from broken lamps at a fair rate, and this would have the effect of slightly reducing the cost of lamp renewals. The value of these lamp terminals is, however, very slight, as the amount of platinum in the lamp is reduced to such an extent that the value is less than one penny when new.

**Renewal Contracts.**—With reference to the renewal of lamps, I would suggest that they should be renewed by a contractor for a fixed sum per unit of electricity consumed, he taking all risks. The lamps should be guaranteed not to consume more than, say, 4 watts per candle-power, and they should be replaced when they decrease, say, 25 per cent. in candle-power, or increase, say, 25 per cent. in consumption of energy per candle-power. Any dispute as to these last points should be settled by a test and the fee paid by the party in the wrong. By this means when the current is obtained from a supply company, unduly heavy electric-light bills would not be so common, owing to ignorance of the qualities of lamps, and the high cost of lamp renewals which are caused by lack of judgment would be lessened.

The point which must be settled before the question of lamp renewals is decided is the variations of pressure on the supply mains or private plant.

If the pressure could be *guaranteed* constant within one per cent., and in the case of a supply company, a heavy fine imposed if it were exceeded, lamps of  $2\frac{1}{2}$  watts per candle-power could be universally used, and electric-light bills would be reduced to nearly half the present amount.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

The minutes of the last meeting having been printed and circulated they were taken as read.

The Hon. Secretary announced the death of Mr. William Tipping, hon. Associate.

Mr. H. E. Milner, F.L.S., read his paper on

### The Garden in Relation to the House.

He said that he proposed to speak of the treatment to be adopted in laying out grounds, particularly in their more immediate relation to the house, and to indicate generally a practical application of the theories advanced.

The formal treatment of gardens reached a high state of perfection under Elizabeth, when the architect who designed the house also laid out the garden with its fore-court and broad terrace, its straight walks leading from it encompassing the flower-beds, and all harmonising with the building. Little thought, however, was devoted to the treatment of the country outside beyond the planting of avenues. Towards the end of the eighteenth century fashion ruled the destruction of most of the old formal gardens, to be replaced in very many instances by a no less artificial and formal imitation of nature. The designers were not content with amalgamating with whatever was good of the old work a natural treatment of the outlying ground, or of giving greater breadth to the existing formal

work, but swept away all this and replaced it by meaningless walks, by clumps of trees and shrubs dotted irregularly on the lawn and park, by a boundary of planting, by imitation of bits of natural scenery, by the introduction of artificial ruins and such-like objects, with the desire of making a picturesque landscape. The author then went on to speak of the happy mean between the formal and the picturesque treatment.

He differentiated greatly between the treatment of terraces, walls, steps, balustrades, &c., in stone and verdure. Architects should extend their work in the garden in connection with the building; but this work should go hand-in-hand with the composition of the greater picture which the art of landscape-gardening should produce. The increased resources of modern horticulture should be taken into account; not merely the eye but the mind should be appealed to by the beauty of composition of line, colour, perspective and grandeur; a liberal art should not degenerate into a mechanical one. Places differed in the conformation of the ground, in climate, in soil, in the requirements of the owner, in the amount to be expended, and in the possibility of an extension beyond the immediate precincts. It was therefore futile to lay down any hard-and-fast rules for design.

The author then proceeded to treat in detail of the site, the approach, the terrace and the garden formation and planting. The approach to a house should always appear to be direct, and any deviation from such directness should not only arise from, but should also be made to arise from, some decided obstacle. By direct was not meant straight. A straight approach required careful treatment. It was artificial in character, it could appropriately be used when an imposing or somewhat pretentious building was at the end of it, or when the distance was short and when the country was flat. In sloping ground, it should, if possible, be made against the slope of a hill. The gradient should be even and flat, or very slightly and continuously curved, otherwise it would appear not straight. If the ground be very undulating, a straight road is out of character with its surroundings. A curved line of road was generally to be preferred, as being more easy of construction, more varied views could be obtained, its gradient could be varied, following within limitations the natural undulation of the ground, and the side slopes could be more easily and freely dealt with than the sides of a straight drive. Width of walks and drives, entrances, were discussed in detail by the author. A gradient exceeding 1 in 14 should not be introduced, although 1 in 9 might be safe.

The lodge and entrance gates belong to the drive, and should be parallel with and at right angles to it, as distinguished from the highway. The face line of lodge should be at least ten feet from the edge of the drive, and its windows should be able to command the entrance and a certain length of drive. On entering by the drive it was advisable to create a good impression, and therefore to mark distinctly the difference between the dusty highway and the shaded, well-trimmed drive within the gates. Planting might be introduced on either side of the entrance, but once well inside a view should be given of the outlying grounds, or stretch of park, or distant wood. A curved drive should not be planted continuously, but broad masses of planting introduced, at first to shut off the highway, at turns in the drive, and on the top or slopes of knolls round which the drive may wind. The drive should not skirt the garden or overlook it.

The direction and level of the approach, and the character of the architectural features, ruled greatly the plan to be adopted for the treatment next the house. The treatment of the terrace also depended very much on the architectural character of the building. By "terrace" was meant not only the narrow strip of level ground placed parallel with the house, or the more stately portion—often with architectural adornments—laid out along the face of the structure, but the whole of the ground that formed the base or setting of the building.

Having next discussed the various forms of terraces, the author passed on to the treatment of the garden proper, quoting partly from his book on the subject, which defined the system he advocated. So many considerations press in to vary the design in the general plan of a garden, that arbitrary dealing by imposition of what may be termed paper designs, however ingenious, was ill-advised. The detailed plan should spring from the site as an adaptation of its natural, or created natural, features, and should not be forced upon the position, crushing it to an artificial scheme. To copy simply the design of another place is inadmissible. Considerations that rule in this connection were almost infinite—extent, geological formation, soil, existing natural formation or features, climate and aspect, the display of distant beauty, conformity to outside influences, particularly to the requirements of the possessor and the expenditure of money that may be made. There were points of similitude between the painter's art and landscape-gardening; but the landscape-gardener must consider that his colours change and grow; he must realise, as he creates his picture, that in a few years what now seems like a light green stroke of pigment to the painter may have become a tall tree, beautiful in itself, but of altered beauty, either helping or marring the landscape. He must



follow nature by adapting or garnering her beauties, and tutoring her, so to speak, to a display of them. But by following nature was not meant a slavish imitation or reproduction of any of her particular scenes. Some were unattractive, some very inappropriate—all were subject to dissimilar conditions, and imitation in nature as well as in art produced pettiness. But the spirit of the beauty of nature, embodied as it were in those of her works or features that express her majesty, simplicity, peacefulness, sweetness, repose, refinement, strength and variety in form, colour, abundance, or any of her modifications as parts of loveliness, should be included and brought into juxtaposition in an ideal scene so far as it was possible to promote its natural development. The terrace, the region immediately next the house and the general arrangement of the walks and gardens having been discussed, the author next dealt with the most suitable positions for planting trees and shrubs, principles of grouping, the effect of colour on distance, character of foliage, &c.

He maintained that they should carry out in the parts surrounding the house the architectural feeling of the design in terraces, walls, steps, basins, beds, and so form a base; that they could still have the dignified and quiet delight of formal work—not a narrow curtailment of the whole design. But there was in addition a broader treatment beyond—a work difficult to proportion in relation to foreground, to broad lawn-spaces, to grouping, and choosing trees and shrubs for effect in size and colour, to directing the eye to desired points, to taking advantage of climate and character of the place, either natural or acquired, to provision of light and shade in the undulation of the ground, and to a knowledge of horticulture. This art-gardening was far beyond the limitations of formal work only, for it could apply the balance and proportion of the latter, and, in addition, present a noble conception of art-work, in its execution of outline, surface-formation and grouping, and draw into the picture the greater, broader, varied landscape.

In conclusion he expressed thanks for having been elected an hon. Associate of the Institute.

The Hon. Miss Amherst agreed with the paper on all points, and thought that it would be interesting both to those who studied architecture and also those who were concerned in horticulture. In designing a modern garden the employment of flowers must be taken into consideration.

Mr. Aston Webb proposed a vote of thanks for what he considered was an admirable paper and full of useful information. It would be impossible to choose a more delightful subject than gardening, and one that would help us more to realise the beauties of nature. The most pleasing garden was, however, incomplete without the house, the same as a beautiful house was incomplete without a garden. Therefore, the landscape gardener and the architect should work together. The formal garden they were striving for was the formal garden of England, not that of Holland and Italy. But the garden of Hampton Court, Hatfield House and many others contained high hedges and long alleys, besides lawns to walk upon. Sedding, in his book, maintains that the art of gardening declined when the "ha-ha" was introduced; and there is little doubt that a change took place about that time. Some people had the idea that architects wished to surround a house with four high walls, and to call the enclosure a garden; but this was a fallacy. Mr. Milner, in his paper, said the walls of courtyards of houses should be no more than 3 feet high; surely that was a mistake, 9 or 10 feet was the height for them. The great principles of a garden were the prospect, shadow, and a certain amount of mystery. "Alleys green should lead where none would guess." The design of the garden should be apparent, and man's hand visible, as any attempt at naturalisation was a drawback.

Mr. Statham did not altogether agree with the lecturer's idea of what constituted a formal and informal garden; at present we were in a sort of reaction. Hampton Court, as it now stood, was an ideal of a garden near the house, but then it was not the garden that one sees in old engravings; it was vastly superior to what it was then; it was now a formal garden. It was no good making a landscape which tended to be natural, but which one could see was contrived. Another point to be observed was the use of dark and light coloured trees in perspective. He seconded the vote of thanks.

Colonel Prendergast thought Mr. Milner had fallen in between the formal and informal style; he did not uphold either one nor the other alone. Each generation had to deal with the difficulty of making an English house more beautiful than it was before. The principles now had changed, as the buildings of to-day were built on the hill instead of in the hollow. This alteration was important, and the plans of gardens must necessarily be adapted to it.

Mr. John Hebb, L.C.C., also spoke.

The President said everybody born in England would have a taste for a garden, whether formal or informal. There was undoubtedly a charm about the formal style. When Milton poke about a trim garden, it was difficult to decide whether he

meant a well-kept natural garden or a formal one. There was something delightful in the former. The information Mr. Milner had given he thought would be useful to every architect.

Mr. Milner, in reply, said the only rational way to treat a plan was to adapt oneself to the surroundings. As regarded Hampton Court, it should be taken into consideration that the avenue was made when the surrounding fringe of houses was not there. The work of the landscape gardeners was to be able to form in their minds how the picture would look when they had finished with it. Thus the very old gardens had a picturesqueness in the ancient trees themselves, but that was not so much in the design as in the character of the trees. As regarded a wall 10 feet high, mentioned by Mr. Webb, he would be sorry to see such a thing round the courtyard of a house. The place would not be a pleasant one to live in or walk about in; besides, a man wished to obtain a view of the scenery beyond.

The President announced a special general meeting on March 1, to elect the royal gold medallist for the current year, and at its conclusion an ordinary meeting would be held for the election of members and discussion of the following professional questions, viz. :—

1. On the motion of Mr. Owen Fleming, "That it should be referred to the science standing committee to consider the desirability of formulating a definite standard size for bricks."

2. Mr. Robert Williams to ask whether the Institute of Builders had agreed to abide by the provisions of the form of contract sanctioned by the Institute. At the same meeting a paper would be read by Professor Leopold Eidlitz, on "Education."

### ECCLESIASTICAL DILAPIDATIONS.

AT the Stourbridge County Court on the 11th inst. a case sent down from the High Court was heard. The Rev. M. N. Kearney, late vicar of Rowley Regis, and now rector of Oulton, near Lowestoft, sued the Rev. D. Turner, the present vicar of Rowley, for 147*l.* 6*s.* 8*d.* The claim was a long one, including 47*l.* 0*s.* 6*d.* the price of goods sold and delivered; 7*l.* 1*s.* for moneys paid by plaintiff for use of defendant; 51*l.* 3*s.* under an agreement to pay half the amount of the fixtures money at Oulton Rectory assessed by the diocesan assessor of Norwich; and 42*l.* 2*s.* 2*d.* moneys had and received by defendant for the use of the plaintiff. The claim for 7*l.* 1*s.* was abandoned by plaintiff, and defendant had paid into court 96*l.*, there being included in that sum the 51*l.* 3*s.* mentioned.

The Judge asked Mr. Hugo Young, for defendant, what was the question to be tried? Mr. Young said he could not say in a word, but the 47*l.* claimed was for goods said to have been sold, and various questions arose as to what was sold.

Mr. Parfitt, for plaintiff, said the 47*l.* was claimed in respect to certain fixtures left at Rowley Regis Vicarage when Mr. Kearney left. There was a sort of triple exchange of livings at the time. There was an agreement (which he put in) between Mr. Kearney and Mr. Turner of April 14, 1896, in which Mr. Turner agreed to take to the fixtures at Rowley Regis Vicarage, which Mr. Kearney himself had taken from a previous vicar, Mr. Linklater, less a reduction of 5 per cent. on the gross sum paid to Mr. Linklater. Besides the articles which were controlled by the first agreement, there were certain others which Mr. Kearney left at Rowley Vicarage, and for which he paid or exchanged for other articles. Mr. Kearney was examined as to the agreement with Mr. Turner and as to various items for which he claimed under that agreement. Among the items was 10*s.* for manure dug into the vicarage garden.

His Honour remarked that there was a question as to whether that came under the head of goods sold.

Mr. Parfitt said Mr. Turner would get the benefit of it.

Mr. Young: Is it goods sold?

Mr. Parfitt: I will abandon that item.

Mr. Kearney gave evidence as to a claim of 9*s.* for half a ton of coal he left behind at the vicarage.

His Honour: Eighteen shillings a ton? Nine shillings a half ton for coal in a coal country? (At a later stage the value of the coal was assessed at one shilling.)

Mr. Kearney gave evidence as to the items of his claim, which included a kitchen range, hot-water apparatus, window rollers, a boiler lid, bookcase, shelves in pantry, picture rods, gasfittings, &c. There was cross-examination as to whether a number of the articles were not part of the permanent fixtures at the vicarage, and as to other points.

Mr. Young addressed his Honour for the defence, and called Mr. Lewis Sheppard, diocesan surveyor, who said in June last he made a survey of the dilapidations at the vicarage under the order of the Bishop of Worcester. He saw certain fixtures in the house over which he had no control, but there were other fixtures which he had to regard as part of the freehold, and he assessed dilapidations upon them. These included some of the things which plaintiff claimed for. In cross-examination witness said he knew there were differences of opinion among diocesan surveyors as to what were fixtures.

His Honour held that some of the things claimed for were



part of the freehold, but found for the plaintiff as to the remainder. His verdict was for 32*l.* 14*s.* 1*d.* in addition to the 96*l.* paid into court, with costs.

Mr. Young said he was sorry to say that this would not be the end of the litigation between the parties. When they exchanged livings, the dilapidations at Rowley Regis had to be investigated under the Act of Parliament by the bishop, and these had been assessed at 22*l.* They should have to sue Mr. Kearney for that sum. It was true there was an agreement under which Mr. Turner agreed to bear the amount of the dilapidations, but it would be shown that Mr. Turner was induced to enter into that agreement through misrepresentations by Mr. Kearney that the dilapidations were mere trifling things. When the state of the house, however, came to be investigated, and Mr. Kearney's furniture was removed, dilapidations amounting to 22*l.* were discovered. He asked for the amount recovered under the present action to remain in court till a decision of the other claim.

Mr. Parfitt said it was unprecedented to make such an allegation of fraudulent representation against a respectable gentleman. He opposed the application, and denied there had been any misrepresentation.

His Honour said he most sincerely regretted to hear that, after sitting there the greater part of the day trying the case, there was to be more litigation between these parties. He could not interfere.

Mr. Young asked his Honour to stay execution, to give defendant an opportunity of deciding whether he would appeal against the judgment.

His Honour assented to this.

### THE STUDY OF EARTHQUAKES.

ON Friday a lecture was delivered by Professor John Milne, F.R.S., at the Royal Institution, on "Recent Advances in Seismology." The lecturer spoke of the great strides which have been made during the past eight years in the knowledge of the cause and duration of earthquakes, and described the various instruments now used for recording earth movements. He observed that only recently an earthquake was looked upon simply as a transient phenomenon lasting a few seconds, or at the most two or three minutes, whilst now, by the aid of the seismograph, it was possible to discover and record all the tremors preliminary to and following an earthquake. Having described the various movements of the earth's crust and their cause and effect, the lecturer proceeded to speak of his work in seismology in Japan, where he pointed out that upwards of 1,000 earthquakes a year were recorded. A large number of the residents in Japan were now seized with a desire to study seismology, and one result of that eagerness would be to revolutionise the study of earthquakes throughout the world. So far had the Japanese advanced in a scientific knowledge of the subject that they had now entirely altered the character of their buildings so as to considerably mitigate the loss arising from earthquakes. This desire to study seismology had been encouraged by the Japanese Government, which had liberally subsidised a committee to carry on experiments throughout the country with regard to earthquakes and earth movements. Among other matters, the lecturer mentioned that an earthquake could be felt at any spot in the earth, and that from his residence in the Isle of Wight, with his most improved instruments, he had been able to take records of two of the most destructive earthquakes which had taken place last year in Japan. In one case he secured a record, and predicted that an earthquake would be found to have occurred in Japan at a certain time, and in the result his prediction was verified, his only error being that he was one minute out. The lecture was illustrated by a series of lantern slides depicting the effects of earthquakes in Japan, and showing the most recent improvements in seismographical instruments. Several pictures were also shown of buildings in Hereford which were damaged by the earthquake in the Severn Valley last December.

A circular is about to be issued, signed by Mr. G. J. Symons, F.R.S., chairman, and by Dr. C. Davison and Professor J. Milne, F.R.S., joint honorary secretaries of the seismological committee of the British Association, inviting co-operation in an endeavour to extend and systematise the observations of earthquake disturbances. Similar instruments should be used at stations in all parts of the globe, and the committee recommend one in particular as being simple to work, and as furnishing results sufficiently accurate for the main objects in view. The committee ask all those to whom they address the circular whether they are disposed to purchase and make observations with one of these instruments, the cost of which, including photographic material to last one year, packed for shipment, is about 50*l.* "Should you reply in the affirmative," they say, "we shall be pleased to arrange with a competent maker for the construction of an instrument for you, and to furnish instructions respecting installation and working. In case an instrument be established at your observatory, we should ask that notes of disturbances having an earthquake character be sent to us for analysis and comparison with the

records from other stations. From time to time the results of these examinations would be forwarded to your observatory. The first object we have in view is to determine the velocity with which motion is propagated round or possibly through our earth. To attain this, all that we require from a given station are the times at which various phases of motion are recorded, for which purpose, for the present at least, we consider an instrument recording a single component of horizontal motion to be sufficient. Other results which may be obtained from the proposed observations are numerous. The foci of submarine disturbances—such, for example, as those which from time to time have interfered with telegraph cables—may possibly be determined, and new light thrown upon changes taking place in ocean beds. The records throw light upon certain classes of disturbances now and then noted in magnetometers and other instruments susceptible to slight movements, whilst local changes of level, some of which may have a diurnal character, may, under certain conditions, become apparent." It is requested that replies be addressed to the Seismological Committee, British Association, Burlington House, London, W.

### RECENT EXCAVATIONS AT ATHENS.

A CORRESPONDENT of the *Times* says the excavations carried out by the Greek Archaeological Society on the north-west slope of the Acropolis have led to some interesting discoveries. Near the Klepsydra or well mentioned by Pausanias (i. 28, 4) and at some little height above it are two caverns which have been generally identified by archaeologists as the grotto of Apollo and the grotto of Pan. In the former are numerous traces of niches made for the reception of votive offerings. It was customary for the archons at the expiration of their year of office to inscribe their names here, either on the rock or on marble tablets. No similar traces, however, are found in the other cavern. The excavations now conducted under the superintendence of M. Kavvadias have revealed two other larger and deeper caverns in the adjacent rock which are connected by an aperture. This was undoubtedly the shrine of Pan in which Myrrhina (Aristophanes, *Lysistrata*, 911) proposed to Kinesias that their marriage rites should be celebrated. The whole precinct was in all probability originally sacred to Apollo, but when the worship of the Arcadian shepherd-god was introduced at Athens shortly after the battle of Marathon the deep recess in the rock, which resembles his shrines elsewhere, was chosen as a suitable sanctuary for the rustic deity. The cult of Pan was instituted by the Athenians in consequence of the apparition seen by the famous courier Pheidippides in the mountains of Arcadia when he was sent to invoke the aid of the Spartans against the Persians.

A little to the north-east of the grotto has been discovered a flight of steps cut in the rock and apparently leading to the summit of the precipice. The steps can be traced to the base of a buttress of Mediæval masonry which supports the wall of Cimon. The upper portion of the staircase which lies within the wall was discovered by M. Kavvadias in 1886. It now appears certain that these are the steps by which the Persians scaled the Acropolis, and it also seems probable that this was the passage by which the Arrhephoroe, or sacred virgins, made their annual descent to the precincts of Aphrodite, bearing on their heads the sacred vessels of Athena.

### MR. P. W. ADAM, R.S.A.

AT the last assembly of the Royal Scottish Academy there was an election of a successor to the late J. Denovan Adam. There were three candidates, viz. Mr. P. W. Adam, Mr. G. O. Reid and Mr. A. Roche. Mr. Adam, who was successful, is, says the *Scotsman*, a son of the late Mr. Patrick Adam, of the firm of Adam & Sang, writers to the signet. He was educated at the Edinburgh Academy, and afterwards received his art training at the Royal Institution classes and in the Academy's Life School, where he was a prize student. He began exhibiting pictures in the Royal Scottish Academy exhibitions about 1872 or 1873, among his early works, which were favourably received, being *Alice in Wonderland* (1882), which is now on loan in the Dundee permanent gallery; *Ave Maria*, of the same year, which was his first introduction to the Royal Academy, and *The Sisters*, also shown in the early "eighties." He was elected an Associate of the Scottish Academy in 1883. In 1887 he was in Italy, and painted a number of Venetian scenes, which were exhibited at the Mound and other galleries. One of these, *The Ducal Palace*, was bought and presented to the Aberdeen Art Gallery. During the past few years Mr. Adam, while still painting figure-subjects, has given some attention to landscape, his handling of which has been a good deal influenced by the freer methods of the Glasgow school. Two figure-subjects, however, of his, *In the Studio* and *Christmas Cards*, have been purchased out of the Scottish Academy's exhibitions for a gallery in Bishop Auckland, New Zealand. This year he exhibits a figure-picture called *Morning* and three landscapes.



### NOTES AND COMMENTS.

IN the series of plates by JOHN SELL COTMAN which recently appeared in *The Architect* was one of Château Gaillard, the fortress which was erected by RICHARD I. So many analogies are found of late years between the language, legends and literature of Europe and of Asia, we need not wonder if the Anglo-Norman fortress has captivated the attention of M. DIEULAFOY because it recalls something he saw when with his wife he was exploring Susa for archer's friezes and other novelties. In a paper read before the Académie des Inscriptions he explains that Château Gaillard exemplified the beginning of a new era in military engineering, and therefore was evidence of the innovating spirit which inspired the ecclesiastical architecture of the period. What seems more remarkable is that M. DIEULAFOY traces the development of the Norman castle through the Syrians and the people of Palestine (from whom the Crusaders derived the idea of a more scientific system of fortification) to the Persians, and then to Chaldea-Susa. He drew a comparison between the views of the château, Assyrian and other fortresses, and also with buildings erected by the Crusaders, and demonstrated their affinity with the aid of several illustrations.

THE drawings illustrating his "Wanderings in Italy" which Mr. A. WALLACE RIMINGTON has produced show unusual facility in representing buildings. He does not linger over detail, but he suggests enough which memory or imagination can complete. Mr. RIMINGTON has often the good luck to discover points of view which are more satisfactory than those which are common. The view of the tower of Siena is one example. The landscapes are also attractive. Among the 138 drawings, not one appears to be laboured; all seem to have been completed with ease. But they are effective, and suggestive of Italian colour as well as form. Mr. RIMINGTON has visited Genoa, Torcello, Siena, Viterbo, Bologna, Verona, Naples, Volterra, Mantua, Milan, Venice, Modena, Cremona, Trent, and Padua, and his hand is competent to represent the varieties of landscape and buildings which still have survived the rage for improvements which the genius of finance has inspired.

THE highest price demanded for a drawing in the exhibition of the Dudley Gallery Art Society is 50s. (the work of a lady), and the majority can be obtained for less than 5s. It could not be expected that with such prospects the artists would fill the room with 291 masterpieces. But there is a good deal of sincere, if tentative, work to be seen. Landscape, as usual, prevails. The president, Mr. WALTER SEVERN, deserves his rank by the superiority of his work; Mr. CLAUDE HAYES, Mr. CARTWRIGHT, Mr. POCKOCK, Mr. D. GREEN, Mr. M. SMYTHE, Mr. A. STEVENS, Mr. ALDRIDGE, Mr. N. E. GREEN, Mr. WETHERBY, and Mr. CARLISLE also deserve mention. Those who speculate in drawings can gratify themselves at a cheap rate. There are several excellent drawings of architectural works, Miss M. BERNARD's "blottesque" examples from continental towns being obtainable at a tithe of the sum usually expected for that sort of execution. For amateurs who have frugal minds the Dudley Gallery is worth a visit; they can become patrons of art on most economical terms.

THE Société des Artistes Français must feel rather alarmed at the demolition of the building where the Salon exhibitions were held of late years, for after 1900 who can say what arrangements will be made concerning the Palace of Arts which is to be erected on the site? But while much allowance must be made for those who have received a decree of ejectment, it is hardly becoming on the part of the council of so important a society to display so much pettishness in dealing with so simple an affair as the sharing in an exhibition in Brussels. The Belgians are, of course, eager to obtain examples of modern French art for their forthcoming international exhibition. The Minister of Fine Arts in France considered it would be best to leave the selection of examples to a jury, one-fourth of them selected from the Académie des Beaux-Arts, one-fourth from the Société des Artistes Français, one-fourth from the rival Société des Beaux-Arts, and one-fourth to be nominated by

the Government. The Salonists could therefore be assured of one-half of the jurymen, for the Academicians belong to the older society, and would also have a share of the nominees of the Government. They are, however, monopolists, and as they did not constitute the whole of the jury, it has been decided that the Société des Artistes Français will take no part in the Brussels International Exhibition either as jurors or as exhibitors. It is the action of a spoiled child, a rôle which has been long performed by the members. French Governments are not disposed to treat kindly that sort of waywardness, and if no loss arises from the absence of the representatives of the Salon at Brussels, it may also be considered good policy to dispense with them in the universal exhibition of 1900. That would be a grievous loss to visitors, but the Society would also suffer.

FRANZ SCHUBERT, "the most poetic of musicians," was born in a small house in the Himmelpfortgrund, Vienna, on January 31, 1797. The centenary of the event has been celebrated not only by performances of his works, but by an exhibition which was promoted by the Municipal Council. All the portraits of the master of song-writing that could be procured are shown, as well as those of his friends. Few men were more indebted to friendship, for without the aid he derived from a few enthusiastic admirers of his genius SCHUBERT could not have attained his thirty-first year. The Council recently commissioned Herr SCHMID to paint a picture showing SCHUBERT surrounded by those Viennese who esteemed him as the most delightful of composers.

THE arrangement of the competition for the Westbar Fire and Police Station announced by the Corporation of Sheffield will not, we hope, be taken as an example for imitation. There can be no objection to limiting the competitors to architects living in Sheffield, or to entrusting the selection of four designs to the president and two past presidents of the Sheffield Society of Architects and Surveyors. But why are members of the society alone to be considered eligible for taking part in the competition? There are many architects who on principle keep aloof from societies, whether local or imperial, and it cannot be said that their ability as designers or as men of business is deteriorated in consequence. There may be representatives of that class in Sheffield; but as the spirit of trades unionism has been always of excessive power in the city, we suppose it is assumed that a non-society architect should be made to suffer for daring to be independent. The scheme is not, moreover, likely to be advantageous to the Sheffield Society of Architects and Surveyors. There never was a competition in which the awards were accepted as satisfactory, for unsuccessful candidates do not believe sufficient pains were taken to understand their designs. The youngest students are as much liable to that weakness as senior practitioners. If by any act the officers of a society are considered to be inequitable that society is not likely to flourish. We hope such a result will not follow on the Westbar Fire and Police Station competition. The authors of the four designs considered to be most meritorious will each receive a premium of 15s. In addition to receiving a premium, the author of the best design will be entrusted with the carrying out of the work at the usual rate of commission. The total cost of buildings, exclusive of furniture and special fittings, is not to exceed 7,000s.

### ILLUSTRATIONS.

ELY CATHEDRAL—THE REREDOS.

DESIGN FOR REBUILDING NORTH BRIDGE STREET, EDINBURGH.

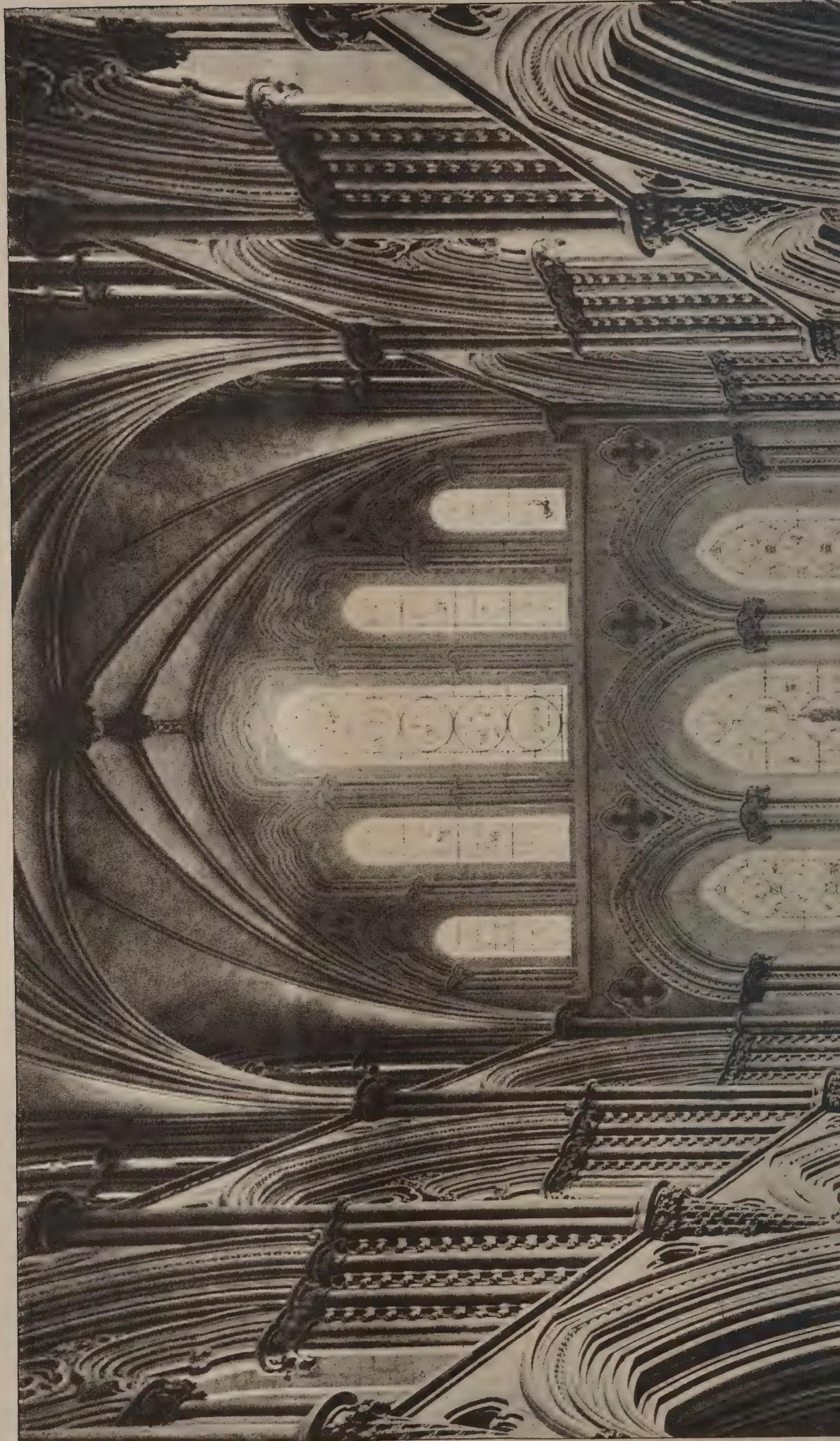
THE design by MESSRS. MARSHALL & BRADLEY, of Westminster, was submitted in the recent competition. The main elevation is the north one, which is visible from Prince's Street, on the other side of the valley. The perspective was taken from the nearest point approachable, some 200 yards away, and for this reason the designers relied for effect rather on mass and outline than on elaboration of detail. The endeavour has also been to lead the eye up gradually from the lower buildings surrounding the site to those on the Bridge Street level, 50 feet above.



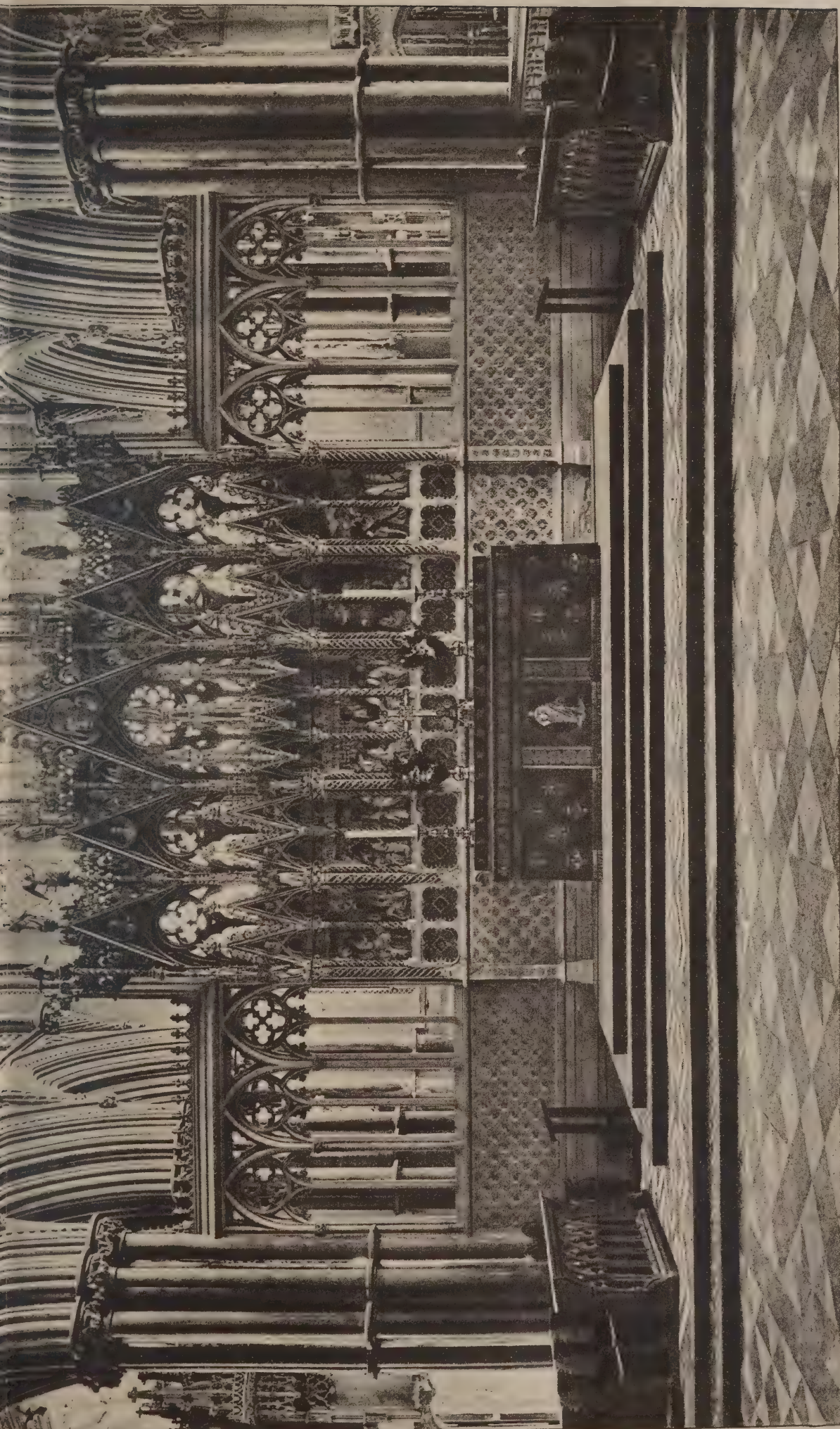




Die Architektur, Feb. 19<sup>th</sup> 1897







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CATHEDRAL SERIES, No. 12.—ELY: THE REREDOS.







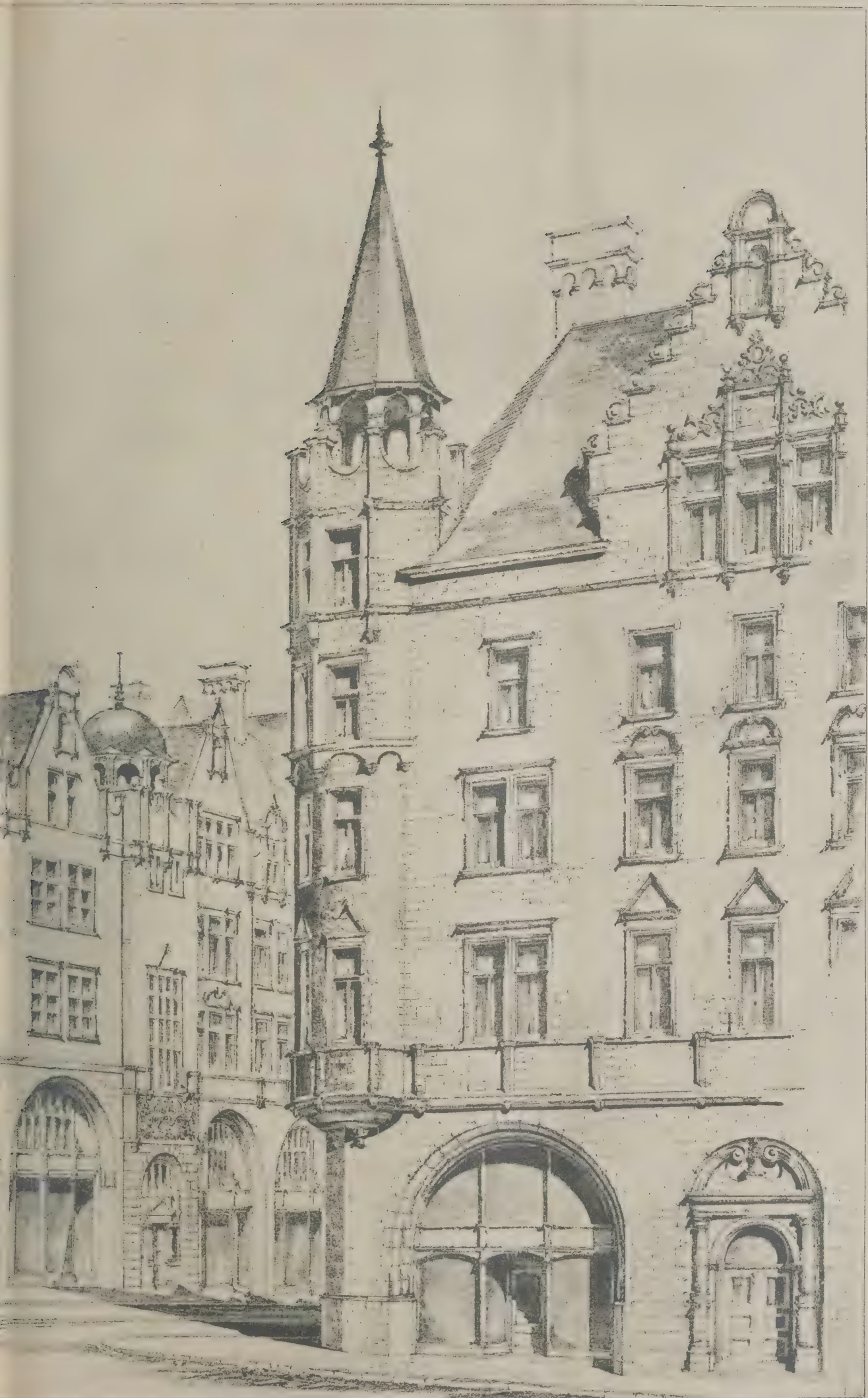








Feb 19<sup>th</sup> 1897



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BRIDGE STREET, EDINBURGH.















Feb 19<sup>th</sup> 1897



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TH BRIDGE STREET EDINBURGH.  
SHALL & BRADLEY.







## ELY CATHEDRAL.—IV.

*Recent Works.*

I WILL close my paper with a brief statement of recent works so far as they have come under my own observation.

I should premise that during the last century very extensive works were carried out in the cathedral under an able architect, Mr. Essex. These works embraced important repairs, the re-leading and remodelling of the central octagonal lantern, and the entire transmutation of the position and arrangement of the choir.

I have already stated that the choir originally occupied the space under the central tower and two bays of the nave. Its altar arrangements extended into the eastern arm, the shrines of the saints occupying the apse.

When Northwold added his vast presbytery these arrangements were somewhat modified, the shrines being moved into the new work. Whether it was then that the arrangement involving two altars, viz. the choir altar and the high altar behind it, was introduced, I am not able to say.

When Walsingham converted the central space into a vast octagon, it would not appear that he introduced any great change in the previously existing arrangements. The Norman choir screen had escaped, but all other choir fittings seem to have been destroyed by the fall of the tower and were renewed, but, so far as I can tell, in their old positions.

Instead, then, of the octagon being an open as at present—so well suited for preaching and other extra-choral uses—it was cut through by the choir, whose stalls with their lofty canopies and screens effectually screened its two flanks from the central space.

It remained so till the time of Essex's repairing, and though a little inconsistent with the beauty of the central octagon, I could wish that it had so remained, for then we should have seen unaltered the arrangements as left by Walsingham, Prior Cawdon and Bishop Hotham; and in reference to which their tombs and those of all subsequent dignitaries were placed. The Chapter, however, for whom Essex acted, determined to bring matters to something more approaching what they conceived the normal type, and so thrust the altar back to the eastern wall of Northwold's work; and, as the space between that and the octagon was needlessly long, they placed their screen two bays eastward of it; thus, instead of the choir encroaching by two bays, as it had once done upon the nave, they made the nave encroach two bays upon the eastern arm which they had nominally adopted as their choir.

Things remained, as I imagine, pretty much as left by Essex till the time of the gifted and zealous Dean Peacock.

My own recollections of the cathedral date from 1828, at which time I recollect that the remaining half of the western transept (which, by the way, had been shorn of its apsidal chapel of St. Catherine) was a mere rough workshop or lumber-room cut off from the church, while the lantern storeys of the western tower were shut out from internal view by two timber floors. I well remember, however, being filled with admiration for the beauty of these parts, though only seen under the greatest possible disadvantages.

When Dr. Peacock took the office of dean he set vigorously to work to remedy the ills which his cathedral had suffered. He restored the interior of the western transept, reconstructing the chapel of St. Catherine. He cleared away the obstructions from the western tower both above and below; restoring to view its glorious lantern stages, he set to work to cleanse the interior from its coatings of yellow wash, and to repair the decaying Purbeck marble.

These works were carried on, by the aid of a clerk of the works, under the personal direction of the Dean and of Professor Willis, assisted by the Rev. Mr. Stewart, who was then the precentor, and, as I believe, with the occasional, though non-professional, advice of Mr. Basevi, who so unfortunately lost his life while accompanying the Dean over the works going on in the lantern storeys of the western tower.

In the autumn of 1847 I was honoured by the appointment of architect—I will not say to the cathedral, but to the rearrangement of the choir—the other works going on much as before, whether under me or not I hardly know.

As the ancient arrangement had been effectually lost, we made no attempt at its recovery, but contented ourselves with the correction of the obvious faults in that which existed, at the same time determining, as the ancient screen had ceased to exist, to open out the choir to the nave by the adoption of an open screen.

On the suggestion of Professor Willis, we followed the precedent existing in Henry VII.'s Chapel at Westminster, of retaining only one returned stall on either side, viz. those of the bishop and the dean. For it may be mentioned that, as the bishop took the place here of the former abbots, he took also their stall on the south side of the entrance, the prior retaining his stall on the north; and when the prior became the dean, he simply retained his old place, the bishop also retaining his.

So that the dean here occupies traditionally the side opposite to his customary position.

The eastern arm of nine bays in length being too long for a choir, we brought forward the screen to the eastern piers of the octagon, and cut off two bays (I should have wished three) at the east end, as an ambulatory connecting the aisles.

I will say nothing more of this work as it is before you, excepting that it was most satisfactorily carried out, so far as the woodwork was concerned, by the late Mr. Rattee, of Cambridge, aided by his foreman, Mr. Kett, who on Mr. Rattee's early death became his successor; but is now, I regret to say, deceased.

Alan de Walsingham's stalls were of course retained—I regret I did not retain some of the fronts of the desks which remained, but in a very altered condition.

The monuments which had been removed by Essex were replaced to the best of our judgment, for the old arrangement having been departed from, their perfect restoration to their true positions was impracticable. The canopy, or rather the half of a canopy, which we found to overshadow very clumsily the removed tomb of Bishop Hotham, was found to be, in all probability, the substruction of St. Etheldreda's shrine, and was completed from its existing remains. This suggestion of its original use was, I think, due to my talented friend Mr. Burges.

Since that time the internal works have proceeded gradually as funds would permit.

The most notable among them has been the introduction of a richly painted ceiling throughout the nave. This had been previously covered with a plain cradle roof, ancient, but hardly intended to remain visible. The painting of this roof (or rather of the ceiling affixed to it) was nobly undertaken by a most talented amateur, the late Mr. Le Strange, of Hunstanton Hall, Norfolk, who had previously practised his hand most successfully in painting that of the western lantern.

On my suggestion he visited Hildesheim, where a then untouched ceiling of a corresponding date remained, and on that he based his design, though making it in all its details original, and a most excellent work, tending through the reserve which characterises its colouring to increase rather than to diminish the apparent height of the interior. Its compartments contain admirably studied subjects illustrating the sacred history of man.\*

Unhappily he was not spared to finish his noble work, but died when about two-thirds of it was completed. It was then in the most chivalrous spirit taken up and completed by his friend and brother-amateur, Mr. Gambier Parry, of Higham Court, Gloucestershire. So that we owe to non-professional talent this noble addition to the internal beauty of the church.

The next great work to which I will allude is the reparation and restoration of the woodwork and its leaden covering of the central octagon and lantern. This was carried out by a special subscription, as a fit memorial to the fame and earnest zeal of Dean Peacock.

In carrying out this work I gave great study to ascertaining, as nearly as was practicable, the ancient design, much of which had been lost and much obscured by the repairs of the last century.

I had the satisfaction of proving the greater part of the timber-work to be original, having from the bottom to the top the carpenters' marks of Walsingham's workmen, and by which, having prepared their work in the field, they were enabled to put it together in its place.

This investigation proved the view taken by Browne Willis to be in the main correct; indeed, we found the very mortices into which the angle turrets he shows were framed, and we again made use of them for the restored work. I have in my reports detailed the evidence discovered, and will not here dwell upon it further.

The internal painting of the lantern, with its groining, of which the original accounts and many vestiges exist, still remains to be restored; and for this we again take the proposals of talented amateurs.

I should mention that the repairs of the central lantern, &c., were carried on under the zealous care of Dean Goodwin, now Bishop of Carlisle, who at the time made most careful researches into the ancient accounts of Walsingham's time with reference to this great work. He discovered the complete accounts of the bells introduced into this central campanile, which were then not well known, but have since been published by Mr. Stewart.

His periodical circulars, printed at about this time, particularly that for 1865, will be found to contain most interesting matter relative to this and other works (such especially as the ceiling of the nave); one discovery made by him I will give in his own words:—

"The most curious discovery that I made at Ely was the marks of the lantern bell-ropes upon the vertical mullions (if they may be so called) on the south side of the lantern. I recorded this in one of my periodical fly-sheets, and I think I have mentioned it in a note to my 'Recollections of a Dean' in

\* Mr. Le Strange's work begins with this inscription:—"Sit splendor Domini Dei nostri super nos; et opera manuum nostrarum dirige super nos, et opus manuum nostrarum dirige." Mr. Gambier Parry's work terminates with the following inscription:—"Non nobis, Domine, non nobis, sed nomine tuo da gloriam."



'Essays on Cathedrals.' The ropes converged (as the marks show) to the northernmost (easternmost?) pier of the south transept, and upon that pier you may still see the marks of two pegs or nails, upon which I presume the ropes' ends were twisted when not used. You may remember that there used to be a question in Le Strange's time, How were the bells in the lantern rung? This discovery entirely settles that question."

The more recent works have consisted in—1. The restoration of the western portal and door.

2. The reparation of the western tower, which had again shown the effects of undue pressure; and has now, besides other repairs, been bound together by a splendidly executed system of iron ties.

3. The repairs of the buttresses and foundations of a part of Northwold's work, which showed signs of weakness after an unusually dry summer. These foundations are based on a thin and superficial rock, while those of Walsingham's work go down to one of a more solid character, to which we have underpinned the buttresses we dealt with.

4. The application of a similar process to the eastern angle of the south transept, which also showed great signs of weakness, and

5. The repairing of the nave from the west end as far as the octagon.

I may mention in addition to all other works,

1. The immense extent of stained-glass throughout the cathedral, introduced mainly under the zealous auspices of Canon Sparke;

2. The addition of subjects in relief (evidently intended by Walsingham) into the flat niches over the canopies of the stalls. These were suggested by myself, but have been carried out through the energy of Canon Sparke, to whom also we owe the brass lectern and many other benefactions.

3. The new pulpit under the octagon.

I will only add to the above already too lengthy sketch a list, which may be interesting, of the examples of different periods of architecture which our cathedral offers to the student and the antiquary.

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| 1. Of the earliest variety of Norman.                      | Abbot Simeon's work in the transepts up to the triforium level.  |
| 2. Of the more advanced, but yet early Norman.             | The upper stages of the transepts.   |
| 3. Of the yet more advanced Norman.                        | The nave with its splendid doorways to cloister.   |
| 4. Of a further advance, showing great richness of detail. | The lower stages of the western transept.  |
| 5. Of the latest and most refined Norman.                  | The exquisite remains of the infirmary.  |
| 6. Of the Transition.                                      | The upper stage of the west transept and the western tower.  |
| 7. Of perfected Early English.                             | The western porch and the six bays of the presbytery.  |
| 8. Of later date with early tracery.                       | The eastern chapels of the south transept (now the library), also the relics of the refectory.   |
| 9. Of perfected early Decorated.                           | The canopy of Bishop de Ludas's tomb.  |
| 10. Of late Decorated.                                     | The central octagon and the three eastern bays adjoining. The lady chapel, Prior Cawdon's chapel, &c., also later specimens in the inserted windows in the aisles of presbytery. |
| 11. Of Perpendicular.                                      | Several tombs. The chapel of Bishop Alcock. Many insertions throughout the building.   |
| 12. Of Perpendicular verging into Renaissance.             | Bishop West's chapel.  |

### THE HELLENIC SOCIETY.

ON Monday the second general meeting of the session of the Hellenic Society was held. Mr. Talfourd Ely presided. Two papers were read by Professor Percy Gardner on "A Stone Tripod at Oxford" and "The Mantinea Basis." In his first paper, the Professor said that the tripod was the gift of Mr. Lefroy, and on the stone was an inscription to the effect that the tripod was dedicated to the mother of the gods and came from Corinth. Round the pedestal were figures of three women, each wearing a long chiton. There was, as we know, a temple to the mother of the gods at Corinth, but in his opinion it was hardly likely that the tripod came from that temple. A tripod of a not dissimilar character had been found at Olympia, of which Dr. Treu had effected a most successful restoration, and others had been found at Delphi, and others again were to be seen in the Central Museum in Athens. Figures of three women were of common occurrence—as in the

threefold representation of Hecate and the three graves. In his opinion no real cultus was indicated by the tripod, which was of a purely architectonic character. The work was probably an original of the earlier part of the fifth century. If it was a copy it was a remarkably faithful one, in marked contrast to the superficiality of Roman work.

Professor Waldstein also thought that the work was not later than the middle of the fifth century. But the original, of which he believed this to be a copy, took us back to a remote antiquity. The Olympia tripod was more archaic than that at Oxford, which reminded one of the specimens of Ionic art at Athens.

Professor Ernest Gardner thought this was a specimen of the transition period between Oriental and later art, and that the purpose was purely architectonic.

Miss Harrison could not accept the view that the work had no religious or mythological significance. The number 3 pointed to the Muses or some group of goddesses. The number 9 was by no means indissolubly connected with the Muses; but the number varied, always being, however, a multiple of 3.

In his second paper, Professor Gardner said that Professor Overbeck in his "Geschichte der Plastik" had recanted his former opinion and assigned as the date of the vase at Mantinea about 370 B.C. In the midst of the basis were figures of Apollo and Marsyas, and on either side three female figures, as to which there had been considerable controversy. Furtwängler attributed the group to the later Praxiteles, but whether or not there were two artists of that name was a question involved in considerable doubt. He was not able to accept the theory of Dr. Waldstein that there had originally been four slabs, of which one had been lost. The side slabs might be Leto and her children and a group of three Muses, and with respect to the latter he was glad to be fortified by the observations of Miss Harrison.

Professor Waldstein adhered to his opinion that there had originally been four slabs, as in its present condition the work was far too symmetrical for Greek art. As to the Muses, there had always been nine of them from the days of Homer and Hesiod.

### A CANADIAN VIEW OF THE STYLE OF THE FUTURE.\*

IT is now some 350 years since the last living style of architecture reached its culminating point and began to fall away into decadence. These last three and a half centuries have been in some respects the richest in the world's history. Greater progress has been made in discovery and invention in every department of science during these three and a half centuries than had been made in the preceding thirty centuries. And yet, strange to say, during this last period—which has been so fruitful in the advancement of science—there has nowhere been in existence a true living style of architecture; while during the whole time that elapsed from the earliest dawn of the art to the beginning of this period there has never been a time when there was not being practised somewhere in the world a living and growing style.

This fact, however, is sometimes stated in such an exaggerated form as to lead to the very erroneous conclusion that nothing worthy of the name of architecture has been done since the middle of the sixteenth century, and that everything that was done before that time was good, and everything that has been done since must necessarily be bad. This is far from being the case. But critics seem often to lose their critical faculty when they are dealing with old work, and speak of it reverently and almost with bated breath, merely because it is old. This spirit sometimes leads them to profess admiration for examples of old work which, if they were the work of modern architects, these same critics would at once condemn and hold up to ridicule. There has been a vast amount of architecture produced during this last period, and much of it has been good and some of it excellent. Nearly the whole of the architecture of the Renaissance belongs to this period.

But while this is true it is also true that there is a radical distinction between architecture which is living and that which is not living. A living style contains within itself the elements of growth along the same lines on which it has arisen. As new conditions arise and new problems present themselves, new forms are evolved by a natural process of development from within. This process goes on slowly and gradually. There may be no apparent break in continuity and no abrupt step anywhere visible, and yet it is found that after the lapse of a certain time the style has wholly changed. In short, a new style has been invented. But after a style has ceased to be a living one such growth as this never takes place. Its features and forms may indeed be used with academic correctness, and may be adapted to new situations and purposes. As a new need arises another old feature will be taken and ingeniously made to serve the new purpose. But a style may be made use

\* A paper read by Mr. D. B. Dick at the annual convention of the Ontario Association of Architects.



of in this way for an indefinite length of time without making any advance beyond the point which it had attained while it was still living and growing, because this method is simply imitative and eclectic.

At this point the question, "What is style?" seems naturally to arise. Very few writers have made any attempt to give an explicit definition of the term, but have contented themselves with recounting the history and describing the features of the various styles and pointing out the differences between one and another. Such definitions as have been made are more or less unsatisfactory and may convey different meanings to different minds according to their individual predilections and the character of the architectural objects with which they are familiar. Owen Jones, for instance, says in his preface to the "Grammar of Ornament," "Architecture is the natural expression of the wants, the faculties and the sentiments of the age in which it was created." "Style in architecture is the peculiar form that expression takes under the influence of climate and materials at command." Both these statements are true so far as they go, but as definitions they do not appear on one hand to cover the whole ground, and on the other they seem to claim almost too much. Here is an attempt at another definition:—"Style in architecture consists in the harmonious working out of the construction and ornamentation in a manner so characteristic that the period and locality of the erection of original examples can be determined (by comparison) from the evidence which they themselves furnish."

All true styles will be found to fill these conditions, no matter how much they may differ from each other either in method of construction or character of ornamentation. The number of true styles into which the architecture of the world may be classified is wonderfully small considering the length of time over which they extend, and the variety of conditions under which they were produced—conditions varying with the purposes of particular buildings, with difference of materials, of mechanical skill, of climate, and of those peculiar qualities of mind in the builders which go to form what is called the genius of a people.

The first beginnings of architectural design were the fruits of a desire to hand down the memory of some great event or personage to future generations. The next were inspired by man's religious instincts, and it was only after architectural ideas had become somewhat crystallised by practice in these two directions that they began to be applied to buildings of a purely utilitarian character. It would take too long, and it is not necessary for the present purpose, to trace in detail the evolutionary process by which each style advanced to its highest perfection, only to be gradually changed into something altogether different. But this point may be noted in passing, that the change from one style to another was always the result of the introduction of new factors, such as a change in structural methods caused by the attempt to solve new problems or supply new needs, never from a mere desire to change the fashion of the external form in which architectural ideas were expressed. The most potent of these factors have been the general use of the arch by the Romans, the development of groined vaulting by the Gothic architects, and possibly the use of the truss. A couple roof and a simple barrel vault both require a straight wall for their support, with only this difference, that unless the vault is tied in so as to take the lateral thrust off the walls, they must be made much thicker to resist that thrust than would be necessary to carry the couple roof. But as soon as the principle of groining or trussing comes into play the continuous wall necessarily changes its character and becomes a series of strong supporting points with a comparatively light enclosing wall or screen between them. In the case of the highest development of this idea—the Gothic cathedral—the enclosure becomes a mere frame of stonework for the display of the largest possible quantity of painted glass. In effect the side wall is cut into sections which are turned round at right angles and so developed into buttress and flying buttress and pinnacle. This is but one illustration of the principle upon which all true development has taken place.

Two important elements in the formation or modification of style have invariably been materials and climate. The Egyptian and Grecian styles could never have been developed except in a country capable of supplying very large blocks of excellent stone. Nor could the type of dwelling-house found in Pompeii, with its shady open-air features, so suitable to the south of Italy, ever have come into general use in the climate of the northern parts of Europe.

The course of the historical development of style has been along certain well defined channels or main arteries. There have been many offshoots and possibly some indigenous styles, but these may all be left out of account because they have had no influence upon the general historic sequence of styles. This sequence includes the Egyptian, the Assyrian, the Greek, the Roman, the Byzantine and the Gothic. No style outside of these can be said to have had any influence in forming the great historic chain of styles.

One or other of two great principles of construction will be

found to be the ruling idea in the formation of every style. And the distinction between these two is so great that it is a question whether it would not be proper to say that there are only two great styles, and that all others are only subdivisions of them. The one of these great root principles is that of the pillar and beam, and the other that of the arch. All before the Roman period belong to the one style, and the Roman and all that come after it to the other. For although the principle of the arch was undoubtedly known long before the Roman period, it was the Romans who first used it as the leading principle of their construction.

Disregarding the intermediate links connecting the different styles, and considering only the most characteristic examples of each, their remarkable dissimilarity is much more obvious than their resemblance. It requires some consideration to realise, for instance, that the church of Sta Sophia is the direct descendant of the Parthenon, the Pantheon at Rome of the Hippostyle Hall at Karnak, and Salisbury Cathedral of them all. But since it is so, it is natural to expect that all these different styles should contain some elements in common. It might even be expected that the elements of which they are composed would be the same in all cases, although used in entirely different ways, just as the type in a fount may set up at one time the text of Herbert Spencer's philosophy, and at another the wit and humour of *Punch*, or a work in the English language one day and one in French or Italian the next. These elements are of two kinds, the constructive and the decorative. The essential constructive elements are very few in number. All that are absolutely necessary to constitute a building are some sort of enclosure, a means of entrance, and in most cases a roof. The constructive elements, then, are walls, piers or columns, and a roof, composed either of lintels, vaulting, or trussed work, the choice between the three perpendicular or supporting elements being most frequently determined by the principle of construction of the roof to be carried by them. The decorative elements are more numerous and complex, although wonderfully simple after all. Mouldings are the most universally used of all decorative forms, and these, no matter where or in what style they may occur, consist invariably of one or more of four simple elements used either singly or in combination. These simple elements are the ovolo, the hollow, the bead or roll, and the fillet. The ogee is only a combination of the quarter round and the hollow, and the scotia is only two hollows of different sizes contrasted. The fillet may be used either with its face set perpendicularly or at an angle, in which latter position it suggests the chamfer, which may therefore be reckoned as merely a modification of the fillet and not an independent element. There is absolutely no moulding or combination of mouldings in any style that has ever been invented that is not made out of these rudimentary elements. The possible number of combinations of these simple elements is practically inexhaustible, through the mere variation of the order of their juxtaposition and their relative sizes. When to this is added the variety obtained by modifications of their profiles the possibilities become infinite. Compare the crude simplicity of the Roman ogee or ovolo with the subtle refinement of the Greek and the difference is at once apparent, and yet they are essentially the same. There is a great difference in the effect of the ordinary attic base and the common Early English one, which consists of a small roll at the top and a large one at the bottom with a hollow and fillet between, and yet the chief difference between them is the omission in the Gothic base of a couple of fillets. The Greeks sometimes combined their elements in such a way as to produce undercut mouldings, and the Gothic architects afterwards seized hold of this idea and used it with wonderful effect in composing their groups of mouldings. But an analysis of the most elaborate groups invariably shows that they are composed of the same simple elements. The desire to produce richer effects than could be obtained by simple mouldings led to the enrichment of their surfaces and so to the use of decorative carving. Sculpture also appears from very early times to have been associated with architecture as a decorative accessory. And the character of the carving and the sculpture varied in different styles, and, taken in conjunction with the mouldings, contributed largely to their individuality.

All architecture, then, is composed of the same elements. But there is a radical difference between the principles on which these elements were used up to the sixteenth century and those on which they have been used since. In the old method they were used as the words by which expression was given to those new thoughts which were ever contributing to the building up of the body of true architecture. In the modern method the thoughts themselves are appropriated and combined and arranged to make up the eclectic architecture of modern times.

That eclecticism is the ruling motive of modern architecture may be considered as an accepted fact. All the so-called "Revivals" have been nothing but eclecticism. The advance of science and the increased complexity of modern life have constantly raised new problems from the solution of which some tendency at least towards a new style might reasonably have



been expected. Engineering and all the other sciences have kept fully abreast of these new demands, and have often created new wants by offering the means of satisfying them. Architecture alone has failed to rise to the occasion. It is not to be denied that in some respects architecture has advanced even within the last generation, but there has been no change of principle, and the improvement has been rather in taste than method.

The chief factors in the creation of these modern opportunities have been the increase in knowledge of the properties and strength of materials and of the principles of framing, and the improvements in the manufacture of iron and steel and of glass. The building of the Crystal Palace by Sir Joseph Paxton, about the middle of this century, gave a great impetus to the use of iron, and the iron front became the new idea. Fortunately it had not vitality enough to live very long. Had the designers been able to divest their minds of the old ideas they might perhaps have made something of the new one. But instead of this they simply took the old forms of a stone construction and tried to adapt them to the new material. The result was inevitable. To save material columns and other features were attenuated to the last degree, and to save expense in modelling details were duplicated with hopeless monotony, while, worse than all perhaps, the principal idea to be kept in mind in designing or selecting the details was not "are they beautiful or appropriate?" but, "will they draw out of the mould?" Some of these attempts have been removed to make way for more modern structures, but many of them still remain and periodically challenge attention by blossoming out in a resplendent coat of new paint.

But the one great opportunity of modern times has been the advent of the steel framed structure generally spoken of as the "skyscraper." It is not yet many years since it appeared as practically a new problem; but the number of the attempts at its solution, and the vast amount of ability and skill that have been brought to bear upon these attempts, afford justification even now for an estimate of the value of the results. There is much variety among the examples, and some of them are good, some bad, and some indifferent. But however various they may be in other respects, this one thing has to be said of them all—that not one of them has contributed in the very smallest degree towards the creation of a new style. They are all shams in so far that their construction is not expressed but concealed. There is not an architectural idea in one of them that was not in current use long ago. They may be divided roughly into two classes—first, those in which the whole height is treated as one composition from which nothing can be taken away and to which nothing can be added without destroying its proportions; and, second, those which are designed on the principle of a pillar, some of the lower storeys being grouped to form the base, and some of the upper ones the capital, while the intermediate storeys form the shaft as it were. The first of these two ideas is by far the more difficult of successful accomplishment, and when it is successful the result is proportionately better than in the best of the other type. The second type is defective in that it fails to satisfy the eye that the design was made for just that number of storeys and no other. The idea is suggested that the building might be cut in two in the middle, the upper part raised, and one or more new storeys inserted. A design that conveys this impression to the mind cannot possibly have been made on true principles. The majority of the very tall buildings are also found wanting when the test of suitability of design is applied to them, because they are usually so situated that they cannot be seen except so much foreshortened that their proportions are entirely destroyed. The only appropriate place for a skyscraper is on the side of a large open square or at the end of a long street, which latter, of course, is rarely possible. It therefore carries within itself the seeds of its own destruction as an architectural idea, because its advantages depend upon its standing alone and towering over its less aspiring neighbours. A street of skyscrapers would defeat its own purposes, and a city of skyscrapers would be unfit to live in. Hence there are already signs that its day is over and that the height of street buildings will in future be generally restricted by legislative enactment. It is not wonderful that the skyscraper has done nothing towards the production of a new style nor that some of the examples have not been very happy as designs. The wonder is rather that, considering the time usually allowed for designing them, the average results have been even so good as they are. There is no need to regret that the skyscraper has done nothing towards the attainment of a new style, because it could after all have been nothing more than a style for skyscrapers, while a new style to be of any use must be one capable of universal application.

One can hardly look back over the history of the styles without asking oneself the question, Is there any reason why they should not have been developed upon other lines than those which they actually followed? If, for instance, the Roman style developed under one set of conditions into Gothic and under another into Byzantine, why might it not under a third and easily conceivable set of conditions have developed into a

third style differing from both of these as much as they do from each other? We have seen that all architecture is composed of the same essential elements. If these have been combined to form styles differing from each other as much as Egyptian and Roman or Greek and Gothic, why have they never been combined to make another different from them all? It can only be because the evolution of a style is a long, slow process, and the world was not big enough to allow of the complete separation necessary for the existence at the same time of more than one or two of the wholly different sets of conditions necessary for the evolution of distinct styles. And further, because during all the time that the old styles were in process of evolution certain social conditions favourable to the process prevailed, but have ceased in modern times to exist, and have been succeeded by others distinctly unfavourable.

In view of the fact that so few distinct styles were evolved during the past, is it possible by analysis to arrive at such a knowledge of the principles out of which they grew as to afford a hope that even yet the following out of the same principles might result in the production of a new one? We have seen that the elements of all styles are the same and are always at hand. There are men of as much talent or even genius in the world to-day as there ever were. The sister arts of painting and sculpture are as much alive to-day as they have ever been at any period in their history. Why should architecture of all the fine arts alone be dead? Is no resource left her but that of fitting together the dry bones of the dead past instead of going forward in the full exuberance of life and creating new ideas to be handed down as working material to future generations as the ideas of the past have come down from one generation to another?

The eclectic method has been tried for several centuries and has failed. Is there no other? Would it be possible by going back to first principles to design a building absolutely without style? Much has been written and spoken about "catching the spirit" of a style, but those who have succeeded best in the attempt have only succeeded in producing imitations—close enough in many cases to deceive those ignorant of the date of their erection into believing them genuine works of the style imitated. They have done absolutely nothing towards carrying the evolution of the style one iota further. There is, however, a "spirit" of design without which no good work ever has been done or ever will be done in any style. It is something akin to thinking without words. It is the creation of a design by the thoughtful working out of all the problems involved under the special conditions of the case. It is conceivable that up to a certain point a design might thus be worked out that would be structurally complete, perfect in its proportions, and yet without a trace of detail belonging to any known style—in fact, without any detail at all. One could not look at the Parthenon or Salisbury Cathedral from a distance too great to permit of any detail being visible without in some measure being conscious of the difference in the spirit of the two styles. If it were possible to work out a design, even without detail, that would not suggest the spirit of any known style, the first step would be taken towards the invention of a new one.

(To be concluded.)

#### ARCHITECTURAL CRAFTSMEN'S SOCIETY.

LAST Friday evening, under the auspices of the Glasgow and West of Scotland Technical College, Mr. Wm. U. Muir read a paper on "Foundations" before a large attendance of members. He dealt very fully with the different classes of foundations to be met with in the ordinary course of building practice, and demonstrated by means of sketches and diagrams their mode of treatment in varying circumstances. The benefit of taking borings, the necessity of draining in most cases, the uses of sand and timber piling were all explained, and a profitable discussion followed.

Mr. Muir was cordially thanked for his paper, undertaken at the last moment to fill the place of Mr. A. Lindsay Miller, who had been unable to attend.

#### EDINBURGH ARCHITECTURAL ASSOCIATION.

THE Association, by the kind permission of the Edinburgh School Board, visited on the 13th inst. the new school at Broughton, under the leadership of Mr. Robert Wilson, architect. The School is built upon the site of Blackfield House, and consists of a central block with a wing at each side. The central block contains the principal classrooms, entering from a combined boys' and girls' staircase, and in the wings are the teachers' private rooms and cookery and laundry classrooms. There is a total accommodation for 1,358 children, provided at a cost of about 24,000*l.*, exclusive of the site. In the basement are situated the gymnasium, swimming-bath, boiler-house and engine-room. Externally the building is a very satisfactory example of school architecture. The visit was brought to a close by a vote of thanks to Mr. Wilson for his interesting explanation.



## THE NATIONAL GALLERY.

THE following recent additions have been made to the National Gallery:—

By the bequest of Mrs. Hodgkinson, the late Sir John E. Millais's celebrated picture of *The Yeoman of the Guard*, exhibited at the Royal Academy in 1876. It is placed on a screen in Room XX.

By the gift of a body of subscribers a landscape by Giovanni Costa, exhibited last summer at the New Gallery, entitled *A View of the Carrara Mountains*.

And presented by the painter's family, a picture of *Christ and the Woman of Samaria*, painted by the late George Richmond, R.A., when he was eighteen.

These two pictures are placed in Room XXI.

Mr. J. Wolfe Barry has presented the drawing by the late E. M. Barry, R.A., which was made as a competition design for the National Gallery. This drawing is placed at the western end of the entrance-hall.

## M. MAGNE ON THE PARTHENON.

THERE has recently been published at the "Imprimerie Nationale" in Paris, under the direction of the Minister of Fine Arts, says *l'Illustration* (translated in the American *Architect*), a very interesting book containing the results of observations made by the eminent French architect, M. Magne, on the Parthenon. Two years ago, while on a journey in Greece, M. Magne called attention to the alarming condition of the edifice. The architraves were broken in places, the entablatures had been badly shaken, and it was evident that, sooner or later, the entire building must fall in pieces.

Informed by the French Government of the result of these observations, the Hellenic Government immediately submitted the question of what was to be done to a special commission, formed in part of Greeks and in part of foreigners resident in Athens. The members of the commission were unable to agree upon any plan. One of them, a German, conceived the idea of fastening together with bolts the detached fragments, and of pouring into all the cracks tons of glue. The difficulties, however, kept increasing. A slight earthquake shock had still further dislocated the entablature and had decided the fall of several fragments of the architrave. There was no time to be lost. The Grecian Government took counsel with a German architect, Herr Durm, and an English architect, Mr. Penrose, both gentlemen artists of ability and well known as archæologists. While they were on the spot studying the situation, M. Magne, at the instance of the French Minister of Fine Arts, was preparing in Paris a project for consolidation, and was drawing up a plan for the necessary supports to underpin the broken or crumbling blocks, and when he returned to Greece last spring he was able to present a model of the framework of stagings that would be indispensable to the work.

He expressed his views at a public meeting. It was a question, he believed, not of a restoration, but of preservation. There could be no question of replacing the great work of Ictinus by a modern work; that would, indeed, be a veritable sacrilege.

M. Magne found that his views were sympathized with and encouraged by his first success, he resumed his studies at the Parthenon and shortly after was able to submit to the Government of Greece a definite plan of work, which was officially adopted. A complement of French carpenters sent to Athens last summer began work at once. The scaffoldings are in place and the work is going forward with all possible carefulness.

The water-colours, photographs and drawings made of the Parthenon by M. Magne are now on exhibition at the Trocadéro Museum in Paris and, as before stated, the Government has put forth a printed report of the results of M. Magne's studies and observations. Never before has there been published such definite information concerning this marvellous structure, in which are united all the perfections of ancient art. M. Magne has not contented himself with merely describing these noble ruins and with pointing out in concise terms their beauties. He has corrected, in the course of writing his book, many errors founded upon ancient texts imperfectly understood. He has thrown entirely new light upon the system of construction of the Parthenon, upon the manner of lighting it and upon the use of colour in its decoration.

The building was divided into four parts: the vestibule, or pronaos; the sanctuary, or naos; a posterior hall, called the opisthodomos; and the opisthion, or posterior vestibule. The naos was the largest part. A gallery two storeys high, sustained by a double row of columns, surrounded it on three sides, and divided it into three naves. At the end of the central nave, which was the largest, was erected the statue of Athena.

The pronaos, from which the naos opened, was not, like the latter, enclosed by a continuous wall. It was a portico of six columns, raised two steps above the peristyle or outer colonnade which surrounded the monument. Along its exterior sides

extended the outer walls of the temple or secos, terminated by antæ.

The opisthion was identical in construction with the pronaos. It communicated by a vast doorway with the opisthodomos, where was kept the treasure of Athens. Less deep, but as wide as the naos, and like that entirely enclosed, the opisthodomos was divided into equal bays by four points of support whose trace is still marked in the flagging. In the flagging of the naos, also, were found the spots occupied by the columns of the interior gallery.

So much for the construction of the building; now as to its exterior decoration. The two triangular tympanums of the pediments had on one the birth of Athene, on the other the dispute between Athene and Poseidon; upon the metopes of the frieze the combat of the Lapithæ and the Centaurs, and the struggle of the Athenians against the Amazons. Upon the walls of the temple, under the peristyle, was a frieze on which the procession of the Panathenæa with its long cortège was unrolled. Starting at the posterior façade the procession followed in two lines the side walls of the secos, meeting at the anterior façade where a group of divinities, seated, was receiving with the consecrated robe of Athene the homage and the offerings of the multitude.

Of all this, here is what remains at the present time: the posterior part of the secos, including the opisthion with its portico and the posterior façade with its peristyle. But the fronton, since the depredations of Lord Elgin, is bereft of its principal figures, which have been carried to the British Museum. As for the anterior façade, whose fronton has also been despoiled and deprived of its bas-reliefs, it has kept the columns at the corners and in front, and its entablature; but the pronaos has only one column left; and the walls of the naos have long since crumbled. On the east and west, the façades have preserved their metopes, but in sadly mutilated condition. The metopes on the north side have partly disappeared. It is with difficulty that one can distinguish the subjects of those that remain. The best preserved of all—those on the south—have been removed and have gone to rejoin in the British Museum the Parçæ, the Iris, the Ilissus and other sculptures which were formerly the glory of the frontons. The bas-reliefs of the frieze have followed, for the most part, the same route, the only ones remaining being those on the west. The group of seated divinities has found in the Museum of the Acropolis a shelter now inviolable.

The Parthenon is erected upon a massive substructure of carefully matched rocks, rocks covered with a layer of marble, upon which rest three steps. The upper one, forming the stylobate, supports the colonnade and defines the limits of the temple. Its flagged surface measures about 69 by 30 metres.

In order to avoid the effect of concavity that so large a plane surface would have produced, the architect has given to this vast plateau a curvature visible to the naked eye. He has given it a regular curve from east to west. A similar precaution led him to curve the horizontal lines and to incline the vertical lines towards the centre. The entablature follows the curvature of the stylobate, the columns incline regularly towards the interior of the temple, and the same direction is followed by the upper courses. Thus is lost the sharpness of straight lines, and the columns do not appear overburdened by too massive and heavy frontons. At the angles a calculation of a different nature occupied the builder. In order to give to the edifice a stability not only apparent but real, he reduced the distance between the columns at the same time that he increased their diameter.

It is known that mortar was not employed by the Greeks even for temples of stone, and, indeed, not an atom of it entered into the joining of the precious materials of which the dwelling of Athena was constructed. The blocks are all cut with sharp edges and united in the same course by cramps of iron, while vertical bolts penetrating into the upper course bind them to that. In order to diminish the burden of the columns upon which, from axis to axis, the architraves extend in thick monoliths, the architect has hollowed out the frieze whose alternating metopes and triglyphs weigh heavily upon the architrave. Between the inner course around the entire circumference of the building there is an extensive passageway, large enough to give passage to a man. Above the frieze, the blocks which form the cornice, like those of the wall, are horizontally united by clasps of iron, and are also fastened by bolts to the plates of the frieze.

So much for the exterior façade. Passing beneath, we find that equal care has been bestowed upon the peristyle, with its marble ceiling and its interior porch, whose columns, unlike those of the exterior, have all the same diameter, and whose axes are in no way inclined. The proportions of the interior order are, moreover, different from the proportions of the exterior order; they are raised two steps above the flagging of the peristyle.

None of the interior divisions of the temple are remaining, but the site of the galleries which divided the naos into three naves is marked by the traces they have left in the flagging. It



is here that rests the question, so many times decided for and against, of lighting through a central opening in the naos. An examination of the flagging alone renders inadmissible the theory of this central opening. The flooring of the central nave is 4 centimetres below that of the side naves. Now there does not exist in the flagging any traces of underground canalisation; the rain water would consequently have remained here as in a cistern.

It should be remarked, moreover, that the absence of a roof would be little probable in a temple heaped with offerings and ornamented in the middle with the chryselephantine Minerva, a statue as precious from the materials employed as from the genius of Phidias, and decorated on the interior, according to all appearances, with those precious tapestries and rich Oriental stuffs so much sought for at all times by the Greeks. In order to give more weight to his argument, M. Magne strengthens it by noting illustrations borrowed as well from Egyptian architecture as from Byzantine structures. Thus, the hypostyle of the temple of Karnac was lighted only by a few narrow slits, and one sees now in St. Mark's at Venice the mosaics of the northern gallery lighted purely and simply, but sufficiently, through the bronze grille opening into it.

Let us pass to the decorations of the building. Here, again, many surprises await us. The unpublished observations that M. Magne has been able to make, thanks to the stagings which he has had erected upon the circumference of the Parthenon, permit him to assert that colour played a great rôle, a preponderant rôle. In the same way that the potter in the time of Phidias drew with a point the figures and ornaments of his vases, so at the Parthenon the decorator has marked upon the marble with a fine engraving the outlines of his ornaments. In the same way also that the potter, after having scratched his design upon the clay, coloured the figures, so in the Temple of Athena the decorator has put the ornaments in colour, after having graved them upon the marble. These colours, it is true, have disappeared almost everywhere, but there remains between the lines a brown coating of the preparation which preceded the application of colour, and to which it served without doubt as a foundation.

What were the tints employed? A comparison with the marble statues of the same epoch, all multi-coloured, permits M. Magne to respond. It is obvious, in effect, that the decorative principles by which the polychromy of statues was regulated must have equally guided the artists who coloured the ornamental parts of the temples. These statues were coloured only partially with a coloured coating. The workmen applied just enough encaustic to temper the whiteness of the marble. Thus he established between the transparent matter and the partial colouration with which he covered the face and the dress, a harmony of which the effect must have been marvellous. Following the example of the sculptor, the decorator of the Parthenon must have applied colour, not indiscriminately on all sides, but have employed it only to make the least lighted parts of the building stand out. He must have reserved its principal effects for the ceilings of the galleries and the mouldings of the frieze, or, still more, for the cornices and the mouldings of the frontons. On the exterior the columns and the architraves bear no traces of colouration, but traces of blue tints may be found in the channels of the triglyphs and of red tints on the guttæ.

The use of metals as well as of colour is apparent in the decorations. Upon the frieze of the Panathenæa numerous cylindrical holes reveal the existence of metallic ornaments applied to the sculptures—harnesses and bits, bracelets and crowns, and bronze bucklers and shields.

Such is the information given by M. Magne. One will not be astonished after learning of them at the recognition his labours have gained from the Hellenic Government, and all Frenchmen are grateful to him for this peaceful victory gained by France over a land in which the German influence has been supreme for twenty years.

### ST. PETER'S CHURCH, THANET.

SUNDAY last was fixed upon for the reopening of the chancel at St. Peter's Church, after the completion of the extensive decoration and restoration that has been carried out in commemoration of the sixty years' reign of Queen Victoria. As Canon Benham remarked in his sermon, probably in the whole history of this ancient sacred edifice—reaching back some 800 years or more—it has never presented so beautiful and finished an appearance as at the present time. In the years 1871-72 the restoration of the roof of the nave and aisles of the church was carried out as a thankoffering in connection with the recovery of the Prince of Wales from his dangerous illness; in 1887 the restoration of the tower, the recasting and rehanging of the bells (which were increased to eight), and the provision of a new clock was undertaken in commemoration of the Queen's Jubilee; and now the restoration of the chancel roof, with mosaic designs for the chancel arch and east window, in

commemoration of the Queen's Diamond Jubilee, completes the entire scheme of restoration, and is a fitting and crowning tribute of loyalty on behalf of the parishioners of St. Peter's, Thanet, to their Sovereign.

The cost of the first two commemorative schemes amounted to over 1,200*l.* each, while the cost of the work just completed is 1,020*l.*, almost the whole of which has already been provided. The following is a description of the work:—The entire length of the coved ceiling of the chancel is divided into five main bays by ribs, which retain their original vigorous colouring of alternate gold and chocolate bandings and white and black fillets; a similar rib at the ridge, with rich pendant bosses at the intersections; the deep and rich cornices at the top of the walls are also ancient, and have furnished the keynote of the decoration. The ceiling between has been covered with pitch-pine boarding, which has been slightly darkened and allowed to form the groundwork for the painted figures and the other ornamentation. The three central bays have on each side a large figure of an angel of dignified, calm and reposeful character, holding a shield bearing the monogram of Our Lord or St. Peter. These angels are the work of Miss Maud Seddon (the daughter of the architect), and are surmounted by labels inscribed "Hosannah." The easternmost bay, that over the sacrum, has on each side three smaller angels with outstretched arms, with labels over, inscribed, "Hallelujah;" and the westernmost bay, that next the nave, has on each side six half-length figures of the Apostles, seated on thrones, with gilded and diapered backgrounds. All these, together with the full-sized cartoons for the mosaic-work, are the work of Mr. Henry G. Murray. The rest of the ornamentation consists of rich stencilled borders on either side of the vertical ribs, with a triangle of floriated panels on either side of the ridge rib and on one side above the cornice, all which are the work of Mr. C. Stollé. The eastern wall of the chancel has been covered with mosaic (Rusts' glass mosaic), and has a large figure of St. Peter on one side of the east window, and on the other of St. Andrew, both under canopies; angels bearing scrolls with inscriptions fill up the spandrels above the window, and there is a similar treatment in the same material of the east wall of the nave on either side of and above the chancel arch. The whole of the work is from the designs of Mr. John P. Seddon, of 62 Albany Mansions, Albert Bridge, and has been executed by Messrs. Belham & Co., church decorators, of 155 Buckingham Palace Road, London, with the assistance of the several artists above named.

An important feature of the restoration is the magnificent marble step to the platform of altar, with its accompanying mosaic—the front step with the inscription being in one piece of Devonshire marble, the whole forming a memorial of two members of the Isacke family. To the late Capt. Isacke, another member of the same family, a new mural tablet has been erected, this being the work of Mr. T. S. Lawrence. The renovation and repolishing of the brass-work to chancel were also by Messrs. Belham.

### TESSERÆ.

#### Fitness of Students.

ONE of the very first duties, and one of the greatest difficulties that presents itself to the juvenile aspirant for distinction in art, is that of self-examination—a duty enhanced in its difficulty at a time when the reflective powers are immature and the experience limited; yet on the neglect of this self-examination much disappointment and suffering are consequent. On this depends all his future success. The student must demand of himself not merely whether he has a liking for a pursuit which forms, manipulatively considered, an agreeable pastime, but whether he is in all humility prepared to undergo those varied and complex exercises without which ordinary relatively feeble achievement is the consequence, whether he can discharge the moral obligations which his inclination for the art imposes, and whether he feels he has the mental constitution and integrity of purpose, no less than the physical determination, to overcome the mental and mechanical difficulties with which he will have to contend. The like determination of purpose which animated him in the choice of his pursuit must also animate him in the patient investigation of mind and eye and the constant exercise of hand, for their functions are inseparable, as it is in art through the exercise of the hand alone that we learn the powers and qualities of our minds. Of a former state of artistic society evidence exists to show us that a long and serious time was passed in the studio of the master, during which the pupil underwent severe and sometimes laborious duties, enjoying the advantage of such emulation as was excited by competing with a number of persons of his own age. Great, therefore, were then the modes of testing the actual qualifications of the future artist. Few of these young men, however, elevated themselves into importance,



and rare are the names that, through their works, have descended to us as authorities. This circumstance is sufficient to prove the fact of a misdirected view as much at that time as now, no less than the necessity that many rare qualities should be combined in the same individual in order to the attainment of distinction. Numerous disappointments demonstrate that the will alone forms but an inconsiderable element, if it be not accompanied by discretion and knowledge, and that until we have made some experiments and have gained some little experience, it would be well to suspend our decision on the choice of a pursuit, to succeed in which a peculiar and distinct conformation of mind is essential, or to use the language of Cicero, when speaking of the legal student, "But if he shall be altogether unfit for the profession, and wanting in sense, I will advise him to make no attempts or to turn himself to some other pursuit. For neither is he, who can do excellently, to be left destitute of encouragement from us, nor is he who can do some little to be deterred; because the former seems to me to be indicative of a sort of a divinity; the latter, either to refrain from what you cannot do extremely well, or to do what you can perform not contemptibly, is the part of a reasonable human being."

#### Relation in Art.

To the artist what is termed relation, or the power of comparison between one object and another, is like the power employed by the metaphysician in considering and comparing one idea with another, from which process the qualities of one or the other or of both are to be ascertained. Size, locality, configuration, tint and numerous other particulars come within the category of the ideas comprehended within the classification of relation, either in respect to their constituent parts or their aggregate. The powers of relation appear at the very basis of our existence. As expressive of the significance of ideas or objects in our art, it is analogous to the several degrees of comparison in grammar. Morally considered, may we not ask ourselves whether our ideas do not exist in our perceptions in certain degrees of relation? Physically, where our arts have to deal with the more tangible objects of sense, the investigation and discovery of their varied qualities establishes to our minds so many distinct degrees of relation. There is no one object that does not possess and present some degree of relation to those of its kind or others differing from it. "Our estimate of personal merit," says Gibbon, "is relative to the common faculties of mankind. The aspiring efforts of genius or virtue, either in active or speculative life, are measured not so much by their real elevation as by the height to which they ascend above the level of their age or country, and the same stature which in a people of giants would pass unnoticed must appear conspicuous in a race of pigmies." This power of relation also applies equally to things absent as to those present, for it is not absolutely necessary that the objects of comparison should both be present. Thus, in regarding the attributes of any one object, we can scarcely consider it by itself or divest our memories of all recollection of other objects of its class, when a specific difference in some particulars is certain to be perceived. Our minds may be transported from the consideration of the immediate object by the remembrance of something absent that is more or less intense in its colour, form or size. When in the Bible we read that in those days there were giants, a comparison in scale is suggested between the stature of the existing race of men and those colossal beings of a past age. Again, when the traveller says the skies of Italy are more blue than those of England, the waters of the Rhone are more blue than those of the Thames, or Mont Blanc is higher than Ben Lomond—in each of these instances he makes a comparison with only one of the objects present. Thus another result of the memory is seen conjoined with the reasoning from absent things to those immediately before the eye.

#### Italian Gothic Porches.

Italian porches are always constructed in the following manner. Two parallel and horizontal stone beams spring from the wall on each side of the door-archway. Their outward extremities rest each on a shaft, and another is in the larger specimens placed close to the wall to assist in supporting the vault. These four shafts are not necessarily alike; they are often borrowed from antique buildings, and the two foremost rest on the backs of animals, such as lions, bears or wolves. These animals are the insignia of the State, and are often represented as grasping and tearing other animals, which indicate the towns or factions with which they were at war. For example, the griffin belongs to Perugia, the wolf to Siena, and the lion to the Guelphic party. Accordingly, the doorway of the Palazzo del Publico at Perugia is decorated with a griffin tearing a wolf. Upon the beams rests a waggon-vault, forming the roof of the porch, and generally concentric with the archway. The front is finished upwards with a gable and common-slanting roof. Porches of this description with slight variations are found at St. Saba, St. Clement and St. Prassede (Rome), St. Zeno at Verona, at Monza,

the west front of Modena Cathedral, and in many other instances. The west porches of the cathedrals of Verona, Parma, Piacenza, Cremona and the south porch of Modena have two storeys. In these the lower storey is constructed as before, but its roof is finished with a horizontal floor, upon which stands another porch with a gable precisely similar to those just described. At Modena and Cremona, however, the upper porch has in front an arcade of three arches on bearing shafts instead of a single one. The south porch of Verona Cathedral, which is small and of two storeys without the intermediate floor, is a very curious specimen, and there is a large porch on the north side of S. Fermo Maggiore, Verona, which differs from these in having an arch on each side instead of the lateral stone beams. All these are plainly derived from the antique portico, which even in some cases was, like them, roofed in the central part with a waggon-vault; for example, the portico or the Pantheon. Somewhat similar porches are to be met with out of Italy, of which that of St. Trophime at Arles is a notable example. These porches in Italy are confined to the Christian Roman and Lombard styles, and never occur in the Pisan, Byzantine or Italian Gothic. Nearly allied to them are hoods, which consist of a porch-roof resting either immediately on corbels or else on shafts which are so sustained, as in the churches of S. Pietro, Martire, S. Apostoli and S. Stefano, Verona.

#### Wöhler's Law of the Strength of Materials.

As the result of a long series of experiments for the Prussian Government, A. Wöhler in 1858 first pointed out that a load much less than that necessary to cause rupture by a single application would cause rupture if repeated a sufficient number of times, and that it was not sufficient, in experiments on materials of construction, to learn only the rupturing strength for a single application of load, but that it was necessary for a safe foundation for calculation to experiment upon the resistance to stress frequently repeated. The results of his researches are embodied in the following general statement which is known as Wöhler's law:—"Rupture may be caused not only by a steady load which exceeds the carrying strength, but also by repeated application of stresses, none of which are equal to this carrying strength. The differences of these stresses are measures of the disturbance of continuity in so far as by their increase the minimum stress which is still necessary for rupture diminishes." Professor Unwin states, in reference to Wöhler's researches, that they show that the safety of a structure subjected to a varying amount of straining action depends upon the range of variation of stress to which the structure is subjected and on the number of repetitions of the change of load. It has hitherto been assumed that the safety depends only on the maximum intensity of the stress, but this must now be considered to be erroneous. Every machine subjected to a constant variation of load must be designed to resist a practically infinite number of changes of load. In order that it may do so the greatest intensity of stress must be less than that for a steady load, and less in some proportion which depends upon the amount of variation the stress undergoes in its successive changes. Weyrauch remarks upon Wöhler's law that in the general form already given it is without doubt correct, and it may even be considered as a long-known result of experience, since we continually make unconscious use of it.

#### Ancient and Modern Pictures.

There are many circumstances which favour the paintings by the old masters that are entirely separate from any merit appertaining to their respective authors; and to judge fairly of pictures recently painted, these circumstances should be known and borne in mind, or justice cannot be awarded to the genius and talent of our contemporary painters. Amateurs might discover this by a little reflection, although not practically acquainted with the arts. The great multitude, however, who visit exhibitions should be made acquainted with the facts, as it is not likely that they would ever find them out. To the public in general we then address these observations. There are certain crudities in a painting newly wrought that arise out of the very nature of oil paints, namely, from their want of time to harden. The impurities of oils and varnishes decrease as the colours become indurated, until the picture acquires a general texture of surface, which the utmost skill of the painter in laying on his colours, be they ever so purely or finely levigated, cannot at first produce. Vandyke's incomparable pictures were comparatively raw and crude when recently finished; so much so, indeed, that those who lived to a great age many years after his death expressed their surprise on beholding the change which time had wrought upon them, they being then mellowed and glowing with harmony. Having said thus much of what time will effect in favour of pictures as to improving their tones and hardening the colours, we shall add a few words on the other advantages which their compositions acquire by time, namely, those which we attach to antiquity; for there is a



charm in this, abstracted entirely from the merit of the author of a picture or a book. Costume, so main a feature of the picturesque, is always the more interesting the more remote it may be from our own times, the value of which is so well known to painter, sculptor, poet, and to the dramatic corps, that to insist upon it would be at the entire expense of good taste; for all agree in their admiration of this essential quality in composition. Hence the living artist who paints scenes from modern life, however exquisitely they may be wrought, has to contend with the prejudice in favour of old costume, and although the difficulty of surmounting this requires the utmost skill that the art is capable of, yet he is denied credit for invention, because painting and poetry, in the opinion of the world, seem to be only congenially employed when the imagination carries the genius back to portraying the customs and habits of the times past. Thus it is the costume, the buildings, the furniture, utensils, though modern in the ancient painters' day, are become ancient in our day; hence they have acquired, without any superior invention on the part of the designer, a picturesqueness of character that stamps upon them a value which modern objects, however well represented, cannot impose. No, not even if the pictorial imitation were even ten times more perfect in the new picture.

#### Silica in Stone.

Notwithstanding all the discoveries and improvements which have been made in chemical science, we are still unacquainted with the means of dissolving silica in water or other fluid, so as to imitate nature, or to show how silicious earth is produced in the animal, vegetable and mineral kingdoms. The presence of silica, completely in solution, may be detected in various mineral springs, especially if they are naturally hot or tepid, as in those at Bath, which is the more remarkable, because the Bath waters contain no alkali nor any material known to contribute to its solution. The geysers, or boiling fountains in Iceland, contain nine or ten grains of silica in every hundred cubic inches of water, from whence solid silicious matter is copiously deposited about the mouth of each fountain. A small quantity of silica is also to be met with in the hair, horns and feathers of animals; and it is secreted in larger quantities on the wings or hard shiny external casing of the numerous tribes of beetles; it is likewise deposited abundantly round the outside of cane, bamboo, straw and all the larger kinds of grasses. These facts are constantly operating in the beautiful laboratory of nature, but they, like many others, are inexplicable with our present knowledge. The elementary substances which form either chert, flint, quartz or sandstone are produced perfectly in solution, but we are ignorant of the means; neither can we discover, by any of the ordinary processes of nature, a mode of dissolving the individual grains which compose silicious rocks, their decomposition being usually effected by disintegration, or separation of the grains from each other by mechanical forces, assisted by some chemical agency.

#### Vitruvius and Josephus.

In looking at the life of Vitruvius, we see enough to render it very probable that it was in the army of Titus that he held the post of engineer, and might therefore have been present at the siege of Jerusalem. He might have had access to the sacred books then taken from the Temple. He might have been the intimate friend of Josephus when, under the favour of the same emperors who patronised him, Josephus became a denizen of Rome, entirely throwing off all the shackles of his Jewish citizenship, which had so long sat uneasily upon him. Is it not possible that they were one and the same person?—that Vitruvius was no other than the Latin name adopted by Josephus with his newly-adopted country?



#### Cathedral Illustrations.

DEAR SIR,—Will you allow me, though personally a stranger, and not even an architect, but an ardent though humble archaeologist, to express the delight with which I welcome each succeeding number of your "Cathedral Series." At the same time may I add my voice to the appeal made by Mr. Johnson and "An Old Admirer," that you would allow your illustrations at present in the letterpress to appear as separate sheets, corresponding with the full-page ones, and also, which is almost more important, would give us the letterpress distinct from the other articles? A second copy only enables us to make a patchwork and a muddle. Such a work would prove a *chef-d'œuvre* among histories of English cathedrals. I feel sure that none of us would regret or begrudge the extra cost of such a work.—I remain, dear sir, yours faithfully,  
Detling Vicarage, Maidstone. J. CAVE-BROWNE.

#### GENERAL.

**The London County Council** on Tuesday last declined to approve of the erection of a theatre at the junction of Norris Street and St. Albans Place, Haymarket, on account of the difficulty of the approaches.

**A Mosaic Pavement**, which is a rude attempt to represent a map of the country, has been discovered in a village on the east of the River Jordan, half-way between Salt and Kerak.

**A Sum** of 12,000 francs has been granted by the French Commission of Historic Monuments towards the restoration of the Roman theatre at Orange.

**The Princess's Theatre**, Oxford Street, was offered for sale by Messrs. Debenham, Tewson, Farmer & Co. on Tuesday. The property is held on a lease which expires in July 1940 at a rent of 1,600*l.* The highest bidding was 20,500*l.*, but the auctioneers said they were unable to sell the property for that sum, and it was withdrawn.

**The Committee** of the London Chamber of Commerce appointed to investigate the subject of illicit commissions having desired further evidence, many gentlemen have offered to testify to their experience.

**The Statue** of the *Chariot Driver*, found at Delphi by members of the French School at Athens, is now supposed to represent one of the kings of Cyrene, and may be the work of Amphion, the Cretan sculptor.

**A Professorship of Public Health** will shortly be established in the University of Edinburgh, as, in addition to the sum of 5,000*l.*, less legacy duty, bequeathed to the University in 1893 by the late Mr. A. L. Bruce, Edinburgh, and a further donation of 1,063*l.* for the same object from members of the family, an offer of 5,000*l.* towards the same object had been received from a gentleman whose name is not to be made known for the present.

**A Gentleman** at Southampton has offered to give 5,000*l.* towards the building of a new town-hall at Southampton in commemoration of the Queen's reign, if nineteen similar donations are made. An effort is also to be made to raise 20,000*l.* to extend the Royal South Hants Infirmary.

**Dr. A. Bredius**, the director of the Royal Gallery of Paintings in the Mauritshuis of The Hague, has sent in his resignation of his office.

**A Majority** of the inhabitants of Gravesend have declined to approve of the purchase of the waterworks, now belonging to a company.

**Mr. Hamar Bass, M.P.**, is to give 15,000*l.* for providing a church and vicarage for the district of All Saints, Burton-on-Trent, on condition that an endowment of 300*l.* per annum is raised. Towards this income Messrs. Bass, Radcliff & Gretton have promised 3,000*l.* and Lord Burton 2,000*l.* Mr. Gretton is erecting a church at a cost of 20,000*l.* at Stretton, on the outskirts of the borough; and at Horninglow, another suburb, Lord Burton has deposited 10,000*l.* for a church, on condition that a similar amount is raised for endowment.

**Mr. William Dannat**, the American painter, who resides in Paris, has been raised to the rank of officer in the Legion of Honour.

**A Site** for the Usher Hall remains undiscovered in Edinburgh. On Monday the committee of the Town Council considered several proposals, but out of them only two relating to sites near the west end of George Street were reserved for further examination.

**Sir H. Trueman Wood, M.A.**, will on Wednesday next read a paper at the meeting of the Society of Arts on "Reproduction of Colour by Photographic Methods."

**The Discussion** on Mr. J. Willis Bund's paper on "Allotments and Small Holdings" will be resumed at the meeting of the Surveyors' Institution on Monday.

**The Sanitary Institute** will, on the invitation of the City Council of Leeds, hold a sanitary congress and health exhibition in that city in the month of September next.

**The Foundations** of a tower which is supposed to have been erected by the Greeks have been discovered at Syracuse.

**A Meeting** of the Metropolitan Asylums Board was held on Saturday at which a letter was read from the Local Government Board stating that the managers were not empowered to purchase land on the Thames Embankment for offices, and that the Board could not give any consent in the absence of any statutory authority. The managers were of opinion that the absence of statutory powers to purchase a site on which to erect a building was a difficulty which ought to be remedied without delay by the introduction of a Bill into Parliament for that purpose. The Local Government Board have authorised the managers to cause an ambulance station to be erected on land adjoining the South-Western Hospital, at a cost not exceeding 14,314*l.*



## THE WEEK.

THE Frankfort Industrial Museum has obtained reproductions of the antique silver vessels which were discovered a few years ago at Bosco-Reale, near Pompeii, and which Baron EDMUND DE ROTHSCHILD purchased and presented to the Louvre. The casting was undertaken by the firm of HACK & HOURDEQUIN, of Paris. The drinking vessels are a further revelation of the luxury of Pompeii, and suggest that, as in the poems of HORACE, there was amidst all the revelry occasional recollections that, as life was very short, it was wise to enjoy the fleeting hours. A row of skeletons in relief on one of the cups might appear a grim sort of ornamentation, but to the Pompeian guests it was suggestive. The plate is unlike any known examples. For that reason the authorities of our museums will probably make no effort to secure copies of the reproductions. Having already defined the limits of ancient art, anything which casts a doubt on their infallibility is of course disagreeable to their official eyes, and if a worker in London, Birmingham, Sheffield, or Edinburgh is desirous to realise what the Bosco-Reale treasures are like he must visit Paris. That is not the only inconvenience which arises from the system by which our museums are controlled.

IN connection with the Brussels International Exhibition of this year *cortèges* are inevitable—in fact, a Flemish celebration of any kind would be considered incomplete without them. They have the advantage of uniting the past with the present, and to the people they are as interesting as any collection of historical paintings. Unfortunately, Belgium has just lost the artist who was pre-eminent in devising scenes of the kind. M. DEN DUYTS was an excellent landscape-painter, and his works might be cited by Mr. RUSKIN as expressions of the “pathetic fallacy,” but to the popular mind his living and moving *cortèges* surpassed all he attempted on canvas. He was entrusted by the Municipality with the organisation of the *cortège des cloches*, which was to be one of the attractions of the exhibition pageants, and he had prepared drawings of all the cars and groups, which were approved when death surprised him. Those who remember his *cortèges* which symbolised flowers and light can imagine what a loss will arise from the absence of DEN DUYTS. His drawings will enable others to realise his ideas, but in dealing with groups much depends on happy thoughts which do not always visit the studio, and which are rather inspired by the sight of the living statuary. However, the organisation of the various parts of the exhibition cannot be suspended because a chief has fallen. M. SAINTENOY, the architect, is more busy than ever over the pavilion which the city of Brussels is erecting, and he has the co-operation of M. BAES, the decorator. Nor are the operations confined to the exhibition grounds. The pictures in the Musée Moderne, which of late years have been often changed, are once more to have new positions assigned to them, in order that the art of to-day may impress visitors. The arrangements are entrusted to MM. CARDON and A. J. WAUTERS.

It is to be regretted the Lord Chancellor and the learned law lords in the House of Lords on Monday last could not “screw their courage to the sticking-point” by giving a decision in CHASTEY and Another *v.* ACKLAND. Perhaps it was considered the consequences would be too serious, because many people might have further inducement to become litigants. The question involved was really whether an action for interference with light and air is not altogether inadequate; graver issues which may bring far larger damages are at stake, although commonly overlooked. In these days when sanitation counts for so much, the raising of a building to a greater height may be a worse evil than the stopping up of a drain. CHASTEY and Another would agree with that view. They have a lodging-house in Exeter, and their neighbour, a dentist, having enlarged his premises, they sought damages for obstruction of ancient lights and free access of air. The case was tried before Mr. Justice CAVE at the local assizes. It was found there was an obstruction, and the damage was assessed at 10*l.* What was more important, it was likewise found that the effect of the alteration was to make the basement of the lodging-house more damp and some of the rooms less wholesome and not adapted for habitation. His lordship

accordingly granted an injunction for the pulling-down of the part of the building which caused the dampness. The defendant appealed. The Court of Appeal found for the defendant on the ground that he had not caused the nuisance, that there was no legal right to such a current of air as was sought, and if any inconvenience was suffered it was “*damnum absque injuria*.” There was no legal ground of complaint. The plaintiff in turn appealed to the House of Lords. It was suggested by their lordships that an arrangement should be come to, and accordingly the defendant agreed to pay 300*l.* instead of 10*l.* for obstruction of ancient lights, besides costs, and that any right to have the new building demolished should not be enforced. There is no actual judgment with regard to dampness and other discomforts, but plaintiffs in the future will be satisfied if they are as fortunate as CHASTEY and Another in having 10*l.* damages increased to 300*l.*

THE plans for the restoration of Malmaison, which were prepared with the aid of M. DAUMET, are now complete. The estimated cost of the works is 480,000 francs, and does not comprise the outlay on the decoration of the interior or on the gardens. M. OSIRIS, who has enriched France with so many costly memorials, intends to have the restoration scheme carried out in its integrity. Malmaison will recall associations of BONAPARTE and JOSEPHINE for many a year to come. The charge of the building will be undertaken by the Department of Fine Arts. The coming international exhibition has incited M. OSIRIS to further generosity. In 1889 he offered 100,000 francs to reward the author of the work which was considered to be most interesting as an example of art, industry, or public utility. A similar sum will be available for the exhibition of 1900, and, as in the former case, the selection will be left to the syndicate of the press.

THE late WILLIAM DAWES, of Manchester, paid a heavy penalty for being endowed with a gift of genuine humour. People who might have been his clients were afraid that “Elifer Goff” could not deal with bricks and mortar gravely, and was likely to enjoy a failure of foundations or an interference with an adjoining owner's rights as an excellent joke. The fact was Mr. DAWES was very careful with every work entrusted to him, and although he was known to be connected with theatrical enterprises he was not disposed to sacrifice convenience or economy in building to effects. His largest work is the block of Victoria Buildings. Financial causes have affected it, and on a gloomy day it is not the cheerful refuge which the designer had anticipated, but Mr. DAWES undoubtedly made the most of his opportunities, and every inch of the awkward site was utilised. He was the architect for some of the Manchester Board schools, and in one case he had to surmount unusual difficulties with the foundations. We have published several drawings of his works, including the original design for the Victoria Buildings. WILLIAM DAWES was a native of Gloucester, where he was born in 1840, but he was trained in London. In 1863 he entered into partnership in Manchester with Mr. HAYLEY. He distinguished himself in the competition for the Town Hall, and thirty years ago he was able to look forward to a prosperous career. His manners were charming, and his humour pleased rather than wounded. Even those who differed from him must regret his loss as one of the best of good fellows.

PROMPTITUDE was never better exercised in architectural affairs than when an injunction was applied for to restrain Messrs. J. ALLEN & SON, contractors, from interference with the visits of the architect, Mr. WOODWARD, to works on which the firm was engaged. The British workman is often anxious to exercise authority at all costs, and in the case in question it is the labourers who should be held responsible. But the interference has excited much indignation, and many architects will agree with Mr. T. E. KNIGHTLEY when he says:—“So far as I am concerned, in all future contracts I shall insert a heavy penalty clause with power of dismissal to meet the case, and if treated as Mr. WOODWARD has been, will refuse certificates for payments and be very guarded in the selection of those I employ.”



## CONSTRUCTIVE ASYMMETRY.

IT is not easy for anyone who has grown up among examples of the Mediæval buildings of England, France or Germany to take much delight in Italian examples of the same period. The indifference is not always to be justified. Professor WILLIS, while admitting that Gothic architecture never flourished in Italy at any time, appeals for more attention to such works as are found there on the part of Englishmen, because the doorways are very elaborate. Mr. RUSKIN also considers the sculpture is of a character which does not warrant so much neglect. Professor W. H. GOODYEAR, the American, has discovered another reason for attentive consideration of them, and one which appeals to a scientific age. He has ascertained that they are optical puzzles. Assuming his conclusions to be true, the Mediæval Italian churches would on that account be allied on one side to the Parthenon, and on the other to the iron and steel girders of the nineteenth century, which are cambered or curved in order to appear as straight to all who care to contemplate them.

We have already endeavoured to suggest the character of Professor GOODYEAR's researches. He is no speculator. Accompanied by some trained pupils, he has scrutinised Italian buildings. But he has not trusted to the eyes of the party for discoveries or for tests of observations. Scientific instruments, including levels and theodolites, were used, and photographs were prepared under conditions which made them become trustworthy evidence. Yet the Professor has sometimes to acknowledge that some of his discoveries are due to chance.

In the latest instalment of his work which has appeared in the *Architectural Record* of New York, Professor GOODYEAR describes some of the phenomena relating to "constructive asymmetry" which he has met with. Symmetry in architecture is a wide subject, and it is not easy to define in what it must consist. Greek temples and some buildings of the Italian Renaissance are symmetrical, for if an axis be supposed to pass vertically through a middle point, the parts on either side are found to correspond. But the Gothic buildings of the North do not display much respect for the principle in the minds of the designers, and to some extent in later Flemish and modern Queen Anne buildings deviations from symmetry are manifest. It might, therefore, be allowed that Italian Mediæval churches should occasionally neglect a rigid balance of parts without exciting much attention.

In fact, the majority of foreign visitors to Italian churches have not searched for deviations. It was assumed that the early practice of utilising shafts and capitals and other portions of old buildings must inevitably give rise to irregularities, and that the effect of the practice would be more or less indifference to an exact disposition of new buildings. Moreover, it was remembered that Gothic was a foreign style to the Italians, and it was not difficult for them to assume that one of the Mediæval characteristics was a disregard of law and order. Englishmen in the eighteenth century would support that opinion by referring to their own glorious cathedrals as if they were architectural aberrations, and Italians might be excused for anticipating the notions of our most refined arbiters on subjects in which taste was concerned.

It would, however, be agreed that, speaking generally, there was a respect not only for right lines, but for right angles among the English Mediæval buildings. Occasionally there might be a deflection of the choir which was supposed to be a symbolic arrangement in keeping with some other peculiarities of a building. But unless in those cases, and some few where new work was introduced among old work, it was assumed that the right angle was to prevail in all buildings. In the examples selected by Professor GOODYEAR there appears, at first sight of the plans, as much deviation as we should expect if the buildings were constructed of undried bricks and were allowed to follow any direction which the heat of the sun might impose on them. Or we might suppose, the main lines of the buildings were set out by men whose vision was defective, and who could not understand in practice the value of a right angle.

We can only refer to a few of the more striking obliquities which are cited by Professor GOODYEAR. In the church of S. Nicola, Barri, if a line be drawn from a

central point and normal to the façade, it will not coincide with the centre line of the church. Although the sides do not follow the normal lines at right angles to the façade, they are parallel. Again, opposite columns are not always in the same plane; a bay on the left side is 24.45 feet, whilst the corresponding bay on the right side is 21.85 feet, and in the bays nearest the entrance there is a difference of a foot in width. In the cathedral of Ruvo there is a deviation of 8 feet between the centre line and the normal line, or in other words the side walls form an angle of 85 deg. with the façade, instead of 90 deg. No less remarkable are the plans of S. Bartolomeo, Rome; S. Giovanni in Zoccoli, Viterbo; the cathedral of Orvieto, the cathedral of Cremona, S. Maria Toscanella; the cathedral of Troja, &c. As an explanation of the phenomena, Professor GOODYEAR offers the following remarks:—

All of the Italian ground-plans which have oblique exterior walls have interior obliquities in the lines of nave and aisles. In most cases there is a slight spread in the lines of the nave and a slight convergence of the lines of the aisles in the direction toward the choir. The purpose seems to have been an avoidance of mathematically parallel lines, with a view to an increase of picturesque effect. From the standpoint of purely perspective effect there are contradictory appearances in all uses of converging lines in plan, and this is probably why the convergence of church walls toward the choir had no wide application. (About six cases are known to me in Italy.) If the lines of a nave converge in plan toward the choir and the arches do not drop correspondingly, the effect of the arches contradicts that of the lines in plan. If both devices are employed at once, detection of the trick is generally easy. (I do not know of any Mediæval Italian church in which both schemes were employed, but it was the method of Bernini in the Scala Regia of the Vatican.) On the other hand, if the lines of the nave diverge to the choir there is an increase of perspective effect as regards the lines of arches, which are thrown into more pronounced appearance of recession, although the lines in plan contradict the natural effect of perspective. Mystification of the eye, as distinct from direct increment of dimension, seems to have been the purpose of most cases of constructed asymmetry in the plans of Italian churches. For all the cases of the oblique plans taken collectively it is a point that our survey has found no churches in which both walls make an obtuse angle with the façade. The fact that the walls are always oblique in one direction is a strong argument in favour of design. Explanations based on local causes are out of the question, in view of the number of examples (about thirty-five cases), and this possibility has, moreover, always received careful attention from our survey in face of the monuments, but without finding anything in its favour as a universal or general explanation.

It is possible that the deviations from lines which show respect for regular forms may be due to peculiarities of Italian lighting. Some of the northern architects must have known about the Italian practice, but they do not appear to have systematically imitated it. What is remarkable is that there seems to be no reference to the subject in Italian books on architecture, and therefore no explanation of peculiarities which should be the more remarkable because they were not generally adopted. If it were necessary to mystify the eye in some cases, what were the conditions which imposed the effort; and, if the ruse succeeded, why was it restricted to a few buildings?

Assuming symmetry to signify a correspondence between parts which have relation to the same axes or lines, it must follow that exactness in the bays of a church having a nave and aisles should be observed. But we cannot always expect mathematical exactness at the present day, and it could hardly be attainable in days when instruments were less perfect than those in use. In S. Pietro Toscanella, it is discovered that while the bays in the nave on the Gospel side are 13.55, 15.70, 15.10 and 14.80 feet, those on the Epistle or right side are respectively 13.70, 15.95, 15.05 and 15.05 feet. The largest difference is only about 3 inches, and that might arise, as we have said, from careless setting-out. "Fudging" was likely to be familiar to the Italian builders as a way of evading the consequences of a blunder. It happens in the same church that the capitals which are not uniform in size or style are "arranged in corresponding pairs on the two sides of the nave, so that two Ionic capitals, two Corinthian capitals, and two Mediæval capitals, of similar though not identical design, are brought to face one another." The spacing might to some extent have been determined by the aid of the capitals as standards rather than by the axes of the columns. What, however, is not explained by Professor GOODYEAR is the law of optics which is subserved by the irregularity of the bays on either side of the nave. He says that "evasions of regularity



were practised from a definite artistic feeling and purpose, and generally without the design of obtaining an effect of dimension by palpable trickery ;" but how by means of evasions artistic effect was gained is by no means clear. Professor GOODYEAR adds :—" It is not necessary to assert that a special theory was present to the minds of the Italian Romanesque builders in the matter of every intentional irregularity ; but it is clear that their ideal of art was to make every part of a building interesting to the eye, by giving to every part some subtle variety of form and aspect."

The subject is not only curious, but tantalising. It was only after the entasis of Greek columns had been ascertained by actual measurements that a statement of VITRUVIUS was accepted as proof of his familiarity with such a way of producing effect. Whether he was acquainted with the method of substituting curved for straight lines in other parts of a Greek building is uncertain. With that precedent before us, we might suppose it was not strange that the Renaissance writers on architecture neglected to expound all the illusions which were practised in building. Moreover, the study of the subject can only be said to have commenced, and in many later buildings we may yet discover that the practice was followed. But while admitting so much, it must be considered remarkable that deviation from horizontality, symmetry and regularity should be a commonplace occurrence in Italian practice, and yet that it should be abandoned without any valid reason, and afterwards be ignored by all men, while the reasons for its adoption remain among the mysteries that are not to be revealed.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### ACCUMULATORS.

THE advantages of using accumulators have already been casually mentioned, and they should be used wherever possible with private-house plants. They insure a steady light, and make it available at all hours without having to run the engine continuously.

*Theory.*—The action of an accumulator is purely chemical. It does not store or accumulate electricity as the name implies, and which is the general impression, but it stores or accumulates energy. It has been found that every unit of electricity has its equivalent of chemical energy, as it also has its mechanical equivalent. If a current is passed through an electrolyte there is a back pressure exerted, and the energy required to force the current through the cell is an exact measure of the chemical work done. If a current of electricity is passed through two platinum plates in acidulated water, the water is decomposed and the oxygen is given off at the plate where the current enters the electrolyte (the positive), and the hydrogen is given off at the other plate (the negative). The amount of work done in the cell is the amount of energy required to split up the water. If this gas is collected in finely divided platinum it will give out an equal current in the opposite direction for very nearly the same time, which would do the same amount of work (nearly) as that which was done in splitting up the water. This is the elementary theory of an accumulator. In practice the finely-divided or spongy platinum accumulator is impracticable, and other means are used for storing the energy. The lead accumulator is the one used most frequently instead of platinum, and the oxygen is not given off, but attacks the lead of the positive plate or anode, forming lead peroxide. The hydrogen is given off at the negative plate or cathode. When the cell is reversed, i.e. the positive plate made negative, the hydrogen is not given off, but attacks the lead peroxide and reduces it to spongy lead, and the oxygen attacks the positive plate as before.

When working, and the cells are discharged, both plates are partially converted into sulphate, especially the positive, and, if the cell is discharged very rapidly, the negative is partly converted into peroxide.

When the cell is charged the positive is converted from lead sulphate into peroxide, and the negative from lead sulphate to spongy lead.

The positive plate has always a considerable quantity

of peroxide, and the negative has spongy lead mixed with the sulphate, and this allows the current to flow, as the sulphate is non-conducting. When the cell is habitually over-discharged the coating of sulphate becomes complete over patches of the surface of the plate and the cell apparently loses its capacity.

*Construction.*—There are many ways of forming and many methods of constructing plates, and especially the positives. The method of forming the plates direct from the lead is the one developed by PLANTÉ, and this class is at present the most common. The Faure type of plate is pasted with red lead. When this type of plate is immersed in sulphuric acid it converts the red lead into lead peroxide, lead sulphate and water.

There is a great saving in current and time for forming with this type of plate, but notwithstanding specially shaped lead grids, &c., the paste does not adhere to the plate as well as if it is formed directly from the grid itself.

There have been several attempts to keep the paste on to the grid by mechanical means (chiefly outside pressure). The I.E.S. plate is one example of this. This plate, which is somewhat similar to the Tommasi, consists of a very light grid with vertical bars only ; the plate is compressed on this grid (there being horizontal pieces of an insulating material to form a support for the paste), and the whole is then pressed tightly into a bag of perforated celluloid. The celluloid bag, it is claimed, prevents the paste from detaching itself or from being washed off ; but this latter will only occur when batteries are used for traction purposes, falling to the bottom and short-circuiting the plates.

There are very many other devices analogous to this for keeping the paste in its place, such as the placing of asbestos fibre, perforated ebonite, celluloid, &c., between the plates ; but it may be said of all these that when the paste is detached it does not matter whether it falls or not, it is then worse than useless, as there is a bad contact between it and the grids. For private plants there is no need for these devices, as the battery is not subjected to vibration, washing, &c., and their use prevents a proper examination of the condition of the cells.

*Erection.*—It is necessary that a storage battery be used carefully, and if the attendant has not a proper knowledge of the subject, it will be advisable to have the battery inspected at regular intervals by an expert. A very good plan is to arrange with the manufacturers of the battery to maintain it on a contract. Many firms offer to do this, and if reasonable terms can be arranged it will be the most satisfactory.

The battery-room should be completely isolated from the machinery, or in fact, any other portion of the building, and be well ventilated. Heating apparatus (preferably hot-water pipes) must be provided and the temperature must never be allowed to fall to freezing, as the plates often lose their capacity if this happens. The room must be lighted by means of incandescent lamps (not arcs) and no naked lights should be allowed. The hydrogen gas which is given off when the battery is nearly charged has been known to explode ; but a very small amount of foresight and care will prevent any possibility of this.

The connections between the cells should be burned together, not made by brass nuts and bolts, and the attendant should be instructed how to do this. The work is rather more difficult than soldering, but proficiency can soon be obtained. If a cell has to be removed the lugs are sawn through and reburnt when the cell is replaced. The brass nuts and bolts frequently used for connecting cells are often dropped into the cells ; if so they corrode, and a very little copper in the cells will spoil the negative plates.

The makers supply full directions as to fixing, and these must be rigidly carried out.

### THE WORKING OF ACCUMULATORS

When the accumulators are set up and the maker's instructions with reference to the first charge have been carried out, the voltage of each individual cell should be tested, after the battery has been standing some hours. The cells should be tested with a low-reading voltmeter, and the E.M.F. of each should be at least 2.1 volts. If this is not the case the cell should be examined for short circuits, &c., and if needed should be charged up again.



A hydrometer should be placed in each of the regulation or end cells, and one or two in the rest of the battery. The specific gravity of the acid recommended varies with different kinds of cells, but the usual is 1.20 when fully charged, and 1.19 when discharged. The hydrometers should have a distinctive mark on the stem, which shows whether the cells are charged or not at a glance. The hydrometer cannot always be relied upon as a certain indicator, and a cell-testing voltmeter should be used occasionally.

The chief difficulties met with are (1) sulphating; (2) buckling; (3) short circuiting by mud shed from the plates (positive usually); (4) mysterious loss of capacity.

*Sulphating.*—The sign of sulphating is the appearance of white patches on the plates, which usually spread rapidly, especially on the positives. This is due to over-discharging, either at too high a rate or for too long a time.

The only satisfactory way of reducing this sulphate is to overcharge the cells, *i.e.* keep them gassing for several hours before discharging, and then discharge at a very low rate, and stop before the cells are fully discharged. Several charges and discharges on this plan will usually convert the sulphate into peroxide and spongy lead. The apparent result of sulphating is loss of capacity, which is caused by the non-conducting layer of sulphate preventing the necessary reaction between the electrolyte and the electrodes.

*Buckling.*—This is due to unequal expansion of the positive plates. It is a well-known fact that the plates expand and contract when used, and if one part of the plate is charged or discharged more than the other, due to many causes, usually sulphating, the plate expands and contracts unevenly and buckles.

For this reason it is impossible to make large plates work satisfactorily. When a plate once buckles, the buckled plate approaches the adjoining one, takes more than its share of the current, and the buckling becomes worse. If cells are discharged at too high a rate they will buckle, and there is no permanent remedy to prevent this recurring. Buckling can be prevented in the design of the plate, but the subject is too large a one to enter into here. The smaller the plate the less is the buckling, and a plate built up of a number of small elements is better (from this point of view) than a large solid one.

*Shedding of Active Material.*—This fault occurs in all cells without distinction, and is at present unpreventable, and when the material is once detached there is no means of replacing it. It is better to allow it to fall than to try to keep it in position by mechanical means. Molecular forces cannot be resisted successfully by means of perforated celluloid and the like.

To prevent short-circuiting a space of at least 2 to 3 inches must be allowed between the bottom of the plates and cell. If this is done the cell will need cleaning out at long intervals only.

*Loss of Capacity.*—Although great attention has been given to the positive plate in a cell the negative is the one which is most hopeless to deal with if anything goes wrong. Negatives lose their capacity in a, to the user, most mysterious manner.

There is a belief that a fall of temperature to below freezing causes a permanent loss of capacity of from 25 to 33 per cent. Whether this is true or not it is difficult to say, but there seems to be no satisfactory reason for such a result.

Loss of capacity in the negatives is usually, and, in fact, nearly always due to impurities in the lead or acid. The difficulty is that in the negative plate the conditions are those of reduction, and the tendency is to keep the impurities in the metallic condition. The only way to clean out the metallic impurities is to reverse the plates by charging them up with sheets of lead as the negatives, *i.e.* make the negative positive. The impurities become dissolved in the acid or deposited on the dummy plate, as all the oxides and sulphates of common metals (except lead) are soluble in dilute acid. The electrolyte should then be poured away, the plates reversed back again, and recharged with the original positives in fresh electrolyte. The cell will then most probably work satisfactorily. This should not be attempted without the advice of the makers, or an expert on accumulators, as the operation requires great care, and the cell may be ruined by injudicious treatment that is caused by want of knowledge.

It must not be imagined that the above formidable list of disorders to which lead accumulators are liable makes them useless for practical work.

If reasonable care is exercised and a good accumulator of the proper size for the work is selected, very few or none of the troubles, except the shedding of the active material, will be experienced. In a Plante cell the shedding of the active material makes little or no difference to its capacity. The grid or support is left thick enough to enable it to be acted upon and fresh material to be formed out of it for many years, and the battery should become more and more efficient (as regards weight and capacity) until the positives are all peroxide, and then they will fall to pieces.

A battery, like everything else, wears out in time, but it will save many times more during its life than it costs to keep it going.

My thanks are due to Mr. W. FENNELL (one of my assistants) for the help given in my endeavour to prepare this article in a simple manner without going too deeply into the subject.

## THE SOCIETY OF ARCHITECTS.

THE annual dinner of the Society of Architects was held on Tuesday evening last at the Hôtel Cecil. The president, Mr. Robert Walker, J.P., occupied the chair, and he was supported by the Bishop of Stepney, Mr. Wyke Bayliss, Judge Emden, Mr. J. A. Rentoul, Q.C., M.P., Mr. A. A. Hudson, Professor Banister Fletcher, Mr. G. Candy, Q.C., Mr. W. H. C. Payne, Mr. R. Roberts, J.P., Mr. G. Highton, Mr. Edgar Farman, Mr. S. W. Thompson, Mr. H. Lovegrove, Mr. Walter Emden and Mr. Ellis Marsland, hon. secretary, and among the guests present were Mr. G. A. T. Middleton, Mr. S. Trevail, Mr. W. Woodward, Mr. Williams, Mr. O. Marsland, Mr. S. Marsland, Mr. Drysdale, Mr. Hills, Mr. Coyle, Mr. Bennett, Mr. Slater, Mr. Andrew, Mr. West, Mr. Perkin, Mr. Bull, Mr. Jackson, Mr. Finch, Major F. S. Leslie, R.E., Mr. Richards, Mr. Kingerlee, Mr. Welman, Mr. Burgess, Mr. Tucker, Mr. McDermitt, the Rev. A. Mercer, Mr. Ferguson, Mr. James, Mr. Manning, Mr. Hawes, Mr. Corby, Mr. Condry, Mr. Wallace, Mr. Warren, Mr. Devill, Mr. Dick, Mr. H. G. Quartermain, Mr. Elliott, Mr. A. I. Quartermain, Mr. Tarte, Mr. Alderman Skinner, Mr. Scott, Mr. Bond, Mr. Johnson, Mr. Day, Mr. Chart, Mr. Slater, Mr. Hardman, Mr. Dunford, Mr. Boyer, Mr. G. Haslam and Mr. M. Baldwin, M.A., secretary.

After the toast of "The Queen," Mr. Walter Emden, J.P., proposed "The Houses of Parliament." They had an example in the House of Lords of what an untrammelled State could do, and the House of Commons deserved the credit and reputation of being the finest Parliament in the world.

Mr. Rentoul, M.P., who responded, said he had replied to the same toast some years ago. It was unwise to discuss politics before such a gathering, where men of different parties were assembled. He thanked them all for the emphatic way in which they had toasted the Houses of Parliament. He was among those Conservatives who liked Radical opposition to the House of Lords. The last time the Radical party came into power, one of their first acts was to recushion the seats of the House of Lords, and their last was to create a number of new peers. The House of Commons consisted, he said, of 103 Irish members, and some other persons of more or less importance, and as long as Englishmen and Scotsmen were content to allow his fellow countrymen to absorb two-thirds of the time of the House, he thought his compatriots would be perfectly satisfied.

The toast of "The Clergy" was proposed by the President, who thought it was one that specially commended itself to the Society.

The Bishop of Stepney in responding drew attention to the very strong hold religion had on Englishmen, Scotsmen and Irishmen. If he spoke of the clergy with modesty he would say that as a body they did their work as well as the buildings designed by architects would allow them. As far as the churches were concerned he thought too much expense was wasted on the external effect, whereas foreigners very sensibly looked to the interior for effect. Ravenna was an instance of a poor external appearance but magnificent inside.

In proposing the toast of "The London County Council" Mr. A. A. Hudson said the toast should commend itself to architects. Apart from the promotion of the Metropolitan Building Act the County Council had created a tribunal for the judging of building disputes. Hitherto these actions had been treated as not worthy of a higher Court, but they ought to have a fair tribunal and be tried, and if the present powers were increased many other cases might be tried with expedition. There would be a sympathy for the County Council for not being able to build their offices in Trafalgar Square. Had the scheme been carried out, it would have created one of



the finest squares in Europe. It was laughable to find that bricklayers in search of recreation and health went to the Council for work. Somehow they managed to find that the works committee did not require so much of them as the ordinary builder.

Mr. Payne responded. He remarked that perhaps there was nobody so misunderstood as the County Council. Those who depreciated their work knew the least about them, and he advised those people to try and learn something of their administration. The chief drawback to the present municipal work was the lack of proper offices and the difficulty one experienced in finding one's way about the existing buildings.

Mr. Candy, Q.C., proposed the toast "Architecture and the Society of Architects." He said he was only an understudy on that occasion, but he wished the Society success in its efforts to secure harmony and good-feeling among members of the profession.

The President in reply said the Society was progressive; the members sought to elevate themselves by scientific and technical education. The object of the Society was to raise the standard of architecture and put a check on the number of inexperienced, uneducated and unqualified members of the profession. He hoped Parliament would not favour these practitioners by excluding education and registration Bills for the profession.

Professor Banister Fletcher in proposing the toast of "The Arts and Crafts allied to Architecture," referred to the importance the success of the arts and crafts must bear to the enjoyment of the nation. Mr. R. Roberts, J.P., and Mr. Wyke Bayliss responded. The toast of "The Visitors," proposed by Mr. Lovegrove, was responded to by Judge Emden, who looked upon it as a great treat attending these gatherings, not only a social one but intellectual, and he thought he might say on behalf of all the visitors that they wished the Society every success. The toast of "The Press," proposed by Mr. S. Trevail, was responded to by Mr. Harvey Piper.

## A CANADIAN VIEW OF THE STYLE OF THE FUTURE.\*

(Concluded from last week.)

LET us conceive the experiment tried under the most favourable conditions. Let the designer be a man who has been brought up like a Nazirite from his birth with a view solely to this experiment. Let us assume that he has been thoroughly trained in the theory and practice of construction so that the most intricate problems present no difficulties to him. But with all this knowledge of building he has never seen a book on architecture nor a photograph of any architectural example, and he knows nothing of ornamented construction. Let us suppose further that he is naturally a man of artistic temperament to whom the beauties of nature are a constant delight, and that he is a lover of painting and sculpture. Now suppose a problem set before him to be worked out without regard to cost or any other limitation. The subject selected would probably be a large church, because religion has caused the production of a greater number of architectural monuments than anything else in the world. Now how would he go about it? The first idea would be that a large number of people must be able easily and comfortably to see and hear the whole of the service. This means to begin with a large open space unencumbered with piers or columns; altogether there would be no objection to the use of these outside of this space to form aisles or other adjuncts. But they would not be absolutely necessary as constructive expedients because the use of trusses renders it easy to roof over without intermediate supports any space that could possibly be required for an audience room. A consideration of the *pros* and *cons* in regard to the different available forms would probably lead to the conclusion that a rectangular plan not very far removed from a square would be, upon the whole, most convenient both for sight and hearing. Perhaps it might be more convenient to put staircases, vestries, schoolrooms and other appurtenances in projections rather than within the main walls. Something of the nature of an apse or chancel might be rendered necessary by the ritual. A tower might be necessary for bells. Some stacks might be required for smoke flues and ventilating shafts. Windows and doors would be necessary, and perhaps also porches. If the roof were of truss construction a greater thickness of wall would be necessary under the ends of the trusses than elsewhere, which would break up the uniformity of thickness of the walls. That appears to be all. Two other factors, however, remain to be considered—materials and climate. In a country in which stone is the usual building material, and in which large stones could be readily procured, lintels would probably be used to cover the openings to save the labour of cutting voussoirs for arches. On the other hand,

if only small stones or brick were available the openings would naturally be arched over. Considerations of climate would probably determine the pitch of the roof and how the eaves should be formed, whether by projections or otherwise, also perhaps whether there should be an inside ceiling to form an air space or not. The dimensions of the windows and the character of the glass would be determined partly by the quality of the light and perhaps by the character of the service to be performed in the building. In a cold, bright climate the windows might be smaller than in a warm, foggy one. If the service were one in which books had to be used by the whole congregation, more light would be needed than if the ritual were not committed to paper at all, or if books were used only by the clergy conducting the service. It might even be desirable to have only a "dim religious light" in the portion of the building occupied by the audience, in order that they might better see what was done by the officials conducting the service, on whom a bright light should therefore be thrown.

The raw materials out of which the design is to be made are now lying ready to the designer's hand, and it cannot be said that they are lacking in possibilities. The first thing to be done is to arrange the different features in the relation to each other that would be most convenient for the purposes of the building. This would soon be accomplished. Up to this point all has been plain sailing and no difficulties have presented themselves to our designer, accomplished as he is in engineering and building, but ignorant of architecture. But now a new problem presents itself. Aesthetics must be taken into account. The building is not only to be strong and convenient, but it is also to be beautiful. The designer has now gone as far as his knowledge of building will carry him, but if he were to stop at that point the result would simply be building and not architecture at all. How much further will his natural artistic instincts and cultivated taste carry him without any knowledge of existing architectural forms? Bringing these to bear upon the character of the materials to be used, he would probably see that polished variegated marbles would call for some treatment requiring large unbroken surfaces, while a material of uniform texture, especially if light in colour, would require to be broken up to get the effect of light and shade. They might also enable him to compose his raw materials in masses, so as to produce agreeable effects of light and shade. But he must go much further than this to produce anything worthy of being mentioned in comparison with the masterpieces of ancient or modern architecture. There must be beauty of detail as well as of outline, and play of light and shade on surfaces as well as in contrasting masses. He would now have to go on to express the construction by suitable detail, and enrich it with appropriate ornament, so as to form a beautiful and harmonious whole. If, with the limitations we have assumed, he were able to accomplish this, he would thereby prove himself such a heaven-born genius as has never yet appeared in the world. All his ideas of outline of masses and play of light and shade and beauty of form would have been derived from a class of objects entirely different in shape, proportion, colour, and texture from those with which he was now called upon to deal. He would be practically in the position of a student, say of electrical science, who had studied the theory of electricity but had never seen a dynamo or other electrical machine. Such a person would probably discover on taking his first model to the patent office that he had wasted his time in inventing again something that had been invented in the very infancy of the science. Our designer would be in the same position. So far as architecture is concerned he would be in the position of a child or a savage, and his best efforts would inevitably be crude and puerile.

Now let us suppose the same problem presented to an architect trained in the modern or eclectic school, the sole proviso being that his design should be beautiful, but absolutely devoid of style. Would it be possible for him to divest his mind of all his accumulated knowledge of the architectural forms and details and ideas of the old styles as a slate is cleaned off with a damp sponge? Is it not more likely that from the very first steps in the arrangement of his plan he would be influenced by recollections of the old styles? He could not divest himself of the influence on his taste of those buildings which he had admired and studied. Try as he might, he would find recollections of basilica or temple or cathedral or mosque suggesting ideas as to the treatment of his raw materials, and insensibly he would find himself designing in some familiar style. He could not help himself, because style consists not merely in ornamentation, but also in structural form and disposition of mass. So the questions of style and external treatment have to be kept in mind even in the arrangement of the ground plan. The consideration of the nature of the various materials alone would bring him face to face with the question of style. Is the ruling motive to be the beam or the arch? This might not be determined by local circumstances, and so the one system might be as available as the other. What is to determine it then? The aesthetic taste of the designer. And having once made his choice his artistic instincts would lead him to adhere con-

\* A paper read by Mr. D. B. Dick at the annual convention of the Ontario Association of Architects.



sistently to the principles of the system chosen. The leading lines must necessarily be either horizontal or vertical, because every great architectural monument that has ever been produced has been either in one style or the other.

No, it is not thus that a new style of architecture will ever be invented. Man is always the heir of all the ages, and his heritage is the sum of the learning and knowledge that have been slowly accumulated in the past. Progress is only made by advancing beyond the highest point previously reached. The men who originate new ideas are those who are most familiar with all the ideas of their predecessors. New inventions are most likely to be made by those who are most familiar with all previous inventions. So, in art as in science, that man is most likely to invent a new form whose mind is most saturated with the best of the old forms.

Some attempts have been made to produce a new style by harking back to some old style at an incomplete stage in its development, and trying to carry it onward on some other lines than those on which it was actually developed. This appears to have been Richardson's idea in attempting to revive the Romanesque style, and to that extent his attempt differed from most other modern attempts to revive old styles. None of these attempts have had any better result than to galvanize the old forms into a semblance of life more or less ephemeral according to the ability of the apostles of the cult for the time being. Examples of the more recent attempts will at once occur to you—the Gothic revival, Norman Shaw and the Queen Anne, Eastlake and his so-called principles of "Truth." It is curious to observe in Eastlake's case how some of the designs in his own book belie every one of the principles laid down in it. It is difficult, for instance, to conceive on what principle of truth a book-case can be designed which is finished on top with an imitation of a shingle roof with dormer windows. As regards Richardson, it is futile now to speculate what he might or might not have accomplished had he lived to the allotted span. His experience would doubtless have been that of all others who have trodden the same path. Measured by actual results, his influence upon the architecture of this country has not been beneficial, not so much because of what he did or failed to do, but because of what his imitators have done. Richardson went to original sources for his inspiration, but most of his imitators have only gone to Richardson, and the result therefore cannot be considered surprising.

Attempts have sometimes been made to combine the outlines of one style with the details of another, but no new style has ever resulted from these attempts. The best example of this is probably the French Renaissance of the time of Francis I., where the outline is Gothic and the details mostly Classic. The effect is picturesque, but there was no vitality in the resulting style or variety. The English Elizabethan is of the same type. The term "debased" applied to it by the Gothicists is not inappropriate, and no better instance of this debasement is to be found than in the west front of Westminster Abbey, where the Classic details look strangely out of place on the Gothic front.

If, then, all attempts at revivals have failed to produce a new style, if the eclectic method has failed, if the invention of new constructive methods and the creation of new needs have also failed, and if the attempt to dispense with style altogether is sure to fail, is there anything left on which to base a hope that there will ever be a new style? It is a question not lightly to be answered. The conditions under which the old styles were produced have long passed away. Life was leisurely in those old days. There was time to linger over a design until it was as perfect as its author could make it. Men whose work was of an artistic kind worked for the love of their art and took pleasure in their work for its own sake. The styles were not made by men who looked upon their art as a mere means of making a living. In those days each worked in only one style, and all worked in the same style at the same time, and they probably knew little or nothing of any other, so that to them it was the vernacular. They did not dabble in Greek one day and Gothic the next. In some cases they may have had before them examples of the preceding styles out of which their own had grown, but they could only have had such knowledge of these as they could obtain at first-hand. There were no excursion trains to afford them the mental dissipation of a glance at all the monuments of antiquity during a summer holiday. They had few books, still fewer illustrations, and no photographs at all. So it is not surprising that some of the Romanesque work, for instance, was obviously the result of efforts at recollection of Roman forms, which might perhaps have been copied literally, had the means only been available in the shape of a library. Men were, therefore, compelled to think for themselves instead of borrowing the thoughts of others. The growth of a new style was an affair of centuries. The best Egyptian or Greek architect, if called upon to design a spire, would probably have pronounced it impossible. And so it was within the time at the disposal of one man or one generation. But it kept the problem before one generation after another, and gradually the thing is done—not all at once or by one man, but slowly through many tentative efforts and failures success is finally

reached, and the Greek temple becomes the Gothic cathedral. Mr. Sturges puts this idea very well when he says, "Once only in a series of centuries appears an architectural thought destined to grow great and stimulate other thoughts, and call out their embodiment in visible form."

The shadow cannot move backwards on the dial and the old conditions can never be restored. Some one said recently that "the most fertile mind—much less the average—is not able to produce from the use of the material and purposes of the structure an entirely original supply of forms, especially within the limit of the time allowed for the occasion." That is true, and therefore every architect must express his ideas in the forms of some known style. All styles are open to the choice and all are alike alive or alike dead to this generation. The history of the last three centuries seems to point to the Renaissance as the one most in touch with the spirit of modern life. It is by far the most plastic of all styles. It is suitable alike for all classes of buildings, from the most humble to the most palatial, and for every purpose—domestic, ecclesiastical, educational, commercial, municipal, national and monumental. So long as the fancy is restrained within the limits of good taste its forms can be used with the utmost freedom and adapted to every purpose. Every young architect after having acquired a general knowledge of all styles, should take some one and make it his own and try to know it thoroughly, in its principles, its history, its monuments and its details, and he should design in that and no other. If the Renaissance is chosen then some one phase of it—say French or English—should be thoroughly mastered before another is taken up.

It cannot be predicated with certainty that there will ever again be a new style. But there are certain principles on which the existing styles should be used, and it may be confidently asserted that if these principles are not followed there will assuredly never be a new style. Blind copying will never produce one. It would be a long task fully to analyse and formulate these principles, but for the present purpose they may be summed up into two propositions—(1) That construction must be absolutely truthful, and must be expressed in forms appropriate to the purposes of the building; and (2) that no moulding or feature of any sort must ever be used merely from habit, or without careful analysis to discover why it is pleasing to the eye and what it means, and even then it should be used only after long and careful consideration whether it should be used at all, what function it is to perform, and whether nothing better can be devised to perform that function.

The following out of these principles may never result in the formation of a new style. Certainly no one man will ever invent one; but it may be that the efforts of some of those who try faithfully to carry out these principles may start an influence that will increase as it rolls onward, until in course of time it will be found that unconsciously a new style has grown up. But assuredly the only efforts that will be of any avail will be inspired by an earnest striving after what is true and beautiful and an honest love for art for its own sake, and only when these are vivified by at least some spark of that divine creative imagination which must be born in a man, and without which he may be a builder but never an architect.

#### ST. MILDRED'S, BREAD STREET.

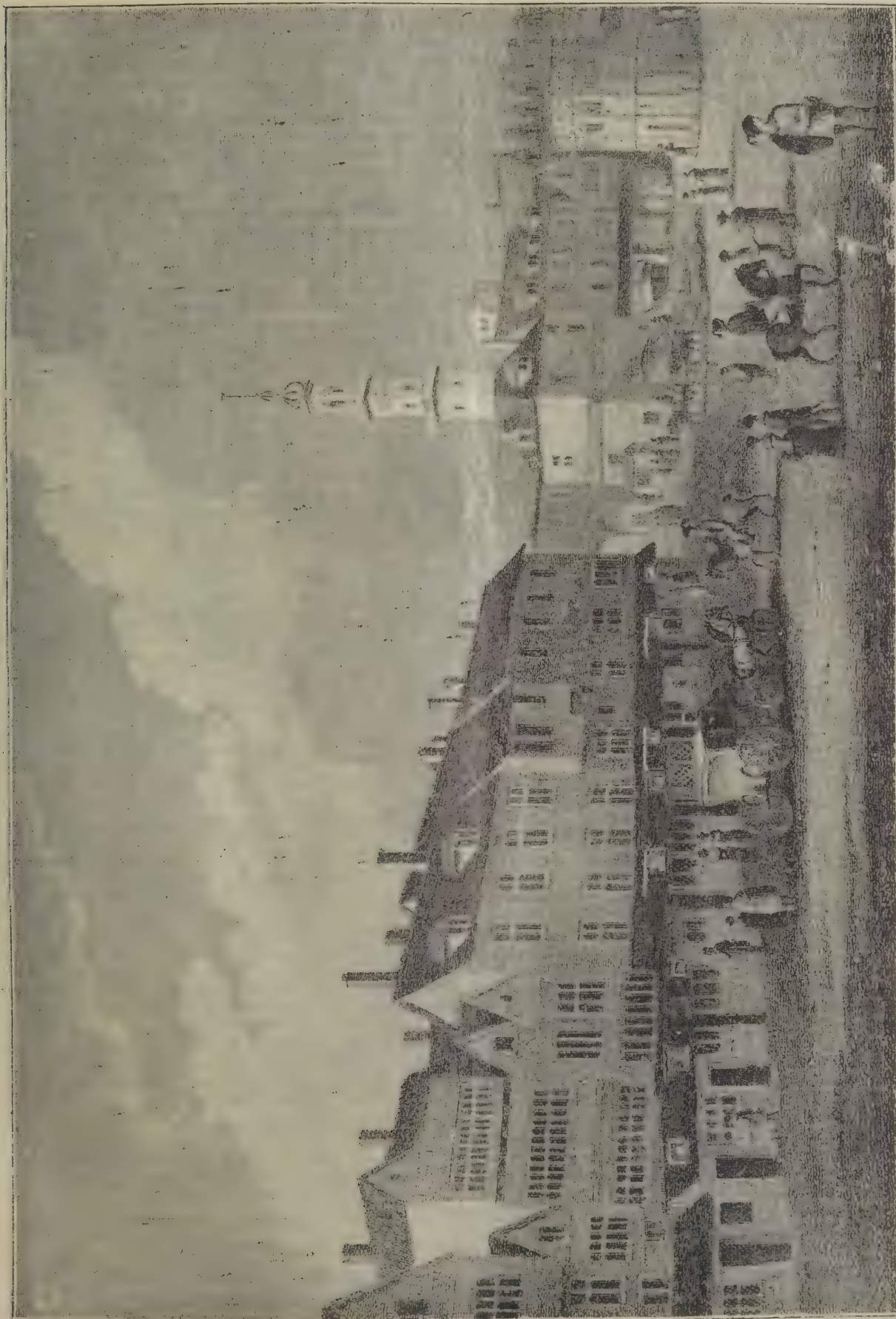
THE promoters of the City and West-end Railway Bill have agreed to accept the clause which the City Church Preservation Society had proposed in the interests of St. Mildred's Church, Bread Street, subject to the substitution of 70 feet for 80 feet as the depth below the roadway of the tunnel which is to be bored for the use of foot-passengers. In these circumstances Mr. H. C. Richards did not persist in his motion for the rejection of the measure when it came on for second reading in the House of Commons. The new clause, as amended, reads as follows:—"Notwithstanding anything contained in this Act or shown on the deposited plans, the company shall not, except as hereinafter provided, purchase or take or enter upon, use, or interfere with the church of St. Mildred, Bread Street, or any part of the property numbered on the said plans 4, in the parish of St. Mildred, Bread Street, in the City of London. Provided that the company may acquire, and the owners of the said church may sell, an easement or right of constructing beneath the said property a tunnel for the use of foot-passengers only, such tunnel to be constructed by the company at their sole risk and expense, and so that the top thereof shall not be less than 70 feet below the surface of Bread Street. And provided also that the company shall use their utmost endeavours to prevent any damage or injury to the said church or any part thereof during the construction of the said tunnel, or at any time after the completion thereof in consequence of the construction, use, or want of repair thereof, and in the event of any damage or injury being caused or happening to the said church or any part thereof, or any of the fittings or furniture therein, by reason of the construction, use, or want of repair of the said tunnel, the company will forthwith, at their own expense, repair and make good such damage or injury."



## OLD CORNHILL.

ON the 15th ult. we published a view of Tudor Chambers, Cornhill, and gave some account of that renowned thoroughfare in the sixteenth and seventeenth centuries. Through the kindness of one of our friends we

are now enabled to give a reproduction of a rare etching, which shows Cornhill about 1630. It is a bit of Old London, and suggests that although much that was picturesque had to be sacrificed, the Great Fire, which directly or indirectly led to the removal of so much that was dangerous, must have been a blessing in disguise.



OLD CORNHILL, LONDON, ABOUT THE YEAR 1630.



## NOTES AND COMMENTS.

MR. G. F. WATTS cannot be considered by the crowd as a successful painter, but there is no one among his contemporaries who has gained more respect. His career has been a rebuke to many artists, for he has remained true to his ideal regardless of disappointments. It must, therefore, have been gratifying to Mr. WATTS when he was surprised on Tuesday morning by the presentation of an address congratulating him on his eightieth birthday, and expressing the hope that he might be spared to practise his art for many years to come. A ceremony of the kind is unusual in this country, but the circumstances justified it. The address was signed by the Prime Minister and other statesmen, the Archbishop of Canterbury, the Lord Mayors of London and provincial cities, the President and Council of the Royal Academy, officers of the British Museum, the Science and Art Department, the National Gallery, the National Portrait Gallery, the Royal Society, the Society of Antiquaries and others. The address was accompanied by a sonnet from Mr. SWINBURNE, and a bronze medal designed by Miss HALLÉ. Mr. WATTS has a wider circle of admirers than was represented by the signatories, and all who know the artist only by repute will be no less desirous that he may long remain as an honour to English art.

LONGFELLOW has made all readers of English acquainted with the legend of WALTHER VON DER VOGELWEIDE, the Minnesänger, who when dying gave all his property to the monks of Würzburg in order that they should daily feed the birds upon his tomb. It is added that "time has long effaced the inscriptions on the cloister's funeral stones, and tradition only tells us where repose the poet's bones." The Historical Society of Würzburg a few days ago discussed the subject of WALTHER'S grave. Dr. KERLER explained that various positions in the Neumünster (which is a very old church) were assigned to the grave, but his conclusion was that the grave was in the cloister. About sixty years ago the inscribed tombstone was there, but it has vanished. An old gentleman who was present at the meeting, said he remembered the stone, for he often played marbles on it. There were small troughs in it for the food and drink which, by the terms of the poet's legacy, should be supplied every day for the use of the birds. WAGNER'S "Tannhäuser" has revived an interest in the Minnesänger and their poetic and martial contests. WALTHER VON DER VOGELWEIDE shares in it, and accordingly a statue of him is to be set up in an open place near the spot where he was buried.

It cannot be said that any of the English museums show an excess of decoration. The British Museum would become more attractive to crowds, and therefore more useful, if the Trustees could expend some money in overcoming the monumental chilliness of the galleries. The most expensive decorations in the South Kensington Museum are the full-length artists' portraits, and they were produced at cost price or less. It is therefore unnecessary to stipulate that if the same Museum is enlarged the new courts should be left unadorned in order that the contents would be seen with more advantage. Mr. ASTON WEBB, who has exhibited marvellous patience over his accepted but unutilised drawings, says in a letter to the *Times*:—"The report which accompanied my design explained that the walls of the courts and galleries had been purposely left without architectural embellishment, being arranged solely with the view of placing objects upon them, decoration being confined to the entrance-hall and staircase; a view of this latter portion only has been published, and may, therefore, have been misleading as to the general character of the interior design. After my formal appointment as architect in 1891, the internal planning of the building was very carefully considered in conference, both with the Office of Works and the Museum authorities, and I was further considering the exterior design when the drawings were stopped, and I have since been anxiously waiting instructions to proceed. That the best architecture for a museum is that which interferes least with the objects shown, and that good lighting and planning should be the leading considerations for such a building is perfectly true, but I venture to think, sir, that beyond this it is the duty of the architect to remember that

he is entrusted with the erection of a great national building to shelter some of the nation's greatest art treasures, and that he would not be properly fulfilling his duty by the provision of a mere utilitarian structure." South Kensington has become a by-word on account of its sheds, and it is time there was a change. In no foreign museum are such costly objects so unworthily housed.

THE REGISTRARSHIP of the Art School at South Kensington may not be the most important office under the Science and Art Department, but it is essential that the holder of it should be familiar with the peculiar routine of the school, or, in other words, should be acquainted with the history of the origin and development of the system. Students are shy of dealing with an ordinary example of circumlocutionism, and it is advantageous for them to be able to refer to somebody in authority when there are doubts over questions which are not within the province of the art-masters. The office is now vacant, and for the sake of the school it is desirable that whoever is appointed should have some other claims to respect than those which belong to a mere example of an arbitrary display of patronage. We have always upheld the advantage of securing for all branches of the Department's service the aid of men who might be called outsiders, but it was on the understanding that they possessed power which was not attainable among the officers. But it is absurd to thrust into any of the appointments a gentleman who may need a long term of coaching from another official, or the continuous aid of a special auxiliary. That experiment has been tried, and the experience of the inconvenience which followed should be enough to restrain any attempt at its repetition. The present time is also not opportune for a return to the ancient process by which interest secured office, while merit was rejected, for the opponents of the Department on a Parliamentary committee could make capital out of an ineligible selection for a humbler office than that of registrar.

THE importance of the easement of support has been exemplified in the Court of Appeal under rather novel conditions. The plaintiff was the owner of two houses on the cliff at Hastings. They were not erected by him. The original owner made an excavation at the back to obtain courts for them, and to insure their security erected a retaining wall to uphold the cliff above them. The defendant also owned houses which were erected above the plaintiff's, as well as an open space which was obtained by an excavation of the cliff. There was also a retaining wall, but it was in front of the premises—unlike the wall below, which was at the back. The upper wall was apparently calculated to withstand the pressure which would arise by any decay of the cliff at the place, although there was not sufficient provision for drainage. The excavated rock, amounting to about seventy tons, was also added to the load on it. As a consequence the upper wall succumbed, and with a part of the cliff attached to it fell on the lower wall, which of course was unable to withstand the weight, and was almost entirely destroyed. Mr. Justice MATHEW, after hearing the case, gave judgment in favour of the owner at the lower level, and assessed the damages at 150*l*. The defendant appealed, but the judgment of the Court below was not disturbed. The Master of the Rolls ascribed the origin of the accident to the excessive weight, a consequence of the excavation, by which the load on the upper wall was increased. There was no default by the plaintiff, and the defendant alone could be held responsible for the damage. The moral to be drawn from the case is, that there are unusual risks in building on the cliff of Hastings; but it is to be feared that there and in similar places there is a belief that a retaining wall acquires additional strength from being contiguous to a rocky mass, while in reality it is the wall which has to strengthen the rock.

## ILLUSTRATIONS.

WINCHESTER CATHEDRAL.—THE CHOIR.

WINCHESTER CATHEDRAL.—WEST FRONT.

PROPOSED HOUSE AT HINDHEAD FOR DR. A. CONAN DOYLE

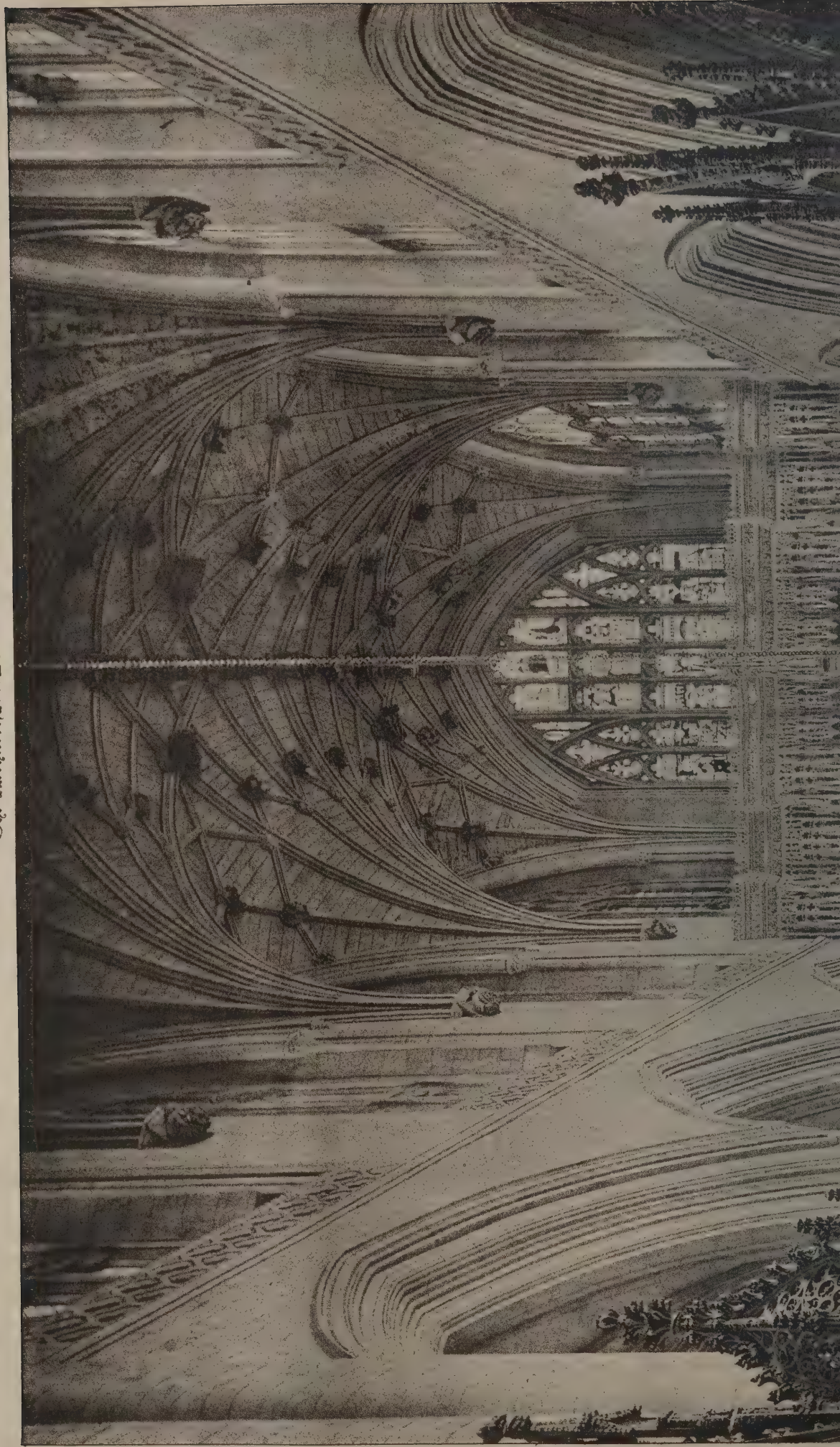
THE DOVER CASTLE, WESTMINSTER BRIDGE ROAD, S.E.



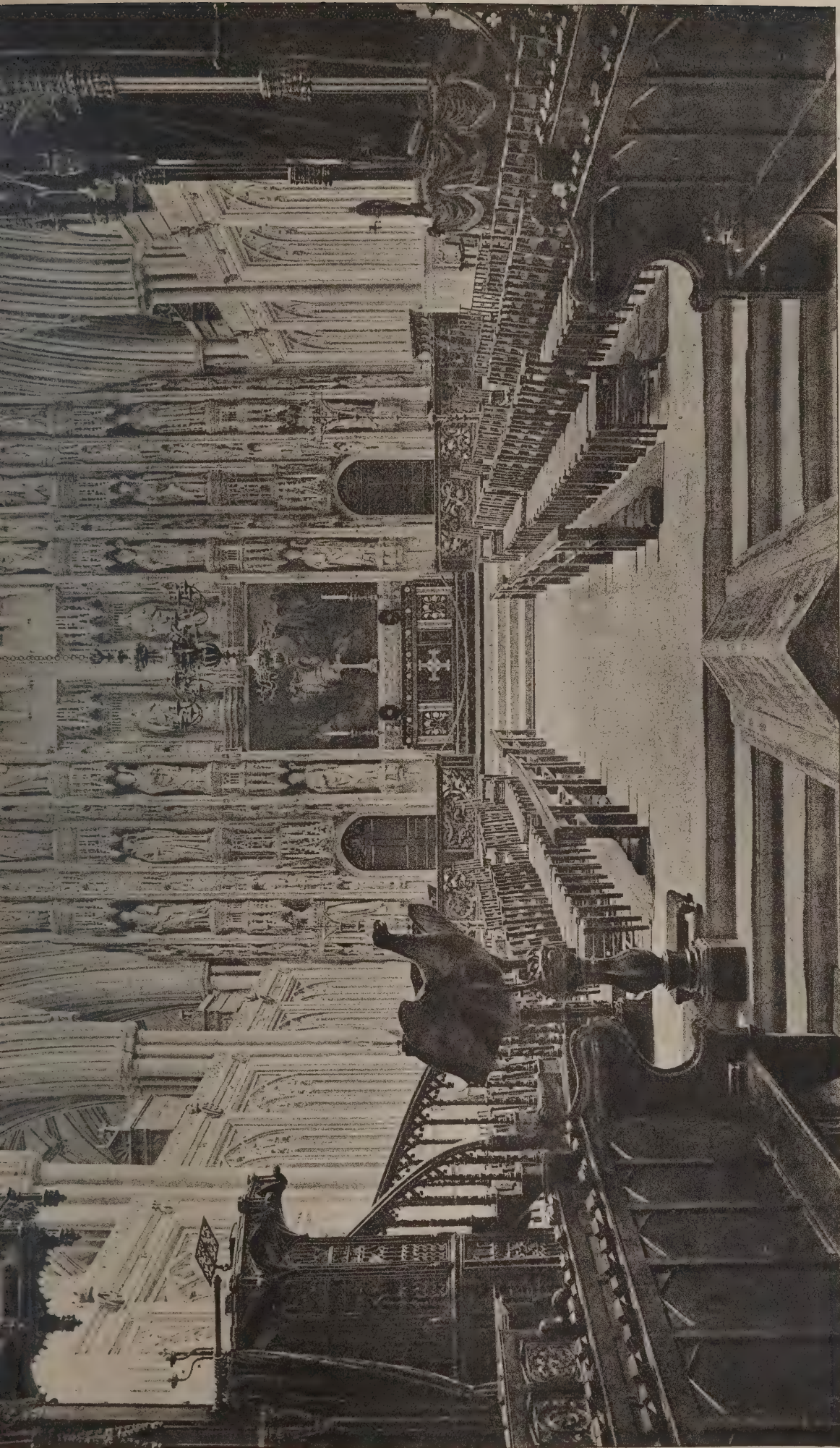




The Architect, Feb. 26<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.4.

INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 14.—WINCHESTER: THE CHOIR.



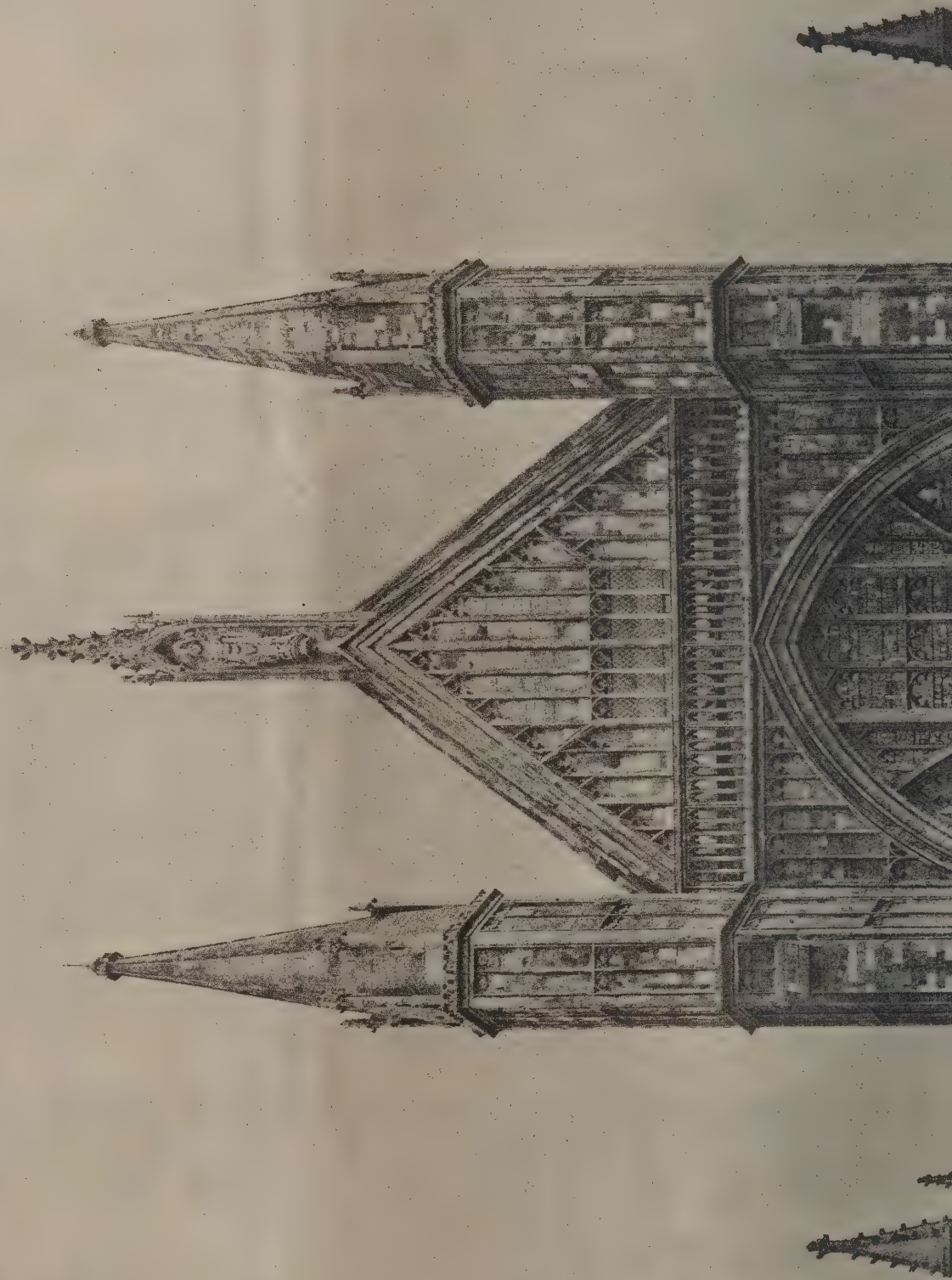




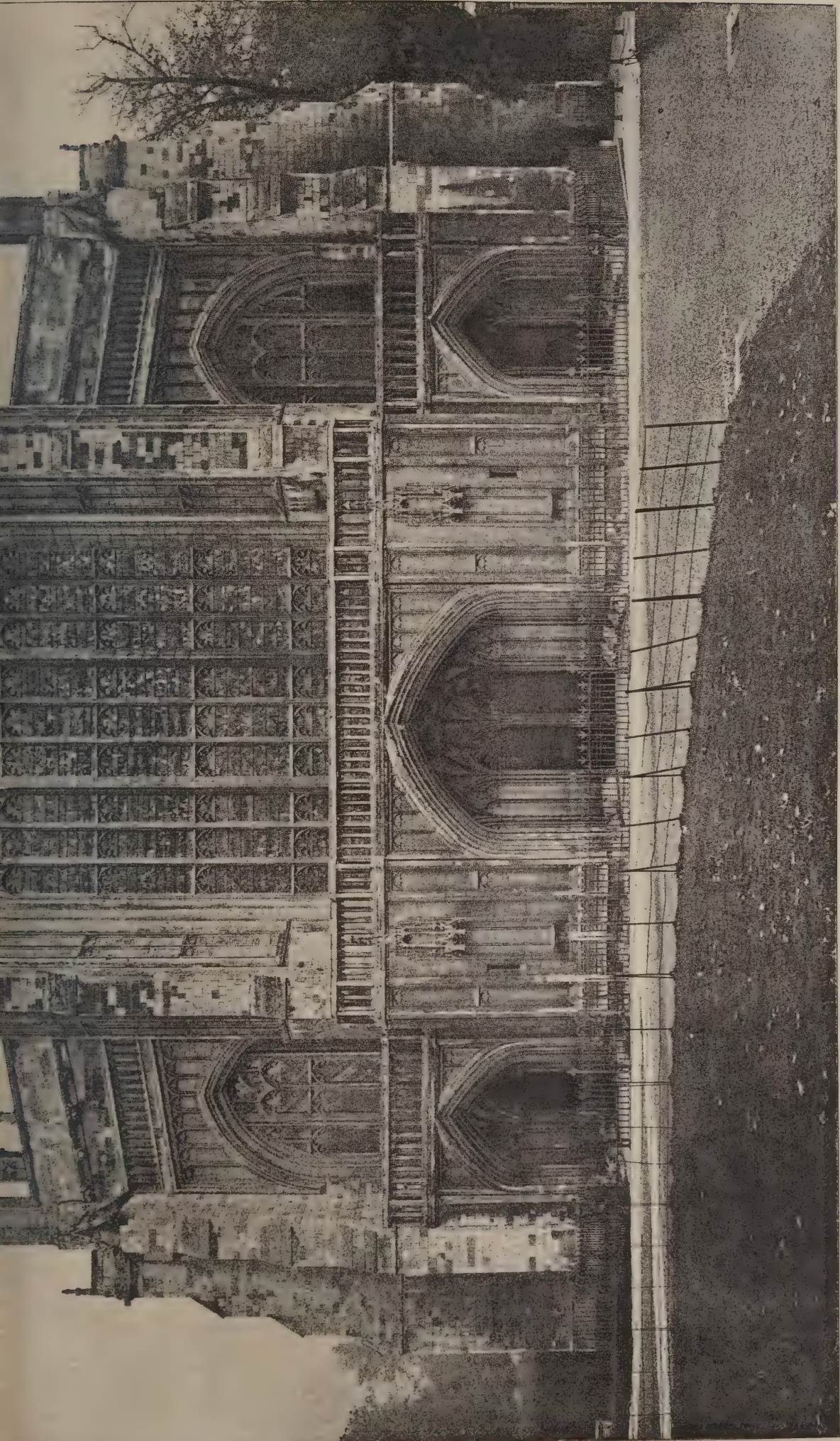




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CATHEDRAL SERIES, No. 13.—WINCHESTER: WEST FRONT.



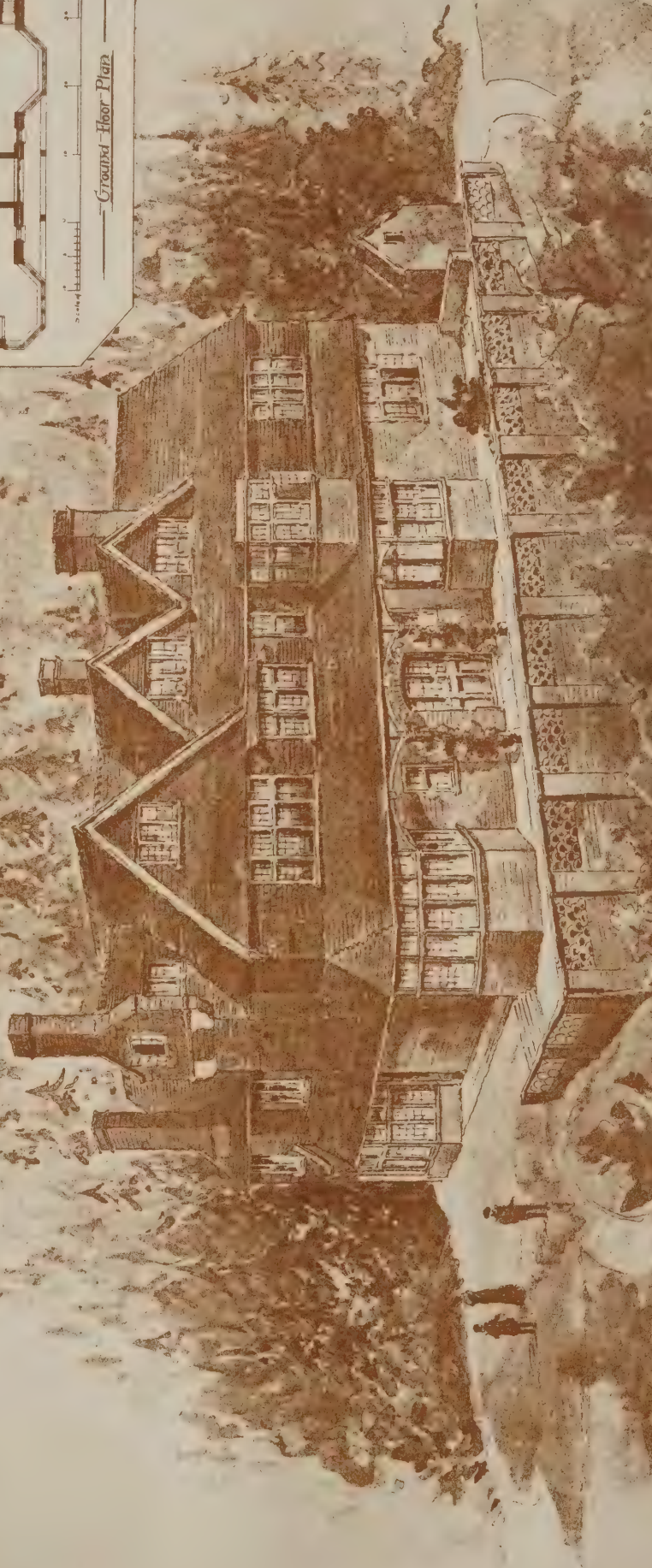








Proposed House at Hindhead  
for Dr. A. Conan Doyle.



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## WINCHESTER CATHEDRAL.

IT is often an advantage to be able to consider English objects and institutions as it were through the eyes of foreigners and strangers, for in that way the drawbacks of too much familiarity are partially removed. The English cathedrals are pleasing to our French visitors because they see in them evidence of the influence of their countrymen at an early age. But Americans consider the buildings with more affection than is given to them by inhabitants of the cities in which they are placed. Mr. J. F. HUNNEWELL, who has made a dozen tours through the country, expressed American sentiment when he said:—"Around these venerable cathedrals the history, character and sense of beauty of the people, with the power and grace of the deep faith of England, appear in forms that are visible, making all they embody real to us, and the land fairer and more

church, being 556 feet by 250 in breadth of transept. I think I prefer this church to all I have seen, except Westminster and York. Here was Canute buried, and here Alfred the Great was crowned and buried, and here the Saxon kings; and later, in his own church, William of Wykeham. It is very old; part of the crypt, into which we went down and saw the Saxon and Norman arches of the old church on which the present stands, was built fourteen or fifteen hundred years ago. Sharon Turner says:—"Alfred was buried at Winchester in the abbey he had founded there, but his remains were removed by Henry I. to the new abbey in the meadows at Hyde, on the northern quarter of the city, and laid under the high altar. The building was destroyed at the Reformation, and what is left of Alfred's body now lies covered by modern buildings, or buried in the ruins of the old." William of Wykeham's shrine tomb was unlocked for us, and Carlyle took hold of the recumbent statue's marble hands and patted them affectionately, for he rightly values the brave man who built Windsor, and this cathedral, and the school here, and New College at Oxford.



*Photographed by S. B. Bolas & Co.]*

WINCHESTER CATHEDRAL, WEST DOOR.

lovable and precious. The hearts of the builders have been English, and they have built each throb in with the stones wrought to make shrines that have long kept, and, we may hope, will save for all time the unique record of the steadfast piety and wise endurance that have made the small, wild island become the throne of the world-wide empire, telling its people of this every day, and that the nation's strength and glory will endure while they, like what they signify, remain secure." In the case of Winchester we have a record of the effect it produces on one of the most distinguished Americans, R. W. EMERSON. He visited the cathedral in company with THOMAS CARLYLE, and he gives the following account of his impressions:—

In the cathedral I was gratified at least by the ample dimensions. The length of line exceeds that of any other English

It is easy to understand why an American, who was accustomed to look at long stretches of open country should feel less restricted in Winchester than in the majority of cathedrals, although the total length of the building was little over the tenth part of a mile. EMERSON might consider the forest alleys with which he was acquainted, and which resembled those that in an earlier age suggested the aisles of Gothic buildings, as far excelling any vista at Winchester. But he would be the first to acknowledge how immeasurably in historic interest the cathedral surpassed all the buildings in the States. With the exception of Westminster Abbey there is, indeed, no church in all England which was so closely connected with the rulers of the country during a long series of years. It may be well to recall how that arose and why the connection declined.



From its advantageous position within easy reach of the sea, the Romans considered the place where Winchester now stands as a fitting site for a settlement and they probably utilised an early British village. No record of that time relating to the place has survived. Afterwards the historic notes are few and far between. In A.D. 534 CERDIC the Saxon ruler was buried at Winchester. In the next century BIRINUS, the Roman missionary, was fortunate in converting CYNEGILS, the thane of the district, and his son CENWALH, or COINWALCH. The rite was administered at Dorchester, and there BIRINUS was set up as bishop. But it was only a provisional arrangement, for the erection of a church for the bishop at Winchester was then contemplated. It was afterwards erected in a style that amazed the people of Wessex, and was endowed with a vast domain, part of which still yields a revenue to the cathedral treasury. Owing to the reverence for associations which inspired the old church builders, it is not unlikely that the site of the seventh-century building, and it may be of the Roman church as well, is within the precincts of the existing cathedral.

The times were troubled, and Wessex appeared to have experienced alternate victory and defeat for many a year. The petty kings were unable to agree. The princes, we suppose, committed acts in their warfare which, on reflection, they believed to be wrong, and hence we read of long, toilsome and expensive journeys to Rome in order to calm their consciences. At length, in the ninth century, under ÆTHELWOLF, who had been, it is said, a monk, Winchester rose to the foremost place among the cities of Britain, and the Church throughout the country assumed an authority which the early missionaries could not have anticipated. When his youngest son ALFRED ascended the throne, and when peace prevailed, Winchester was not only the capital of a great king, but a school of arts and literature. ALFRED's literary efforts are familiar by name to all, and on their account he must be included in every list of royal authors. As regards art, LINGARD says that "among his artists were numbers of foreigners attracted by his offers, and by his frequent conversation with them he is said to have acquired a theoretical acquaintance with their respective professions which astonished the most experienced workmen." ALFRED died in 901, and was buried in the cathedral. He had resolved to found two minsters in Winchester, and to one of them, the "New Abbey," which his son EDWARD erected, his remains were afterwards transferred. From thence they found their way to Hyde Abbey, which in the last century was superseded by a lunatic asylum. After imagination has traced the noble dust of ALEXANDER until it is found stopping a beer-barrel, the fate of ALFRED's dust deserves to be next considered. It is now impossible to discover for what reason he wished to set up a rival to the old cathedral, and subsequently the wisdom of the new foundation appeared dubious, for the two ecclesiastical establishments were often at loggerheads. Apparently Bishop ÆTHELWOLD, as one means to settle the contests in the middle of the tenth century, began a new cathedral, and somehow was able to persuade the monks to engage in the operations, although it might be supposed their rivals, the canons, would have all the advantages. The building was consecrated in 971, during the reign of King EDGAR.

Forty years afterwards Winchester was in the hands of the Danes. CANUTE was a respecter of churches, and it was on the crucifix of the high altar of the cathedral he placed his crown after he had convinced his flatterers and parasites that the waves were not subject to his power. If he had lived the fate of Winchester, and of England too, might have been different. But the greatest of the Vikings died in his fortieth year. His widow EMMA remained in Winchester when her son EDWARD THE CONFESSOR, the son of ÆTHELRED, reached the throne. After the death of his half-brothers she was considered by the new king and his supporters as the most dangerous enemy of the English race. Winchester became in their eyes as a hostile fort. The Saxon Chronicle records how EDWARD unexpectedly swooped down on the city, seized all the treasures which EMMA had amassed, and swept away the cattle and corn from the lands which were her dower. She was, however, allowed to remain in Winchester until her death in 1062. She was buried in the cathedral. But while living her presence was not pleasing to her son, and EDWARD held no council in Winchester until after her death.

The absence of EDWARD, as well as other causes, strengthened the power of the foreign element in Winchester. EMMA was a Norman, and naturally was inclined towards her countrymen. EDWARD, who appears to have been a good prince so long as there was no event to disturb him, was, out of policy, no less friendly towards the Normans. In preparing the way for the invasion, the clerics of Winchester Cathedral were as zealous as if the whole system of Church government were in jeopardy unless the strangers quickly arrived. When WILLIAM THE CONQUEROR marched through England, he found no opposition to his taking possession of the citadel of Winchester, which was the strongest in England. He decided to make it his residence during spring, Gloucester serving for the winter, and London for the summer season.

WILLIAM was not disposed to allow any exceptional conditions to Winchester in his mode of dealing with England. He showed no respect for the loyalty of the monks of the New Abbey to HAROLD and the English cause. According to THIERRY, he had resolved on the simultaneous deposition of the higher English clergy everywhere, and to rule in Winchester one of his relatives, named WALKELIN, was selected. Like the majority of the Conqueror's new bishops, WALKELIN believed in the policy of having splendid and substantial churches, and in 1079 he commenced his operations, in order to supersede the cathedral which Bishop ÆTHELWOLD had erected a century before. It is not easy to determine the relation of the Norman to the Saxon building. Mr. GARBETT, an architect who had charge of the cathedral in the early part of the century, used to maintain that a very large portion of the old masonry yet remains, because WALKELIN wished to demonstrate to future ages by means of it that the Norman builders were far superior to their predecessors. It is, moreover, superior in endurance to much later work. Dean KITCHEN has come to the following conclusions on WALKELIN's building:—

It is possible that Walkelin placed his apse close to the west door of the older English church, and when his main fabric was completed, pulled down the old church and built his lady chapel on its foundations. There is some masonry of high antiquity in the crypt, just to the east of the lady chapel apse, which seems to countenance this view, and if this is a correct surmise, we may venture further and claim that the present cathedral, in part at least, stands on the site of the oldest Christian building of these parts—that Roman church in which the gospel was preached to the primitive inhabitants of the district. Walkelin's church was fourteen years in building. When finished it was almost as large as it is to-day, for it was planned to run 40 feet farther to the west than it does now. Of this huge edifice the massive transepts remain almost unchanged; the long nave, hidden under William of Wykeham's remodelled building, is still there, walls and piers being still Norman; the tower, which fell in 1107, was soon rebuilt in somewhat later Norman style; and though the Norman lady chapel is gone, its ground plan and features remain in the crypt, lately cleared out and made once more intelligible to all who visit it. The stone for the building came by water to Winchester from Quarr in the Isle of Wight, and the cost of the work must have taxed to the full the resources of both bishop and monastery. Indeed, we see this in the quarrels which marked the first years of Bishop Giffard and in the grant to Walkelin by William Rufus of the profits of a fair on St. Giles's Hill in 1094. But the most dramatic incident in the building is of an earlier date, when William the Conqueror granted Walkelin as many trees in Hemptage Wood as he could fell in three days wherewith to roof the nave. The bishop called together "carpenters innumerable," and swept off the whole wood of oak trees, leaving nothing standing there save the traditional "Gospel Oak," under which St. Augustine is said to have preached. The bare stem of this ancient oak still stands, and by it yearly, when bounds were beaten, the parish priest used to read, till quite lately, the gospel for the day. The solid trees thus carried to Winchester are still to be seen in the roof of the nave above Wykeham's stone groining, and they are as sound as when they were first hoisted up more than eight centuries ago in 1086.

Although Winchester was safe enough under the control of his officers, it did not possess all the qualities which WILLIAM I. desired for a capital. He recognised the capabilities of London to be the seat of government, but owing to the strength of its citadel he continued to utilise Winchester as a treasury. The first act of WILLIAM RUFUS was, therefore, to seize on the citadel, and when he was



pierced by an arrow in the forest his brother, HENRY I., was no less eager to take time by the forelock in gaining possession of the wealth which the second WILLIAM had left untouched. WALKELIN, meantime, took advantage of the state of affairs to gain privileges which would enable him to complete his cathedral. The Red King made over to him the royalties of St. Giles's Fair as well as other sources of revenue, and he utilised the money on building. He was zealous as an ecclesiastic, but in the great contest between ANSELM and WILLIAM RUFUS he stood by the king. Retribution followed, for he died in 1098 through sorrow arising from a royal demand for money which he was unable to supply.

He was succeeded by WILLIAM GIFFARD, who was not consecrated until 1107, and in that year he had to encounter the difficulty of erecting a central tower in place of WALKELIN'S, which had fallen. That was not an unusual fate for Norman work when carried to a great height, although when it did not rise beyond the dimensions of such a transept as is found at Winchester the masonry may appear as if capable to endure for ages.

GIFFARD was succeeded by HENRY OF BLOIS, a nephew of King HENRY I. He was a young man of twenty-eight, and it was natural for one of his race to be ambitious. His desire was to have Winchester raised to an archbishopric, and in the contests of the time between the Empress MATILDA, King STEPHEN (the bishop's brother), and others, his conduct appears unaccountable, unless we realise the object he had in view. In the family and personal squabbles which were then enacted in Winchester the dignity of history is not to be discovered. The bishop had fortified his castle, and he was not ashamed or afraid to cast red-hot missiles from it on his flock, or to reduce Hyde Abbey to ruins, although he was its official protector. Afterwards he endeavoured to make amends for his turbulent conduct, and when he died it was said of him that never was there a man more eager to adorn his church. His work in the cathedral would appear to consist in the erection of a treasury and the presentation of the immense font, which shows scenes from the life of St. NICHOLAS of Myra. He deserves to be remembered, however, as the founder of the Hospital of Holy Cross.

The coming of the Angevine kings, beginning with HENRY II., was not advantageous to Winchester. As a matter of form the king received the homage of the nobility, but it was from London, Woodstock, or Falaise he preferred to rule his kingdom. After BECKET'S death HENRY adopted a new system, and he occasionally visited Winchester. He does not appear to have been a benefactor to the cathedral. Bishop DE LUCY ruled the see from 1189 to 1204, during the reign of RICHARD I. and part of JOHN'S. He gave the first indication of dissatisfaction with the Norman style. He extended the church towards the east and erected a lady chapel. The change was rendered necessary by the number of pilgrims that visited the shrine of St. SWITHIN. Several of the bays of the arcades show trefoil arches, but Mr. PARKER considered the style to be pure Early English and quite as advanced as any work of the time found at Lincoln. Professor WILLIS observed a similarity between the arrangement of a double pointed arch under a single trefoil arch, in the lady chapel, and what is to be seen in St. Christopher, Mentz.

DE LUCY'S experiment of employing the new style somehow does not appear to have much impressed the succeeding bishops. A great hall was erected in Winchester in 1235 for royal use, but that did not either produce any effect on the cathedral authorities. A century and a half had to elapse before a bishop arose who was sufficiently venturesome to attempt a transformation of the building. In 1345, when WILLIAM OF EDINGTON was appointed to the see, Gothic had gone through a series of evolutionary processes. It was then in its Perpendicular period. To Bishop WILLIAM are attributed the first two windows on the north side of the west end of the cathedral and the first window on the south side with their buttresses. The great west window is also his work, but the parapet and pinnacle above it were added by his disciple, WILLIAM OF WYKEHAM. WILLIAM OF EDINGTON, from the little he attempted, was able to imagine what his cathedral would become, and on his death in 1366 he bequeathed money to continue the works. (To be continued.)

## THE ARCHITECTURAL ASSOCIATION.

AN ordinary general meeting was held in the rooms of the Royal Institute of British Architects on Friday evening last, Mr. Beresford Pite, president, in the chair.

The minutes of the last meeting were read and agreed to.

Three nominations having been read, the following were elected members:—Messrs. S. E. Barron, C. B. Chesshire and T. M. Wilson.

The Chairman announced that Mr. Arnold Mitchell, F.R.I.B.A., had asked to be reinstated a member.

Mr. W. H. Bidlake then read the following paper on

### The Architect and the Public.

The public is not inherently or intuitively antagonistic to the architect nor the architect to the public. Some assume that this state of hostility does exist. On the contrary, each stands for a mutual help to the other. I must live and be sheltered. This want you will satisfy, and you will make my shelter beautiful for me. For all this I will assist you in turn towards living and being sheltered. What arrangement could be more just, more harmonious? Quite true, and yet the working of the arrangement might undoubtedly be more just, more harmonious. Then comes the question, How? That is the subject for to-night's discussion.

The world is divided by the English schoolboy broadly into two classes, What is good to eat and what is not.

To the architect society appears in similar fashion divided into two groups—clients and non-clients. The former, I think, forms a disproportionately small minority. The architect has the advantage of the schoolboy: he can regard any member of the public as a potential client—perhaps would be wise to do so—but the small boy cannot regard in the same way his rod of chastisement as a potential plum-cake. Literally, too, every taxpayer and ratepayer is a client where state or municipal buildings are concerned. Of course he will take an interest in the matter, will see, as far as he can, not only that money is wisely expended in a well-constructed and convenient building, but that its architectural beauty shall gratify his citizen pride. In securing economy he will undoubtedly do this, beyond that not the slightest.

The unwelcome fact may be faced at the outset:—

The British public is profoundly indifferent to architectural matters. Some one perhaps says no. I reply, "Brompton boilers." From this lethargy one will occasionally awake, and, with a volume of Ruskin in his hand, vehemently denounce the modern architect and all his works. To me it seems immensely to the credit of architects that in the teeth of this public indifference so much good work is done.

No wonder Seti or Rameses could count upon the production of a hypostyle hall at Thebes, superbly grand. The services of the architect were then regarded as amongst the highest in the State.

Under Pericles every Athenian gloried in each fair jewel of that architectural diadem that crowned the Acropolis.

At Florence, in the days of the Renaissance, the same keen interest in architecture invigorated the air her great builders breathed. It braced them to surpass each other, to surpass themselves, to rear works that should be the subject of public praise, even of public gratitude. And of the many great men of that period who practised architecture some have achieved immortal fame.

When a people is deeply touched it is heart and emotions, especially when it has been emancipated from some yoke and is intoxicated by the spirit of freedom and hope, then is there an outburst of music and song and exquisite and grand creations of art.

Such was the case amongst the Athenians after the overthrow of the Persians at Marathon and Salamis, and such when, at the Renaissance, men threw off the superstition and tyranny of the Church which had held them in moral and intellectual slavery.

A certain degree of wealth ungrudgingly spent is necessary before the enthusiasm of a people can express itself in grand architecture. But easy commercial prosperity makes men content with the uneventful commonplace present; it does not set them longing or idealising. Physical luxury and social position is what they ask, and that they may be left alone to make money. Life runs smoothly, and surface currents do not disturb deeper emotions. The arts, however, minister to the pleasures of life amongst those who are cultivated to feel their influence, and so, even in easy commercial days like these, they may not only flourish, but progress in a steady, quiet fashion, provided that public apathy be replaced by a keen appreciation. For no lovely flower blooms in the garden of neglect.

An architecturally appreciative public would stimulate the architect to produce his best. He would produce better work than he could do in an indifferent world. All his faculties would be awakened. The prospect of public commendation would stimulate him to create something worthy of public praise. But, gently. He will need more than that. Public



praise is very well, but what if it be the applause of ignorance? Public appreciation, to have any worth and to be capable of influencing the best men, must be critical, and founded on knowledge and good taste. Else will it only be despised.

This leads us to consider a second unwelcome fact. The British public is profoundly ignorant in architectural matters. How could it be otherwise? Indifference breeds ignorance, and ignorance indifference.

People for the most part do not even know what architecture consists in. Some seem to regard it as the application of archæology to modern building, a view which has been fostered by architects themselves. There are some clergymen, for instance, who have studied Parker's "A.B.C. of Gothic Architecture," or have mastered the terms in a glossary, whose lecturing on correctness of style the architect finds much more trying than modest ignorance. And we may, no doubt, recall one or more amateur architects whom a little knowledge has made extremely dogmatic.

The popular idea of architecture is that of ornamenting buildings. Here is a barn or factory. Only cover it with sufficient ornament, and it will become architectural. The ornament may be inappropriate and misplaced, it matters not. Before it was a plain, ugly building, now it is a beautiful one; it is a work of architecture. Such a view might be pardoned in an uneducated man, but it is the view of many an otherwise well-educated man. It is notorious that many people of taste who can appreciate good music, and painting, and literature fail in understanding the excellences of good architecture.

If a building is treated in simple broad masses, it is called plain and ugly—that is, unornamented. The grandeur of breadth and mass is the last thing that the public will admire, unless it be that equally fine quality of reticence. No doubt there is a winning grace in modesty, theoretically, but the Englishman likes to see a man push himself to the front, and he likes to see a self-assertive building too. He calls it a "handsome structure."

This popular architectural taste is especially to be deplored, because it is answerable for the production of an ostentatious class of building which is vulgarising whole districts. And we must suppose that there are architects as insensible as their clients to modesty and refinement in design, or else that they are content to sacrifice whatever principles they may have to captivate the popular taste.

Another popular fallacy is that the planning of buildings and the designing of them are two separate processes, and further, that a building may be designed on paper. So it may be by the experienced man who is reading the perspective value into every part of his drawing. But this paper and T-square designing is, I fancy, one of the chief causes of architectural failure. The right treatment of building material is a matter about which the public has no ideas at all—in fact, does not even know that there may be a right and a wrong way of using material, still less that this is an important factor in judging the excellence of a building.

The effect of this widespread ignorance is not only that architects are deprived of the stimulus of cultivated public opinion and approbation, the public itself is a loser. For not being able to criticise its architects intelligently, and being perhaps conscious of the fact, it is at their mercy—and the tender mercies of an architect may be very cruel. Having revived Greek, Mediæval, Gothic, or some other more or less unsuitable style, the architect will tell his client what is at present the fashion and what is the proper thing to have, and the client, with British long-suffering, will pay heavily for being made miserable and uncomfortable until his lease or his life runs out.

But why should this public ignorance of architecture surprise us? From our youth up we have been taught music, and have studied English literature. We have also been taught English history, as being for the most part a series of sanguinary conflicts between England and France, with occasional civil wars at home; but no one has instructed us how to read for ourselves the history of our forefathers written in the stones of our village church. Is it not astonishing that the study of English architecture is not part of a school or at least college curriculum? What better method could there be of teaching a boy to observe accurately, and reason from his facts? Even in the schools of art throughout the kingdom we may find, perhaps, building construction taught, but the study of architectural history and design is conspicuous by its absence.

A man ought to be considered as lacking in the cultivation of an English gentleman if he did not possess more or less knowledge of English architecture at least.

Can this be remedied? If architects who have presumably studied the subject exerted themselves to further its claims by bringing it before public notice, by assisting in the appointment of architectural professorships and lectureships and the foundation of architectural scholarships, and by exciting an interest in their own neighbourhood in architecture, much might be done towards securing public recognition of the claims of architectural study. This, of course, would not necessarily

mean a purification of architectural taste, but it would assuredly tend in that direction. It is vastly more important that our streets, wherein we walk every day, should be adorned with beautiful buildings than that we should be able to listen to grand music for a few hours in the winter season. Yet we think much more of our concerts than of our street fronts.

One of the most important departments of municipal government nowadays is that which deals with the erection of new buildings. Never by any chance is an architect, whose experience might be invaluable to his town, found to offer his services on its council. No: architects neglect their opportunities of advancing their art and instructing public taste, and stand by and whimper.

Indifferent as the average Englishman may seem towards architecture, he is not so any longer when his interest has been excited. He really wishes to know what is good and what to admire, and if he is authoritatively told to do so he will admire it. But he must be taken in hand; first he will not take the initiative, and it is the architect from whom he has a right to expect this leading.

He is for the most part unimaginative and commercial. He worships a fact, especially if that fact is a bargain sealed to his own advantage. So when he builds he likes to see his money's worth. Refinement of proportion is a quality which eludes him. Ornament is tangible. Let him have plenty of it and full flavoured, and he will be content; he will even praise his architect. But if the beauty of proportion and grouping, breadth of mass and breadth of light and shade, of reticence and all those other evidences of refined thought were pointed out to him, he is not so insensible but that he would learn to admire them. But who will point them out to him? Not architects, they are too busy with their private practice.

If this be the attitude of the public towards architecture, how does it regard the individual architect? Frankly, it cannot see the reason for his existence. It does not regard him as the practical man—that term refers to the builder. He is a luxury and an expensive one, and his services may be dispensed with, especially in these days of municipal and rural inspection, when you can rely on the "authority" for seeing that your drains are right and walls dry.

People are quite ignorant of the *modus operandi* in designing and erecting a building. They think that when an architect has made a plan and designed an elevation, and obtained a builder's estimate, he has practically finished his work. They have no idea of the immense amount of detail work necessary, of the varied knowledge required, of the responsibility, anxiety and labour entailed.

It comes as a surprise to most clients who have had no previous experience of buildings to see the number of drawings required, and to find the architect actually giving his attention to the most minute details.

If this knowledge were generally diffused it would save much misunderstanding. "Well," says a client, "I really had no idea you architects had to do so much work for your money. Why, I should not think the 5 per cent. pays, does it?" And you answer, "Well, perhaps not."

As it is, however, 5 per cent. commission is usually considered a high rate, and architects are frequently asked to take less. Not a few do so rather than lose work, even though they are men of established practice, and it becomes a difficult matter to obtain more than 5 per cent., even for the most elaborate church fittings or church decoration.

If a building is to be erected for a religious or charitable purpose, the architect is often asked to forego part of his commission on those grounds, and if he demurs he is reminded that a subscription towards the organ would be very acceptable. It is desirable to have an imposing ceremony of foundation-stone laying because that stimulates the subscriptions, and the architect is asked to present a silver trowel. Later on, perhaps, he may have to present a silver key for the opening ceremony. As a result, the architect whose practice lies not amongst the commercial, but amongst religious and charitable bodies, is subjected to a perpetual fine, while at the same time the work probably requires a large amount of attention.

Not infrequently a committee will act with contemptible shabbiness towards its architect. In fact, a committee may sometimes prove a very good instance of individual morality and collective immorality. Happily, I have not suffered from these experiences myself, but I know I am fully justified in these remarks from the experiences of others.

On a committee there is usually at least one member who has already had some experience of building, and he assists in formulating the requirements of his colleagues, but the private client is often incapable of forming an idea of his own wants, and the architect has to find them out for him. This sometimes entails a number of alternative sketches, and then, perhaps, the client will decide not to build. He is astonished if his architect then sends in his bill. "Why," says he, "I did not approve of any of the sketches you made me." But he knows at the same time that sometimes his doctor's prescription has done him no good, but he has still paid for it, even if it has done him harm.



Many a patient architect will continue to lay one after another of his most exquisite ideas before unrefined and uneducated wealth to find them brusquely set aside, and will meekly endure with only a sigh for the ill association of beauty and the beast.

Another method by which a client realises his own wants at the expense of the architect is the private competition. This method is becoming alarmingly prevalent owing to the folly of architects in ministering to it. It appears to me a very mean way of getting 100% worth of brains and paying 10% for it. For undoubtedly the client, if he saw good points in the unsuccessful drawings, would not hesitate to incorporate them in his building. I wonder if painters will in time be asked to compete for painting portraits?

Public competitions, on the other hand, provided that a professional assessor is appointed, seem right and desirable. But the offer of a first premium is a delusion and a snare. Why, it always merges in the commission. The architect competes under the tacit understanding that if placed first by the assessor he will be employed to erect the building. It would not pay him to do the immense amount of work necessary in a competition for the paltry and wholly inadequate amount of the first premium. The competition drawings will not serve as the working drawings. All the work must be done over again, and it is right that the architect should receive some compensation for his preliminary labours. There are others, however, to whom these labours have been just as great, and who have not the consolation of carrying out the work. Should not these, too, receive compensation for their work in all cases wherein they have been personally invited to compete, and would it not be far more satisfactory to divide the amount offered in premiums, including, of course, the first premium in equal honorariums to all those who had been invited to compete, than the present system of prizes?

Further, would it not be to the interest of all to limit the number of competitors in any competition and so avoid the enormous expenditure of labour and bad language which the Exeter church competition must have entailed? It is practically impossible for an assessor to select the best out of 400 drawings unless one chances to be of conspicuous merit. No competition should have more than twenty competitors, and these should be taken in the order of their application or by some system of ballot. Those of them, however, who had been invited would, of course, receive precedence.

In the case of one of the competitors submitting a design of great excellence, but at the same time omitting to fulfil one or other of the conditions, it seems wrong towards the public and posterity that they should be deprived of a great or beautiful building on trivial or ephemeral grounds. The right course seems undoubtedly to erect such a building, but part of the commission payable to its architect might be deducted and paid over as compensation to the first of those competitors who had observed the conditions. In any case the latter should receive a substantial compensation, and any course of procedure which might be adopted by the committee in such a contingency should be clearly made known to the competitors from the first.

Now, where the public generally knows little of the extent and character of the architect's work, the attitude of the public towards the architect himself is, I believe, one of distrust. This is the underlying sentiment, the fundamental note, engendered both by prejudice, hearsay and experience. We may be inclined to deny this; we certainly should wish to be able to do so. But is it not true? If it is true, what are the causes? There may be many, but I believe there are two chief ones—the distrust of the architect as included in the general distrust of the term “artistic,” and the particular distrust of him on financial grounds. As a red rag to the Britisher is the very word “artistic,” except as restricted to washed-out colours and painted drain umbrella stands, to which his wife and daughters, instigated by the various ladies' journals, have accustomed him. To him it means faddism, want of common sense, the sacrifice of comfort to architecture, an unnecessary outlay of money without any compensating gain. It means a complex system of gables and gutters, which are always needing repair. Sham half-timber work which warps off in the sun, small windows with a transome at the eye line, leaded glass so arranged that it distorts the outlook, ingle nooks with very uncomfortable straight-backed seats. Ask the Britisher himself, and he will say that if he has to go to an architect at all he will go to a practical one, and not one of those “artistic chaps.”

Now, architects have to blame themselves for this conception of the artistic. The Britisher has shrewd common sense, and his idea of a home is comfort; further, he has an idea that every building should be made as serviceable as possible for its purpose. He does not think it proper to make a building dark in order that its exterior should be in the style of Mediæval Gothic.

I am aware of the extreme excellence of much modern domestic work, and how possible these examples prove it to be to combine the greatest comfort with the artistic in its best and highest sense, but we must remember that the public judges

from the rank and file of buildings and the rank and file of architects.

Undoubtedly most architects set themselves sincerely to interpret their client's wishes, but there are others—a minority—who seek their own reputation at their client's expense, practically compelling him against his will to accept a certain design or certain features of that design.

Now, if a private client consults an architect and has definite wishes, it is the duty of the architect to respect those wishes if he feels they are wise and reasonable. If not, it is equally his duty to persuade his client against them to, so to speak, save him from himself. This is especially the case in an uneducated man, or one who is possessed of some fad of which he will probably tire. If the architect acquiesces without protest, his client will turn upon him afterwards and say, “It is true I wanted such and such, but I did not know much about the business, and I certainly did not foresee the effect of it. I came to consult you as a specialist, and I expected you to advise me. I was quite open to argument.”

If he cannot persuade his client, then he must carry out his wishes, and make the best of the circumstances, for it seems only reasonable that if a man is going to pay for the work he should have it to suit him.

With public work the case is different. The committee stands for the public, and the individual opinion of any member ought not to override that of the architect, who, presumably, better understands the subject. The architect, it appears, convinced of the rightness of his view, should then maintain his position, not dogmatically defending it so much as winning his opponents to his own side by persuasion. The fact is, both a client and a committee will allow themselves to be persuaded by their architect if they put confidence in him.

A further question remains to be considered, one of the greatest importance—the public distrust of the architect on financial grounds.

It is often said that if you go to an architect to build you a house you never know when the expense will end.

The client lays his wants before his architect, and tells him how much he is prepared to spend. Usually the sum is quite inadequate. Of course the architect tells him so. Not at all. He tells him that it will need economy, and implies that the design which he submits, and which meets his client's approval, can be carried out for the sum named. All goes well until the builders' tenders are opened, and then comes the disillusionment of the client. The lowest tender is half as much again as the sum to be spent. The architect anticipated as much, but he trusted to his power to surmount the difficulty when the time came. This misleading of a client as to the cost is of most frequent occurrence. How much more confidence a client would have in his architect if the latter told him at once that it would be impossible to erect the building for the sum named. Not at all. He would doubt the architect's judgment, and say that Mr. So-and-So had built a house of similar size for less money, and eventually he would consult another architect, who was willing to mislead him. Every architect knows that if he is thus frank and straightforward with his client he runs the risk of losing him. Notwithstanding this it is better, even as a matter of policy, and certainly as a matter of professional morality, to let the client know the worst. For you will in time obtain the rare distinction of being regarded as an architect whose estimate can be trusted, and that means in time a practice based on the most solid foundation.

A similar difficulty occurs in competitions. A fixed sum is stated, and competitors must design a building which can be carried out for that sum. Each competitor must give an estimate of cost. Some of them conscientiously endeavour to carry out the instructions in the spirit as well as in the letter. They have to somewhat cripple their design in consequence. Others make elaborate drawings of an equally elaborate building, and give every accommodation that could be desired. They arrive at the probable cost by dividing the sum allowed by the cubical contents of their building, and then, having found a constant— $4\frac{1}{2}d.$  a foot, perhaps—they multiply this by the cubical contents, and find to their satisfaction that it works out at exactly the sum they have to spend. This operation, if judiciously described in the report, is sufficient to throw the committee off its guard, and has even misled the professional assessor. In due time the builders' tenders are opened, and then comes this disillusionment of the committee, and the suppressed growls of the fellow competitors.

But if the public distrust the architect on account of the unreliability of his first estimate, how much is that distrust deepened when the bill of extras is presented.

Here, again, the architect has himself to blame. He cannot, perhaps, prevent extras altogether, but he can do much to spare his client from the extreme annoyance of an unexpectedly heavy bill.

The two most fertile sources of extras are the absence of a thorough thinking and working out of the scheme before the quantities are taken out and the subsequent alterations made by the client himself. Every building ought to be worked out



in  $\frac{1}{4}$ -inch detail and an exact specification written by the architect himself, and not by the quantity surveyor, and then, and not before, the quantities should be taken out. And if a client is inclined to order extras he should be kept informed by the architect of how the bill is mounting up, and he will not then be taken by surprise at the total.

All this takes much trouble, and a client in his hurry to commence work grudges the time spent in making details. Besides, the work may fall through, and then a large proportion of the work will have been done in vain, although the architect will certainly be entitled to claim payment for it.

Notwithstanding these drawbacks, the reputation of being able to build without extras is so unique and so priceless to the architect that it is worth some trouble to win. It will increase his practice more than any misleading shifts, or engaging to do work for less than 5 per cent.

There remains but one more subject for consideration. The public has heard from time to time some talk of illicit commissions associated with the practice of architecture. There have even lately been discussions on the subject in the Press. There may, of course, be no truth in it at all, but the public is naturally suspicious.

Now, while it cannot be doubted that the majority of architects, as upright and honourable men, would not stoop to receive indirect commissions, yet it is an equally undoubted fact that there are some who do. It is useless to disguise the fact as it is too well known. The opportunity of increasing his income by the acceptance of those commissions is no temptation to the well-established architect. But all architects are not well-established; some have a struggle to make a living, and others are just starting in practice and have not thoroughly grasped the moral question involved. Very severe blame, therefore, rests with those manufacturers and others who offer these temptations, and it is the duty of every honourable architect to endeavour to attach a public stigma to the name of any such firm. In fact, a black list ought to be kept by each local association, and the members of that association should undertake to boycott all manufacturers and tradesmen whose names appear on such a list.

But it is not from tradesmen only that architects sometimes receive indirect payments. It is a practice far too prevalent for architects to share in the quantity surveyor's fees. It is not, indeed, to the credit of either architects or surveyors that the practice should exist at all. The architect employs a surveyor to take out quantities, and for this the surveyor charges certain fees, of which he pays the architect a certain proportion. What for? If the architect has properly worked out his plans and written his specification, both of which are supposed to be included in his own fees, it gives him no extra trouble to employ a quantity surveyor. The payment is as much an illicit commission as if it were paid by a tradesman, although a specious defence is sometimes advanced by those who receive it on the score of custom. It is not that the surveyor is paid less for his work; the extra charge comes indirectly out of the client's pocket.

It is the architect, as the client's agent, and not the client himself, who employs the surveyor, and the latter is therefore largely dependent on the architect for his work. The same may be said of the builder, as it is usually the architect who invites him to tender. The client meantime, who is entirely ignorant of the preliminary methods of procedure in building a house, is often left in the dark by the architect even of the very existence of the quantity surveyor, and as the latter is paid not by the client but by the builder, there is no very evident way by which a client should get to know of his existence, or that he had been indirectly paying him through the builder.

Now, while I would most carefully guard myself from implying the slightest motive of dishonourable practice in thus keeping the client ignorant, I do say that the present system of an architect, practically on his own initiative, employing a surveyor, and the latter receiving payment directly from the builder, so that the amount of that payment is hidden in the builder's charges, is one which might readily lend itself to the practise of dishonesty and fraud. I do not say that the fraud exists, but that when the means for fraud exist without the likelihood of discovery, there is a probability that someone will sooner or later be found to avail himself of them.

The wise architect will explain everything to his client in the fullest detail at the very first. He will explain the functions of the surveyor, and mention the name of the one whom he proposes to ask. He will state his charges. He will also explain that if the building is not proceeded with the surveyor will none the less be entitled to his charges in full. And he will also consult his client as to the builders who should be asked to tender. And I think it would be wise if he arranged that the surveyor should be paid by his client direct. It may come to the same thing in the end, but in an evil world one must consider appearances.

It is only by the utmost frankness on the part of the architect, combined with loyalty and justice towards client and builder alike, and associated with the most assiduous care in

sparing his client unexpected or excessive expense, that that distrust to which I have referred, and which undoubtedly does exist, can be removed. That is a consummation devoutly to be wished. It devolves upon each architect individually to assist in its realisation.

Mr. Osborn Smith said he was present that evening because he expected to hear a very interesting paper, and he had not been disappointed. Mr. Bidlake had put his finger on certain defects in the architectural profession which he thought ought to have been pointed out before, and he was prepared to endorse the remarks the reader had made. One of the first items he heard was an allusion to the difficulty the average client had in understanding the vast amount of knowledge put on paper in relation to drawings. He himself took every opportunity he could of deluging his clients with drawings when necessary. In this way a difference would be seen in such a work as a house when put up by a speculative builder and one erected after the design of an architect. As regarded irregular commissions, there were undoubtedly quantity surveyors and architects who shared, but he had never come across them. The system was dying out, but he was bound to make an exception that it was much more prevalent in the provinces than in London. It could not apply to first-class surveyors, and even second-class, in London. It was not the custom, so far as his experience went, to pay architects in proportion for taking out quantities. If the drawings were prepared properly there was no occasion for an explanation regarding the quantities. The only remedy for indefinite plans was that they should be developed before they were put into the quantity surveyor's hands. If everything was made clear to the client, and he was told at an early date that such a person as the quantity surveyor did exist, a lot of distrust would disappear. He had much pleasure in proposing a vote of thanks, and was extremely glad such a good paper had been read before the Association.

Mr. Banister F. Fletcher seconded the vote, more especially as he differed on several points. Why should the public be ignored? Too much should not be expected from them, considering that architecture was one of the most difficult questions to understand. Even if the architect was looked to for guidance he was often found to be quite ignorant on the subject. New revivals might be said to be due to this ignorance. Proportion was a subject they knew little about. It was innate and could not be solved by the rule of thumb. The right use of materials seemed to him the very last thing the public would learn anything about, the study being very laborious. It was a question of a little knowledge being a dangerous thing. The more the public knew about a certain form of architecture the worse for it. The knowledge of form could not and would not be reasoned out of them. As regarded the payment by percentage it was not an ideal way of working, but it was a definite way and could therefore be understood by outsiders. It would be impossible to work out a building entirely on paper, so that it was almost out of the question to build without extras. The subject of commission was one that could hardly be treated in a paper of the present description. It did not affect the public and he thought it did not go on to the same extent as Mr. Bidlake had expressed, at least not in London.

Mr. H. W. Pratt also stated he was not aware that the question of sharing commission was so general as Mr. Bidlake had made out. For himself, he was dead against such practice, and wished architects would look at it from a conscientious point of view. Then, if the commission was not sufficient as had been first agreed to, let the architect go direct to the client and explain the case openly. Clients never had an idea of the amount of work involved respecting details in drawings, and it was sometimes believed that the architect made use of his competition drawings as working drawings. If a little more business capacity as regarded finance was put into the work he thought extras would be reduced, in fact found unnecessary. A man who sat down and thoroughly worked at his drawings need never go beyond any extras he had calculated. A close ring, composed of the quantity surveyor, architect and builder he had never heard about before, and thought it would create a false reputation of all three, but he hoped Mr. Bidlake, after hearing the discussion, would go away with the impression that in London they knew nothing about it.

Mr. E. W. Mountford thought the paper had rather brought into prominence things which might exist, but only in a comparative degree. He could not imagine that there was such a thing as the ring of which the quantity surveyor, architect and builder formed parts. Of course, builders were honest men, but looking at things from a different point of view, they meant to do good work, but then came the question of profit. They were entitled to a fair profit, but then builders differed on this point; 10 to 15 per cent. was a fair profit, but anything beyond this it was the duty of the architect to stop. The accepting of commission might be true to a certain extent. He (the speaker) always made the invariable rule that when commission was offered his connection with that firm ceased. In the past it



may have been a common custom, but he could not think now men would accept illicit commissions.

The Chairman said they had to recognise a fact which would clear the ground. Architects were never paid for the design, and the client did not understand that there was so much work and time spent in designing. The young architect was liable to sacrifice everything in order to get an idea of his own embodied in stone, and under these circumstances it could not be expected that a client would put up with all work. The client might even imagine the architect ought to pay him for being allowed to express an idea of the Renaissance. Architects were employed to carry out the ideas of clients, and yet the former took the opportunity for carrying out their own. This ought to modify their idea of the public. The adjudication of competitions was unsatisfactory. Why should not the decision rest with the competitors? But failing this, the Royal Institute of British Architects should adjudicate in any competition without charge, and this would be a great gain to the profession at large. As regarded estimates, they should learn to please their client and not to run into artistic fads at first. The client's reasonable wishes should be satisfied, and nothing ought to be started before everything was clear to one.

Mr. Bidlake said he did not wish to speak disrespectfully of the British public. He had a great pity for them, and, if they were ignorant, it was their misfortune and not their fault. Extras could be avoided on a large scale—not altogether perhaps. An architect who was constantly picturing the building should be able to picture the various parts of it, and thus he might be reasonably expected to know before the foundations were built. There was a distrust on the part of the public regarding building, and, if architects dealt frankly with their clients, it might disarm suspicion. There was, undoubtedly, the risk of a ring existing quite unknown to the client. The quantity surveyor, builder and architect could make arrangements by which higher fees would be obtained. There was a possibility of fraud, and when such a possibility existed some would be found to take advantage of it.

It was announced that at the next meeting on March 5 Dr. F. S. Granger will read a paper on "Greek Sculpture and Greek Legend."

### THE PHILÆ TEMPLES.

IN Lord Cromer's annual report on Egyptian affairs is found the following passage concerning the Philæ temples:—The work of excavating the temples at Philæ was completed in April 1896. The débris has been carefully removed from the whole of the area enclosed by the two colonnades, as well as from the open spaces to the south of the colonnades. The site of a Temple of Augustus at the north of the island and a small unfinished temple near the Kiosk were also excavated. Subsequently the Coptic village, which covers three-quarters of the island, was laid bare, the walls, stairways and doors of the dwellings being left, while the streets and interiors of the houses were cleared from the rubbish of fallen roofs and walls which encumbered them. To the great Temple of Isis nothing has been done beyond clearing out the crypts which were choked with rubbish. The foundations of all the principal buildings were examined by sinking holes to their bases. In every case the foundation masonry was found to be in a sound condition and extending to a great depth below the surface of the ground. No sign of any settlement was visible, although the infiltration water had saturated the subsoil in every direction. The main Temple of Isis is founded upon the granite rock. The only instance in which serious deterioration of the stone was observed was at the bases of the columns of the eastern colonnade, which were buried in the rubbish of the Coptic village. Here the contact with the salted earth had caused considerable corrosion to the stone. This portion of the buildings has now been restored. Repairs have, however, been as few as possible and have been limited to replacing dislodged blocks and drums of columns. Other fallen stones belonging to each separate structure have been collected together, numbered and catalogued. Great progress has also been made during the past year in the work of preserving the Karnac temples. The engine and pumps presented by the Egyptian Exploration Society proved of the greatest utility.

### THE NATIONAL TRUST FOR PLACES OF HISTORIC INTEREST.

A MEETING of the executive committee of the National Trust was held at No. 1 Great College Street, Westminster, on Wednesday, 17th inst., Sir Robert Hunter in the chair. It was determined to take steps to initiate a regional survey of the country, and by means of local correspondents initiate the compilation of a catalogue of buildings, objects and places of historic and archæological interest, with a view to their proper protection and preservation. Such a work is

urgently needed in this country, and it is hoped that it may eventually be possible to obtain the recognition of the Government and its aid in the performance of such duties. A report by the treasurer showed that the work of repairing and making sound the old clergy-house at Alfriston (which has recently been acquired by the Trust) had had to be suspended on account of lack of funds; a sum of 200*l.* is still needed to put this interesting edifice into a proper state of repair. It was announced that the purchase of the cliff situated opposite Tintagel Castle in Cornwall (which has been recently acquired by the Trust), was now complete. This fine headland, comprising 14 acres of down, is now, therefore, in the hands of the Trust, the property of the nation for ever. The secretary was able to report that the circular issued by the Trust, in conjunction with three other societies, suggesting the acquisition by local authorities throughout the country of a piece of land or place of historic interest or natural beauty as a "Victoria Open Space" in commemoration of the Queen's long reign, had aroused wide-spread and sympathetic interest.

Finally, the committee were unanimous in agreeing to resist as strongly as possible the Hastings Harbour District Railway Bill, on the ground of the serious interference to which it will give rise with the most charming features of natural beauty in the district.

### TESSERÆ.

#### The Arts and Queen Elizabeth.

THE prejudices to which the zeal of the Reformation gave birth against painting and sculpture and their consequent state of humiliation in England has been but too sensibly felt by artists. Among prejudices can be comprised that of false judgment of the value of the art, not formed on a rational consideration of its real qualities, but first imposed by casual circumstances, and afterwards, by their continuance, grown into habitual opinion. Of the state of these opinions soon after the time mentioned as the era of their commencement, an idea can be formed from the words of Stow, who wrote his annals in the reign of Elizabeth:—"Of the art called of Aristotle graphice, and in English paynting, there be in this citie cunning masters for either shadding, pourtraying, counterfetting, tricking, paynting, enlumining or limning. But this is an art now not accounted ingenious or fit for a gentleman, by reason that it is much fallen from the reputation which it had aunciently; which, whether it be for the unworthinesse or unskilfulnesse of the persons exercising and practising it in this age, or for the abuses and deceipts used by paynters, or for the scandall of images and idols . . . or for what other cause I know not well; but sure I am, it is now accounted base and mechanically, and a meere mestier of an artificer and handy craftsman. Insomuch as fewe or no gentlemen, or generous or liberal person, will adventure the practising this art." This statement may appear to many too severe, and even exaggerated. There are some instances of regard shown to painting at various periods after the Reformation; and Elizabeth herself, although issuing her injunction against all pictures in churches, seems at other moments to have been inwardly desirous of protecting them. But the general aspect of the arts after the Reformation is correspondent with the account here given. The change which they suffered in public opinion, from the honour with which they had been formerly treated to the degraded state in which Stow reports them, and to the light in which they were then generally viewed, is certainly very striking. Stow's defence of painting, immediately following, is scarcely less singular:—"But inasomuch as Aristotle recommendeth it to his statesman or politician, and because it is numbered among those arts which are necessary for a gentleman and for a courtier, by Count Baldassar, and in regard also that the heraulds (who be gentlemen by their places) must be skilful in this art, I must preface somewhat in the defence or excuse of it."

#### Sir J. Reynolds as a Painter.

Reynolds stands distinguished as a great painter because his mind discerned and his skilful hand displayed the expression and feelings of nature in every various stage and condition of life. He sought and disclosed every grace of youth and beauty; he gave dignity to the noble, respect to the matron, innocence and mirth to the child. His pictures frequently reflect back the strong impression made on his mind by the eminent beauties of former great masters; and the attitudes of his figures, as well as the ideas of his compositions, are sometimes evidently borrowed from others; but his powerfully combining mind rendered everything which he touched his own. In portraiture, Reynolds, no less than Titian himself, excelled in the due and skilful selection of the appearances which nature holds indiscriminately forth to view. With him, not every peculiarity, not any vice of incidental habit, affectation rarely, deformity never, were requisite to produce the complete likeness of the person who sat to him. He excluded the transient and stamped on his canvas the permanent character



of the countenance; he painted the mind; and it is by these distinguished powers of perception and expression prevailing over every other excellence of his works that his superior eminence as a painter is finally established. As an historical painter it cannot be denied that Reynolds remained imperfect; and it is not now to be calculated what might have been his accomplishment of that province of the art if youthful competition had conducted him to it and if opportunity had been presented to foster his exertions. Who shall say to what disclosure of his mind the proposed plan of adorning St. Paul's with scriptural subjects might have roused him? His powers of conception occasionally, and of execution always, appear to have been equal to the highest enterprise. The fame of Reynolds is acknowledged worthy to have mixed with that of the proudest name that has ever adorned the records of our history. But he shines in solitary glory. Phidias, illustrious as the sanction of ages has made him, borrowed splendour from the favour of Pericles, under whom he rose, and Raphael from that of Julius II. and Leo X. The fame of Apelles became tributary to Alexander, and that of Titian to Charles V. The English painter had no patron. The coldness or the magnanimity of State neglect has left to Reynolds undivided honours.

#### Thorney Island, Westminster.

It was about 470 yards long and 370 yards broad. On the east it was washed by the Thames, a branch of which entered at Canon Row, or as it was probably called from this cause Channel Row, almost close to the south wall of the Privy Gardens, and at the east end of Manchester Court, then running westward, it intersected King Street and flowed down Gardener's Lane, from the west end of which its course ran to the south by a moat called Long Ditch, by the present line of Princes and Delahay Streets. The stream crossed Tothill Street to the west of the Gatehouse, and sweeping to the east continued its way under the south wall of the infirmary garden in College Street, and so fell again into the main stream. This island comprised the precinct of the Abbey and Palace, which were further defended by lofty stone walls, those on the east and south of the college gardens being the last remains of such defences of a later date. They were pierced with four gateways—the first in King Street; the second near New Palace Yard, the foundations of which were seen in December, 1838, in excavating for a sewer; the third opening into Tothill Street; and the fourth near the mill in College Street. The precinct was entered by two bridges. One crossed the water of Long Ditch at the east end of Gardener's Lane, having been built by Queen Matilda, the consort of King Henry I., for foot-passengers; the other was situated at the east end of College Street, underneath the pavement. It connected Millbank with Dirty Lane.

#### Ancient Spires.

Of Norman pyramidal spires England cannot now produce one single specimen. The towers of Southwell in Nottinghamshire were once surmounted by two such spires, and Rochester Cathedral before the innovation by Cotingham presented to us a venerable low plain spire covered with lead, which, though not perhaps of Norman date, was probably coeval with its base of early English structure. Low conical cappings are still also to be met with on the tops of turrets, as fortunately yet at the west end of the interesting building just alluded to. Bentham has stated that the first spire built in this country was that of Old St. Paul's, and Dugdale says a clocher or tower for bells was finished there about the year 1221. But whether he alludes to a detached campanile which stood in the northern part of the churchyard and was pulled down in the time of Henry VIII., or to the spire which surmounted the central tower of Old St. Paul's, it is not easy to determine. If we may credit the etching by Hollar, this spire, the highest in Europe, was octagonal, and appears if coeval with its tower, which had the lancet windows of the thirteenth century, to have been equally subjected with the south door and other portions of the old foundation of King Ethelred to the barbarous incongruities of Inigo Jones and his coadjutors in the expulsion of our estimable English architecture.

#### The Iron Age in Denmark.

Antiquities from the Stone and Bronze period occur very plentifully in Denmark and the south-west part of the present Sweden, but very rarely or only in single specimens in the other parts of Sweden and the whole of Norway. With regard to the objects from the Iron period the circumstances are wholly reversed. The swords and other weapons characteristic of that period, the oval clasps for the breast, the mosaic beads, &c., are so common in Sweden and Norway that traces of them are discovered in nearly every barrow which has been examined there; on the contrary, in Denmark (with the exception of Bornholm, which in an antiquarian point of view is connected with Sweden) they occur but very rarely indeed, when compared with the objects of stone and bronze. In places of historical note, for instance, as Leire and Jellinge, which we must con-

sider as having been tolerably well peopled in the Pagan times, swords and trinkets belonging almost exclusively to the Bronze period alone have been exhumed, but none from the Iron period, although numerous graves in the neighbourhood have been opened. This can scarcely be a matter of accident, since the Royal Museum of Northern Antiquities in Copenhagen, which during a series of years has received accessions from different parts of the country, and from many hundred barrows, possesses only a very few weapons of iron which are known to have been found in heathen graves, while, on the other hand, it exhibits several hundred swords and daggers of the Bronze period.

#### GENERAL.

**Lady Wallace** has presented the invaluable collections belonging to her husband, Sir Richard Wallace, to the nation on condition that they are kept in a special museum unmixed with other examples of art.

**The Members** of the Architectural Association, by courtesy of the architect of the County Council, Mr. Blashill, have paid a visit to the large scheme of improvements being carried out in Shoreditch. Mr. Owen Fleming conducted the visitors over the buildings, and gave a short address embodying the main points of the scheme. The members of the Association then inspected the buildings, which are in various stages of completion. Great interest was shown in the workmanship of the works department.

**The Members** of the Edinburgh Architectural Association met on the 17th inst. in the Royal Institution, Princes Street, Dr. Rowand Anderson, president, in the chair. After the transaction of formal business, Mr. Henry F. Kerr read a paper upon Elgin Cathedral, illustrated by limelight views.

**The Society of Antiquaries**, on the motion of the Rev. G. W. Minns, seconded by Sir Samuel Montagu, Bart., M.P., have passed a resolution urging upon the local authorities of Southampton the importance of preserving ancient landmarks of historic interest while the scheme for the removal of certain dilapidated buildings to insure the sanitary welfare of the borough is in progress.

**Sir J. Blundell Maple, M.P.**, has promised to rebuild and extend to three times its present size North London, or, as it is better known, University College Hospital, in commemoration of the Diamond Jubilee. The cost will amount to 100,000*l.* or 120,000*l.* The plans for the new building have been prepared by Mr. Waterhouse, R.A.

**The Next Ordinary Meeting** of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, March 1, at 6 P.M. prompt, when a paper will be read by Mr. W. E. Willink, entitled "Mediæval Trade Guilds," with limelight illustrations.

**Professor F. M. Simpson**, of University College, Liverpool, delivered a lecture in the Corporation Galleries, Glasgow.

**Mr. Matthew Webb** will read a paper on "Gesso" before the applied art section of the Society of Arts on Tuesday next.

**M. Chaucard**, the owner of Millet's *Angelus*, has given 29,000 francs for a drawing by Moreau le Jeune out of the Goncourt collection. The subject is a review of troops by Louis XV.

**M. Edouard Garnier**, the conservator of the Sèvres Museum, has completed a new catalogue of the collections under his charge, which contains about 700 pages, with reproductions of marks, monograms, &c. It is a true history of faïence.

**Mr. Philip E. Pilditch** (Messrs. Pilditch, Chadwick & Co.), architect, surveyor and valuer, has, in consequence of the projected demolition by the Government of Parliament Street, where the firm has practised for the past twenty years, removed to No. 2 Pall Mall East, Charing Cross.

**The Second Visit** of the session of the Edinburgh Architectural Association takes place to-morrow, and will be to the North British Distillery, Gorgie Road.

**Mr. A. T. Cooke**, of Worthing, is the architect for the important additions which are about to be carried out in the existing assembly-rooms of that town, a company having been formed for the conversion of the building into a modern theatre. The alterations will be of an extensive character, and will comprise the erection of a new stage and proscenium, a dress-circle, and the building of a large hall for dances, banquets, &c., with a handsome frontage to Bath Place. It is hoped that the work will be finished in July next.

**Lord Derby** opened on the 20th inst. a village hall which his lordship has presented to the village of Knowsley. The building, which has been erected by Mr. James Pilkington, of Rainford, is in a convenient situation immediately fronting the church and schools. Lord Derby laid the foundation-stone on May 29 last year.

**We have** been requested to announce that the Lord Mayor has consented to open in State the National Building Trades' Exhibition at twelve o'clock on Saturday, March 20.



# The Architect.

## THE WEEK.

THE exquisite ornamentation of Celtic manuscripts has been a surprise to modern designers, and so competent an authority as the late Sir M. DIGBY WYATT admitted he was puzzled with some of the effects. An explanation of the process employed has been given in Dublin by the Rev. Dr. BERNARD, one of the Fellows of Trinity College. He said that no modern vellum was equal to the best specimens of the vellum of the Middle Ages. In Ireland and England the parchment or vellum used was, as a general rule, thicker and heavier than that used in France and Italy. The Irish ink was very black and almost indelible, and seemed not to be made of substances now in use for the purpose. Reeds were first used for writing on vellum, and quill pens afterwards. It would be interesting to know what the actual value of such work executed by scribes would be, but unquestionably in the pre-commercial period these books could not be written for money. Mr. BERNARD might have added that, however excellent the vellum and colours employed, the Celtic scribe was occasionally as careless in his work as any modern member of a trades union. The Irish school of illumination was described by Mr. RUSKIN as without a rival, and seemed as if it might be advanced to the highest triumphs in architecture and painting. But it had one flaw; it was incorrigible. As evidence, Mr. RUSKIN referred to a figure of an angel by an Irish missal painter, who in happy complacency put red dots into the palms of each hand and rounded the eyes into circles, but left out the mouth. That arrested development Mr. RUSKIN considered was indicative of points of character which still diminish the national power of Ireland.

In Scotland papal relics might not seem to be of much interest, but Dr. ROWAND ANDERSON was on Tuesday enabled to fascinate the Students' Union of St. Andrews University with a cast of the head of Pope BENEDICT XIII. His Holiness when at Avignon in the early part of the fifteenth century received HENRY WARDLAW, who came on a mission for the purpose of obtaining facilities for the education of Scottish students in their own country instead of in foreign schools. The Pope gave encouraging sympathy to the project. In order to aid in its restoration HENRY WARDLAW was appointed bishop of St. Andrews and papal legate in Scotland. WARDLAW was able to gather a staff of honorary professors, and he opened a wooden building known as the Pedagogue, which was the first college in St. Andrews. In 1412 the Pope granted a charter conferring on it the privileges of an university. BENEDICT was afterwards deposed by the Council of Constance, and then retired to the castle of his family, the LUNAS, at Peniscola, in Spain, where he died. He was buried in the chapel, but six or seven years afterwards his remains were removed to Illueca, in the province of Zaragoza. Dr. ROWAND ANDERSON having visited Illueca found that DE LUNA's family had specially constructed a small chapel to receive the body of the Pope, and it lay there, surrounded by twelve lamps kept constantly burning, till the year 1536, when the chapel was closed. A priest went in and said mass for the repose of his soul. This act was condemned by the Church, as it was unlawful to pray for the soul of a heretic. It remained built up till in the year 1810 the French overran the country on their way to the siege of Zaragoza. The castle was sacked, and the chapel broken into in the hope of finding treasure. Indignant at finding nothing but the mummified body of an old man, the soldiers threw the body out of the chapel, and it was broken up. Part of the head was all that could be recovered, and it was then taken to Savinan, about nine miles from Illueca, and deposited in the house of the Conde DE ARJILLO, one of the collateral descendants of BENEDICT, and there it still was. All that was mortal of this most eminent man was now enclosed in a small, shabby wooden casket. The head is not merely a skull, it is a mummified head. One could see the

configuration of the head, which was very deep, the brow low but wide, the eyes deep set; but the most striking feature was the very high and prominent nose. The lower jaw was unfortunately lost, but from what one saw one could imagine a face keenly intellectual and highly sensitive, refined and distinguished, a face to command respect and admiration, indicative as it was of loftiness of sentiment, of nobility of character and of uprightness of life. Dr. ANDERSON obtained permission to take two modellers with him when he visited Savinan and to bring away a cast of the head. At the close of the lecture Dr. ROWAND ANDERSON presented the Students' Union with the cast. Principal STEWART made a suitable acknowledgment.

THE question of ownership of plans rarely arises without giving rise to unnecessary acrimony. At Margate the School Board have had a wordy contest over the subject. A school was lately completed from the designs of Mr. DALBY REEVE to the satisfaction of the Board, but when it was proposed to pay him the balance of his fees it was made a condition that the cheque should be held until the plans were delivered. One reason given was that so long as Mr. REEVE retained the plans any new work at the schools would have to be given to him. Some members considered the stipulation was not fair to an architect against whom there were no complaints, but after an angry discussion the resolution about retaining the cheque was adopted by a majority of two votes. It is to be regretted that in all such cases law is not distinguished from custom. Unless there is a clause to the contrary, the architect, so long as he is regarded by the courts as the agent of the building owner, cannot uphold a claim to the retention of his plans after all his fees are paid. But as a rule plans are not demanded by the building owner or employer, and in very few cases has any inconvenience followed from allowing the architect to preserve them. In the Margate case if a new architect had to be employed to carry out additions, he would not be likely to accept a lower rate of commission if the Board could allow him to refer to the original plans.

ACCORDING to the British Consul there are several qualities of very good marbles in the province of Verona of variable tints between the red-purple and red-yellow colours. The most esteemed are those called Broccatello and Nembo, which are obtained from the mines existing at Sant' Ambrogio di Valpolicella and Fiumane. The red marbles of the Commune of Grezzana for flooring and decorative purposes are also in great demand, as well as the stones coming from the quarries of Bosco and Chiesanuova. There are also quarries of fine marbles in the Communes of Caprinico Veronese, Prun and Torri del Benaco. The cost of the marble is moderate and varies according to the quality and quantity ordered. There is a considerable exportation of such marbles to America, Great Britain, Austria and Germany, but the greatest part is used in the interior. There are also numerous quarries of hard stone and tufa in the said province, which are used for building and other purposes.

THE restoration of the pinnacles and battlements of St. Mary's Church, Oxford, was again considered on Tuesday. Professor CASE proposed a return to the plans originally proposed by Mr. T. G. JACKSON in 1892, and accepted by the council, which were not only historically and architecturally preferable, but would result in a considerable economy of money. The President of Trinity pointed out that the House was incompetent to discuss questions of architectural detail, and deprecated the practice of heckling their architect. Opposition on economical grounds he sympathised with, but if the work was to be done at all it should be done well. Mr. HENDERSON asked what Professor CASE would think if Congregation were called on to decide by decree some debatable question in moral science. Finally the amendments were rejected by thirty-five to nineteen, and we suppose there will be no further obstacle to the realisation of Mr. JACKSON's later designs.



## EAST SUTTON CHURCH, NEAR MAIDSTONE, KENT.

BY THE REV. J. CAVE-BROWNE, M.A.

THE spirit of church restoration is indeed in the air. It is permeating the whole country. Not only our cathedrals and larger parish churches, but the smaller ones too, in retired country villages, are being affected by it. The zeal and energy of the laity, in co-operation with their clergy, are verily effecting a revolution. The little village church of East Sutton, near Maidstone, is a pleasing illustration of this. No one who has chanced to see this building within the last few years (say a year or so ago) can fail to be struck with the wonderful change which has lately come over it. It now presents a welcome example of what a conscientious restoration of such a building can produce—and a noteworthy example too. Instead of everything old and out of repair being summarily swept away to make room for “modern improvements” (?), every feature long since well-nigh obliterated, every trace of Mediæval art long buried beneath layers of mortar and whitewash and paint, has been carefully uncovered and brought to light.

It is but a short time since the entire area of the church was crowded and blocked up with high pews of painted deal, comfortably cushioned and hassocked; the walls smoothed off in plaster, once perhaps white, but then toned down with waterstains and mildew and moss; the windows partly bricked up at the bottom to save the expense of re-glazing; the mullions too bulging out of the perpendicular, and threatening to fall; while over all spread a barrel-like ceiling of plaster and whitewash, everywhere betraying signs of leakage through decaying lead. The font also, judiciously thrust out of sight, seemed but little more than an octagonal mass of mortar. The whole church looked as if utterly uncared for and forlorn.

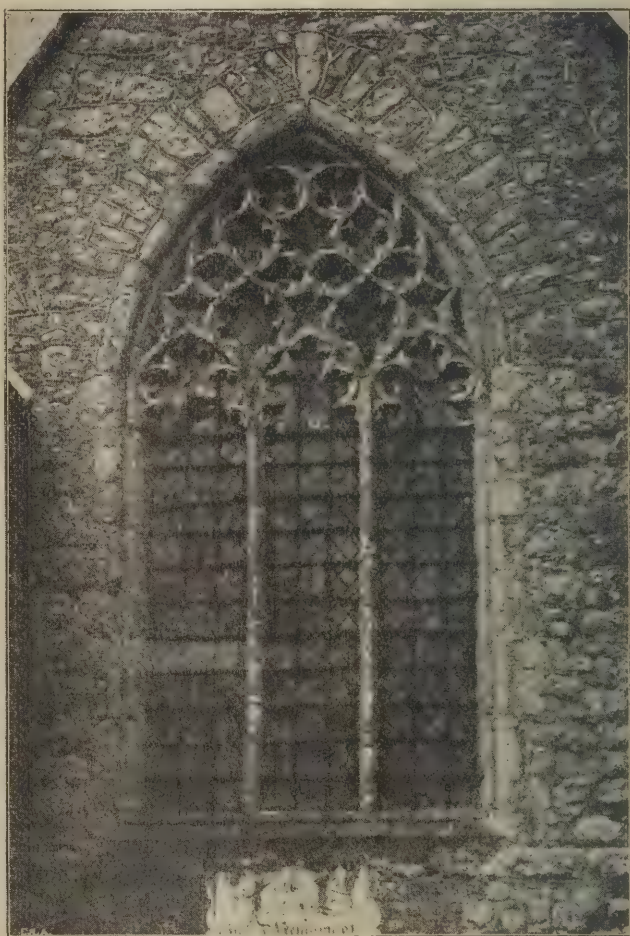
Happily for the parish it had as its churchwarden a man (who we hope will forgive our mentioning his name), Mr. W. R. WARD, who was deeply imbued with the sense of veneration for what is old, and the faculty for appreciating ecclesiastical art. It has been almost entirely through his persevering zeal and untiring energy that this now graceful little church has been restored to almost its pristine beauty. The pews have disappeared and the entire area is covered with open seats of oak, while all round the range of the side walls has been brought to light a line of stone seats with moulded edges. The walls, stripped of their countless coats of mortar and whitewash, have disclosed their long hidden treasures of Mediæval skill and taste. In the little chancel, now relieved of its cumbrous monuments, which have been judiciously placed elsewhere, appeared in either wall a window of which not a trace was visible from within, with jambs and soffits more or less complete. That on the north retained its original form, and has now been filled in with stained-glass presented by Mr. LAVERS, of the firm of LAVERS & WESTLAKE; that on the south side had evidently been partially blocked up when the south aisle, known as the Filmer Chapel, was added. While the arch itself and the upper portion of the window was closed, an opening, either as a lychnoscope or squint, was left open at the base, which has been carefully preserved. A piscina too and an aumbry were discovered in the chancel, and restored; as also in the adjoining Filmer Chapel.

In the north wall of the north aisle was found a beautifully moulded doorway opening into a newel stair in the buttress which led to the rood-loft, of which the entrance door remains. Of the rood-loft itself only portions were found, which had been in a spirit of the grossest vandalism utilised for ornamenting the sides of the family pews. Then the font, which has been described as seeming to be little more than a mass of mortar, has been restored to its pristine form, with apparently a Norman base and four rounded columns supporting an octagonal bowl of Kentish ragstone, having on each alternate face a slightly recessed window tracery of the fourteenth century.

Perhaps the most choice, as it is the most conspicuous, object inside the church, is the western arch leading into the tower. Here, as elsewhere, the thick mortar, which for a time overlaid it, has helped to preserve the graceful mouldings of the jambs and arch, which tell of the fourteenth, if not thirteenth-century work. And lastly, the little

porch on the south has revealed its long hidden treasures in the form of two small windows, one in either wall; these have been carefully restored and filled in with glass, representing the two patron saints of the church, St. PETER and St. PAUL, one on either side. And on the right hand of the entrance door is opened out the stoup for holy water, in good preservation.

Thus is the whole aspect of the church changed. From being a desight and a disgrace, it has become an object of beauty and justifiable pride. The question naturally suggests itself, “How has all this been brought about?” The parish is very small, and by no means wealthy, while, like so many of the grandest estates in the county, Sutton Place, the mansion adjoining the church, has for some years been occupied by a succession of tenants who have no ancestral, and very little personal, interest in the parish church. The metamorphosis which has taken place here may be mainly, if not altogether, ascribed to the persistent efforts of the churchwarden already mentioned. The patronage of the church, which is only attached to and little more than a chapel-of-ease to the neighbouring parish of Town Sutton,



EAST WINDOW, NORTH AISLE, SUTTON CHURCH.

or Sutton Valence, lies with the Dean and Chapter of Rochester, to whom it was transferred on the dissolution of the Abbey of Leeds by HENRY VIII. On a representation being made to that chapter, as being “rectors” of the parish, the energetic Dean HOLE made a personal inspection of the building. The appeal of those dilapidated windows, the leaky roofs, the sad state of the floor, the foul condition of the graves—for they were not vaults—was irresistible; and the Dean and Chapter recognised fully and freely their responsibility, and made a liberal grant towards the restoration, while the trustees of the Filmer estate also contributed handsomely. Thus the good work was started, and an interest created among friends and neighbours soon helped to swell the fund. But, the work once begun, every day seemed to bring forth fresh demands, as it disclosed fresh defects and fresh beauties. The dilapidated state of the walls rendered it necessary to remove all the mural tablets and monuments; and as step by step the workmen



went on clearing away the surface mortar, fresh discoveries were made. One after another the architectural treasures were being brought to light, each discovery stimulating further research; until the present results were attained.

While this was in progress, the deplorable condition of the east window of the chancel created a fresh demand. Here a very poor specimen of seventeenth, or perhaps eighteenth-century taste had been substituted for what the curves of the arch and the jambs which still remained showed to have been a graceful window of the Decorated period. This window, out of condition as well as out of keeping, was a painfully conspicuous eyesore, especially in the midst of so much beauty. This was mentioned to a widow lady who with her husband had at one time lived in the parish, and she offered to replace the window and to fill it with glass as a memorial of her husband. The design of the stonework was taken from a window of Merton College, Oxford, which was thought to correspond nearly with the original one, and the glass, representing the leading events in Our Lord's life, produced by Messrs. LAVERS & WESTLAKE, has now been inserted.

Although so much has been done, and so well done, more still remains before the church can be said to be perfectly restored. At the east end of the north aisle is a beautiful specimen of Decorated tracery, a window of repute far and wide, and in the north wall of the same aisle one of almost unique character, containing some striking Flamboyant tracery. But both of these windows are in a deplorable state of decay; the mullions are out of the perpendicular, the tracery crumbling away, and the whole threatening to collapse. It is to save these that the enthusiastic churchwarden is now pleading for funds. He appeals to those who love Mediæval art—to archaeologists generally—to come to the rescue. Such gems should not be suffered to perish. Who will help to save them?

#### THE PROSPECTS OF BUILDING.

THE oldest architect or contractor in Great Britain would not be able to recall a time when so many projects of building were announced as within the past few months. The number, too, is likely to be increased. There is, however, nothing surprising in so general a desire, for it was anticipated. The year 1897 is deserving of celebration as marking not only an auspicious event, but one that is almost without precedent. There are few kings or queens in ancient or modern times who have reigned for sixty years, and fewer still whose reigns could be considered as continuous incentives to loyalty. The British Empire has had many reasons for satisfaction through escaping from the general lot of nations, and may well congratulate itself on possessing a Sovereign of whom it has been truly said, "A thousand claims to reverence closed in her as Mother, Wife and Queen." It is a privilege to have lived on an occasion which may be considered as unique, and it is no wonder that in obeying an instinct which seems as old as the human race, there should be a desire to set up memorials which shall testify to the feeling that is so general in the present time.

The very depth of that feeling is suggested by the character of the proposed memorials. On an ordinary occasion we may endeavour to imitate our more volatile neighbours and erect a statue, although we know by sad experience it will neither be a thing of beauty nor even a temporary joy. But on exceptional occasions the nature of our race must be expressed, and as we prize our men and our institutions, our Church as well as our Government, for qualities which can be turned to account for the good of the public or of individuals, so in memorials that can be considered as national we expect the quality of utility to be paramount in them. Now and then a case of noble extravagance is tolerated, as in the Hyde Park memorial, but, rightly or wrongly, it is believed that a great reputation cannot be more worthily represented or preserved than by some creation which recalls the object by its beneficence.

The general desire to commemorate Her Majesty's reign by buildings is therefore a testimony of the affection of British subjects, and should accordingly be encouraged. In saying so we trust that nobody will consider we are undervaluing sculpture. There are times when an amor-

phous figure may serve as a record, for apparently the latest representation of JOHN BRIGHT remains unbroken; and although the likeness of himself which the Duke of WELLINGTON loved to contemplate from his windows could not be tolerated in London, it has found a refuge at Aldershot; but the sculptor's art on an unusual occasion like the present is most fitly employed when it becomes subservient to architecture. Let us have reliefs and statues if they are considered necessary to express the character of memorial buildings to future generations, but the sculptor who is most eager to be in unison with the spirit of the time would allow that a simple word such as "Victoria" or "Queen" or the date "1897" would be adequate to suggest why those buildings exist.

The sincerity of the feeling which will make buildings indispensable for commemorating the current year is further suggested by one remarkable circumstance. Amidst the countless projects which arise in cities and towns, there are many which signify local needs. The changes in the relations between various classes of people, the new requirements which follow an extension of education and a diffusion of a knowledge of sanitation, and the exigencies which modern theories of sociology create, give rise to buildings of kinds which were unknown a generation ago. Who could then have imagined that public reading-rooms would be opened in the busiest parts of the City, or that an East End vestry would expend 70,000*l.* in public baths, or that art galleries would be established in provincial towns? Refinement, physical exercise, entertainments, have to be provided at the expense of ratepayers. If a large provincial town will establish a band and a concert-room, smaller towns will long for similar luxuries. Accordingly, among the buildings which are proposed there is much variety. But from a comparison we have made among the projects, it seems to us that the class of buildings which is most generally sought may be described as one for the solace of bodily pain, such as hospitals, infirmaries, convalescent homes, &c. There is an appropriateness in the selection. They are all suggestive of woman's help, for when, as the poet says, pain and anguish wring the brow, the most whimsical woman becomes a ministering angel. How can a woman's reign be more fittingly celebrated than by creating opportunities for the exercise of feminine devotion to duty? It should also be remembered that such institutions derive little support from public funds. They have to depend on the liberality of individuals, and by creating them now there is no departure from the ordinary course of philanthropy. That is likewise an advantage.

The kind of building to be selected must of course depend on the circumstances of the locality and cannot be defined. It is impossible to erect one that cannot be turned to account, although the original purpose may have to be altered. But it cannot be too strongly impressed on committees and other authorities that some expedition should be displayed in the preliminary engagements. It may not be feasible in every case to imitate the action of Sir BLUNDELL MAPLE, who has made himself responsible for the immediate payment of 120,000*l.* in order to have University College Hospital erected. But in that promptitude we can see the act of a thorough and most successful man of business. He knows that shilly-shallying never leads to prosperous results, and having decided on a course of action he resolves to deprive himself of the opportunity to revoke. It would be of the greatest advantage if a similar course of action were followed with all memorial buildings. Architects require time to prepare plans, surveyors for taking out quantities, and builders cannot prepare their tenders without a tedious process of calculation. In each case there may be hurry, and architects, surveyors and contractors are prepared to make a sacrifice of their convenience, but it is always well to remember that more or less deliberation at the beginning of arrangements for a building often removes obstacles to its satisfactory completion. Although clients often think otherwise, plans cannot be prepared for several buildings simultaneously; in every one there are special conditions, and they cannot be met by stereotyped designs. If promoters of building projects will think over these facts they will be spared disappointment.

It is not always easy for architects to take the initiative, but we expect that this year there will have to be departures



from the usual procedure. As it will be supposed that all efficient practitioners are overwhelmed with commissions, and as there will often be no time for competitions, it will not be prudent to assume that the most eligible architect will be selected in every case without any effort on his part. The course to be followed must be settled individually, but there is likely to be often a risk that through a regard for the dignity of the profession by competent architects men of a different class may secure many a building.

As for contractors, there is no use in offering them advice. They have to depend on the caprices of their workmen, and it is much easier to foretell the condition of the weather daily during the summer and autumn seasons than to imagine what the British bricklayer, carpenter, slater, or plasterer will do a month hence. There are, too, the men who are not directly paid by the contractor, and who are also liable to be led astray. But their weakness can be provided against by laying in an adequate stock of building materials.

The manufacturers of materials, and dealers in them, will find they have also to grapple with an altered condition of affairs during the year. As we have said, there is not likely to be many competitions owing to the pressure of time, and for the same reason men who have to depend for business on architects can not expect to be always remembered when an opportunity arises to use their goods. Architects must be excused if they overlook past services and specify the goods of men who understand the occasion, and have brought themselves into notice in order to take advantage of it. This is not a year when architectural ability can afford to be concealed, and manufacturers and dealers must adopt the same course, and seek for publicity if orders are desired.

We cannot conclude without a word to another class who may not be supposed to be affected by the excitement of the time—we mean ordinary building owners. If they are prudent they will not lose a day in completing arrangements for the erection of any buildings they have in view. As we have pointed out, memorial buildings are likely to be started to an extent that is without precedent, and what with stipulations of contract, trade disputes, and the difficulty of obtaining manufactured articles and materials, contractors may be compelled to decline ordinary contracts. To obviate so unsatisfactory a possibility it is best to leave as little as possible to future contingencies.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### FITTINGS.

**Switches.**—It is one of the most important points in connection with installations that the switches should be of such a design that they do not arc or deteriorate rapidly, and that they are of ample size for their work. A good switch should be solid, and have large contact surfaces. The movable part should rub over the fixed part, as by this means the surfaces are kept clean, and there should be a considerable force pressing them together. The parts carrying the current should be massive, and there must be no signs of heating. The break should be long and quick in ordinary installation switches, and there should be only two positions in which the movable portion will remain, *i.e.* "on" and "off."

Main switches need not be very quick break; but the movement should be decided. They are seldom used when any heavy current is flowing, and consequently there is no danger of arcing. The contact surfaces should, however, be large, and the pressure between them heavy. These precautions are necessary, because main switches have to carry heavy currents, and are so seldom used that bad contacts are liable to occur.

Double-pole switches, if used, should be of as good design as single-pole, and extra care must be taken to insure that both poles are made and broken at the same instant, otherwise bad arcs may result. The insulation between the poles must be high, and this should be tested before fixing.

Switches in which the current passes through the pin or pivot are to be avoided, and all good switches are arranged so that this is not the case.

The base of the switch should have a high insulation, and no screws, &c., for fixing the brass contacts should be left projecting through the base at the back, but they must be countersunk and covered with some insulating material such as paraffin wax.

With reference to the material for bases, it is necessary that one be chosen which is strong, unflammable, not affected by moisture or high temperature and which is a good insulator. There are very few materials which fulfil all these conditions, and the materials used almost universally are porcelain and slate. There is a decided preference for the first-named amongst engineers. Slate has often veins of mineral ores running through it, and in consequence its insulating properties cannot be relied upon. On the other hand, porcelain cannot be worked, and all screw-threads, holes, &c., have to be moulded, and the material often warps during preparation.

**Fuses.**—The fuse and fuse block should be the subject of far more thought and be attended to much more carefully than at present.

The fuses so generally used, consisting of a piece of tin wire clamped under two screws, often without washers, are not trustworthy, mechanical or safe, and much annoyance is often caused by the sudden failures of the fuse, usually due to careless fixing.

The gauge of a fuse should be carefully measured and the fusing point tested under working conditions (screwed to the actual terminals to be used), and with the cover on. When this has been done the fuses can be inserted of the correct size with some amount of certainty.

The current at which a fuse melts increases with the sectional area of the wire, decreases with the length of the wire, and, if short (say  $\frac{3}{4}$  inch), increases with the surface and mass of the fuse terminals. The cover for the fuse box decreases the fusing current, and many other circumstances alter it. A great many of these objections are overcome by the spring-clip fuse, each size being of different length. This latter precaution is to prevent the larger sizes from being inserted into the low-current circuits and *vice versa*, but, all things considered, fuses are not altogether reliable.

Large fuses for main switchboards should be of sheet tin, stamped with the fusing current, and firmly clamped between two screw terminals.

The break between the fuse terminals required depends upon the current and voltage. The length should be more than the longest arc possible with double the standard current and voltage. Tables of the lengths of fuses under various conditions will be found in all books of electrical rules and tables.

Double-pole fuses should never be used, but two single-pole fuses, one on each pole, and separated by a distance greater than the break in each fuse. Double-pole fuses have been known to arc between the poles with disastrous results.

**High-voltage Fittings.**—When a pressure of more than about 110 volts is used, it is important that extra precautions be taken to insure that the fittings, switches, lampholders and fuses are properly constructed for the higher pressures.

The 200 to 220 volt systems now coming into use are perfectly safe if the necessary conditions are complied with. The break in fuses must be longer; terminals of opposite polarity must be kept further apart, the break of switches must be quick and long, all metal parts of the cover must be kept well away from all parts of the switch having the pressure on them.

The small arcing distance between the poles in lampholders has been one of the objections, and is overcome by sinking the metal parts almost entirely in porcelain, and the use of the clamp-screw terminals. The flexible cord is, however, still the weakest point in the circuit, especially near the terminals in the lampholder. Extra long and quick break switches, and in brass-covered switches enamelled liners, are used to prevent arcing to the cover.

There must be no fuses in ceiling roses or wall plug bases, or in any place where there are two poles together, but fuses may be inserted in a switch, as one pole only is used.

If care is exercised in these directions, and wires, fit-



tings, lampholders, &c., are protected from damp, there will be no trouble owing to the higher voltage. Higher voltage systems have an advantage over the usual 100 volt system, as any faults which occur are developed at once and burnt out, the fuse blown and the position at once indicated.

*The Wiring of Fittings.*—It is found that fittings are often sold of such a shape that wires cannot easily be drawn through, and it is perhaps advisable to obtain all fittings, which are complex, ready wired by the makers. This plan should only be adopted when the purchaser can thoroughly trust the makers, as bad work may be concealed very easily.

#### CABLES AND WIRES.

There appears to be a considerable amount of misapprehension on this subject, and it will perhaps be of interest to give roughly the properties of an insulator.

Insulation resistance is the inverse of conductivity, and this is the usual way of talking of the matter, because as a rule with a wire the conductivity is always made as high as possible, and with an insulator the conductivity should be extremely low, or, in other words, the resistance should be at the rate of many megohms per mile of cable. The sign  $\Omega$  is always used to denote megohms, *i.e.* millions of ohms; mistakes are often made when "megohms per mile" are mentioned, and it must be remembered that this expression is incorrect; as, if true, two miles would have twice the insulation resistance of one, whereas it has only half. In fact, the term "conductivity of the insulation" should be used, and then there would be no trouble; but unfortunately there is no recognised unit or word for  $\Omega$ . The important matter to remember is that the insulation resistance is inversely proportional to the length and to the circumference of the wire, and proportional to the thickness of the insulation and to the quality of the material. The usual insulation resistance specified for cables and wires for installation work is 500 to 800 megohms per mile, and there is very little advantage in increasing this beyond about 1,000 megohms per mile, as it is highly improbable that the contractor will use a higher class cable.

In rubber-covered cables vulcanised insulation should be insisted upon, as pure rubber is not waterproof enough, and it is better if there is a layer of pure rubber between the vulcanised rubber and the copper wire, as there is a chemical action between copper and the vulcanised rubber. All copper wires in rubber cables must be tinned, as the coating of tin will prevent the action referred to, and also it will be found very advantageous for the soldering of joints.

There are several other classes of insulation used now for wiring—the paper and the jute with resinous insulation, amongst others. With any cable in which a hygroscopic material is impregnated with oil of any description, usually resinous, it is necessary that a continuous water and air-tight sheathing be used. This usually is of lead, hydraulically pressed round the finished cable. The end connections on such cables must be well designed and carefully carried out (and the suppliers of the cable should be consulted in this), or moisture will enter and the whole length of cable may be ruined. Lead-covered cables, in which the insulation depends upon the continuity of the lead, should be armoured or enclosed in suitable mechanical sheathing when buried in plaster, to prevent injury from nails, &c.

There is a growing dislike against rubber cables for use in damp positions, as it is found that even rubber which is vulcanised will not withstand the action of being wet and dry alternately.

For such positions, if rubber cables are specified they should be lead covered, but lead-covered rubber cables are expensive, and are very little better than the lead-covered jute or paper insulated already mentioned.

Whilst speaking of lead-covered wire, it may not be out of place to mention another system of wiring in addition to the ones already noted. This is being introduced by Messrs. ALLINGHAM & FENNELL, and has most of the advantages of the concentric system, while it can be used on the public supply mains. The conductors used by them early in 1896 consisted of concentric lead-covered cable with the outer conductor insulated, but owing to the difficulties experienced with the end connections, this was abandoned later in the year for a twin wire. It was found that,

with the concentric cable, the very fine wires of which the outer conductor is composed were often cut by workmen in paring the insulation, and the wire was bulky. The form preferred is the paper insulated cable, in which each conductor is hemispherical in section; this cable is very small, the  $2\frac{1}{2}$  ampere branch wire being only  $\frac{1}{4}$  of an inch in diameter. This wire can be run on the surface and, owing to its flexibility, can be buried in the plaster at a subsequent date if desired. The conductors are so near to each other that it is impossible to have a fault on one wire, and certainly an arc, without both wires being connected and the fuse melting. Ordinary fittings are used and there is not the disadvantage of an extraordinary appearance, as is the case with most special systems. The ends of the cables are sealed perfectly by a special form of end connection, which is small and flexible, while moisture is kept from the paper insulation.

The fire offices and supply companies to whom the system has been submitted up to the present time have sanctioned its use, and there appears to be no reason why it should not be extensively adapted, as the cost of installation is even less than with wood casing, while there is no doubt that an extremely mechanical and safe installation is the result.

*Flexible Cord.*—The use of flexible cord for wiring fittings is not allowed in first-class work, and, in fact, the use of the ordinary flexible cord for any purpose is one of the most unmechanical and certainly the weakest portion of an installation. It is practically cotton covered wire; the rubber coating is a mere pretence and absolutely useless; the only portion of the wire which is good is the braiding. There are, however, several better classes of cord on the market, one in which all the insulation except the braiding is vulcanised rubber; this wire is not quite so flexible as the cotton covered, but it is quite flexible enough for ordinary purposes, and is very much safer than the other. A point which should be remembered is that when vulcanised insulation is used the wires should be tinned. The cost of tinning flexible cord is rather high, owing to the long length of the wire, but it should be insisted upon in the best work. In all cases where flexible cords are connected to lampholders or ceiling roses the ends should be tinned and sweated together. This prevents stray wires from touching the other pole, or, in the case of lampholders, the brass parts of the holder, so making it possible for persons to receive shocks. This latter precaution is very necessary with high-voltage fittings.

#### WINCHESTER CATHEDRAL.—II.

WE stopped last week in our recital of the history of Winchester Cathedral at what might be called the eve of the great transformation by WILLIAM OF WYKEHAM. It was shown that during a period of about two centuries and a half the building remained unaffected by changes of taste. When WILLIAM OF EDINGTON was consecrated it was still in nearly all its parts a memorial of Norman liberality and artistic power. That character should have been allowed to remain unaltered, for the principal associations of the cathedral were with Norman and other foreign prelates and kings. Winchester and its cathedral after the first half of the fourteenth century could not be reckoned among those happy spots which are without history, but from that period there was less turbulence among citizens and clergy. WILLIAM OF WYKEHAM if he had left the old nave would not have demonstrated his architectural power. He would, however, be entitled to more respect if he had shown reverence to WALKELIN's work, which was substantial enough to endure for more than a thousand years. Several of his predecessors might with as much reason consider the nave to be in an obsolete style, but they refrained from changes, and WILLIAM OF WYKEHAM should have followed their example.

It must be acknowledged that if he could not resist the temptation to innovation he at least made compensation by his manner of yielding. We wish he had shown his skill in an entirely new church on a grand scale, but what he did at Winchester saved English Gothic from an unworthy close. Whether WILLIAM OF WYKEHAM devised the peculi-



arities which belong to the Perpendicular or Rectilinear period cannot be determined. There is no doubt he was among the earliest to employ them. This will be seen from comparison of a few dates. RICKMAN was content to say Decorated English was followed until 1377, and PARKER supposes the transition from Decorated to Perpendicular to have followed for twenty-three years, and he considers the west end of Winchester to be an example. SHARPE says that the Rectilinear period began in 1360, when the Curvilinear, which originated in 1315, came to an end. It was in 1367 WILLIAM OF WYKEHAM was consecrated Bishop of Winchester, and he held the office until 1404. Whether we adopt RICKMAN'S or SHARPE'S chronology, 1377 or 1360, as the starting-point of the period, the bishop's works at Winchester must be taken as Perpendicular. If PARKER'S theory is preferred the nave is not

architect and his friend PETER are seen competing in the creation of forms which would be more remarkable for their difficulty and eccentricity than for their solid beauty. Impossibilities were attempted. Gothic architecture suffered from the same malady as philosophy and poetry—it was too subtle. The artist, continues RENAN, was so eager to excite a sentiment of astonishment and terror, he hesitated before nothing that would help in producing illusion and phantasmagoria. He concealed the supports of his building. Vaulting appeared to rest on colonnettes which were supported by lateral walls. A church became a bundle of towering reeds—"l'épanouissement d'un faisceau de roseaux." From exaggeration so aggravated English Gothic was preserved. There were signs enough that English builders were disposed to be adventurous; but if the new work in Winchester Cathedral could exercise any



Photographed by S. B. Eolas & Co.]

WINCHESTER CATHEDRAL, FROM NORTH-WEST.

affected, for he says the change took place between 1394 and 1410. It is also agreed that WILLIAM OF WYKEHAM carried out works at Windsor and elsewhere before coming to Winchester to assist Bishop EDINGTON, so that in whatever way we consider the subject, it appears to be undoubted that he was associated with the Perpendicular style from its appearance, and so far as can be made out there was not one of his contemporaries who was better qualified to have introduced the new fashion in architecture.

Whoever was the deviser, he saved England from the vagaries which were adopted on the Continent. Before the year 1400, when "Gothique Flamboyant" is supposed to have started in France, the art was in a declining state. ERNEST RENAN considers the Album of VILLARD DE HONNECOURT as sufficient evidence of what "l'ivresse de combinaisons" was destined to produce. On one page the

influence, it was that of a corrective to the tendency towards license which was to be found in some churches of the period. According to Mr. RUSKIN, Perpendicular work is "detestable," yet as there must be degrees in badness he would probably admit that, in spite of their rigidity, the English examples are preferable to the riot which is easily found abroad.

Whatever may be thought of detail by critics who adopt a similar standard with Mr. RUSKIN, it cannot be denied that WILLIAM OF WYKEHAM exercised remarkable tact in dealing with the nave. Whether he planned the alterations which Bishop EDINGTON commenced is not certain, but we cannot believe that he superintended the operations. Apparently there was then a removal of the Norman work before the new masonry was laid. WILLIAM OF WYKEHAM seems to have used as much as he was able of the piers,



and may have altered not more than one bay at a time. He realised the value of height, but restricted himself by adopting the floor and string-course of the clerestory as constants which were to be respected. To gain effect it was necessary to sacrifice the triforium or to diminish its importance to a minimum, but the practice was so general during the Perpendicular period, it is not impossible there were other causes to account for the indifference to that ancient gallery. In that way he was able to obtain bays in the nave which were at least one-half higher than those of WALKELIN, and a clerestory that was of far greater importance. Besides, there was a vaulted ceiling which looks as if indispensable, and explains the necessity for the height of the piers. The late J. D. SEDDING gave much attention to WILLIAM OF WYKEHAM'S great effort, as the following remarks will show:

In architecture man's imagination employs two mediums by which to express itself—first, by the disposition of lines, mouldings and masses in agreeable proportions; and secondly, by sculpture. The relative importance of these mediums of imagination it has been the great life-work of Mr. Ruskin to enforce, and I shall have presently to test the sculpture of the Perpendicular period by the canons of criticism which he has so eloquently and truly propounded. But first as to the science of proportional lines in elevation. Winchester Cathedral affords a well-known illustration of the process of transformation which went on as the science developed. I have had Willis's drawing of the nave in its original state and in its present state enlarged, and it will be both interesting and instructive to compare the aims of the workmen in the early and later middle ages. The Norman compartment is divided into three parts of nearly equal altitude, whereas the Perpendicular is divided into two parts enclosed under one arch. The lower pier-arch of the Norman work is less than one-third of the whole height, whereas the pier-arch of the Perpendicular work is half the total height. The triforium is of equal importance to the other two parts in the Norman arcade, but in Wykeham's work it is subordinate to the general design, and becomes a panelled balcony.

I am well aware that they who look at early art with rose-coloured spectacles consider that the omission of the triforium as a leading feature in a Gothic edifice is one of the many signs of debasement ascribable to the Perpendicular period; and I am also aware that these same people with charming inconsistency declare in the same breath that the proportions of Wykeham's nave, which they even cannot but admire, are the proportions of the Norman nave. But the student finds sufficient reason for the changes that took place by simply following the course of art development. In the first place a design that shall please a trained eye must be governed by laws of proportion, and it needs no angel from heaven to tell one that the proportions of the Norman arcade are not of the highest order. Here is a given height to be dealt with, which the designer wishes to divide into three parts, and in untaught fashion he makes the three parts of equal height, and there is nothing principal and nothing subordinate, nothing above and nothing below the rest. This, then, is not a composition, if composition need the conscious disposal of parts.

Another point to be noted with regard to this and kindred work is, that a design is made bit by bit, and one part is not intimately linked to the other part. A compartment of a nave arcade stands alone; it may be repeated, but one bay does not lead the eye into the other. In this Norman nave the abacus moulding of the pier-arch and of the triforium stops short at the nave pier; there is no through string-course under the triforium to connect bay with bay; while the clerestory runs on to a tune of its own, regardless of any required harmony in the lower parts, and even the centres of the clerestory arcade do not agree with the two lower arcades. A glance at the Perpendicular nave shows a transformation so complete that one might call it antipodal. In every particular where similarity was possible, the Perpendicular is designed in entire disregard of the earlier fabric. It is true that some of the early piers are reworked as they stood, but in regard to the proportions and aims of the later work the architect acts as independently as though the whole had been rebuilt from the ground. The nave of Canterbury is like it, and that was rebuilt from the ground and begun in 1380, before Wykeham's nave. Again, the designs of other cathedrals of intermediate date exhibit a tendency towards the very treatment here brought to such perfection, and the nearer the Perpendicular period the stronger the tendency. To take two such instances in the choir of St. Albans and the nave of Exeter Cathedral; and although the triforium is so strongly marked in such examples as Salisbury and Lincoln, yet in both of the cases I have named the triforium practically disappears. It is clear, therefore, that the Perpendicular nave of Winchester is a spontaneous expression of the principles and laws of design as then understood.

To carry this matter further. In regard to composition, the composition of Salisbury is higher than that of the Norman

nave of Winchester, just as the Perpendicular of Winchester is higher than the Early English at Salisbury; and Exeter lies between these two both in ability of design and the clearer association of part with part. Salisbury gives us, through string-courses which we do not get in the Norman nave of Winchester. But neither Salisbury nor St. Albans carry out Gothic principles to perfection. At St. Albans, as Mr. Freeman has pointed out, the three continuous horizontal ranges have no more vertical division into bays than a primitive basilica. And though vertical lines are more enforced at Exeter, so as to mark the bays more definitely, yet they are only used for a moiety of the whole height, whereas at Perpendicular Winchester there is a continuous line from ground to vault. The evolution of the inherent principles of Gothic design is also to be illustrated in another particular. Exeter nave dates from 1331, Winchester nave, 1394. At Exeter a large traceried window almost swallows up the whole space above the pier-arch, but the triforium forms no part of a scheme in the general design. There is nothing to carry the eye from pier-arch to triforium arcade, nor from panelling to window. The window has five openings, the triforium four. The design is checked, it is not a whole. But at Winchester the vertical principle is strongly felt and asserted, and the law of association has ultimately linked part with part. The clerestory and triforium are unlike the earlier clerestories and triforiums. The old division was but threefold, this is multifold. The window here only forms part of a composition of wall-panelling which has a deeply-moulded arch divided at mid-height by a transom. The harmony is intricate. The tracery is first divided into three divisions, then into five—the middle taking three, and the side compartments one panel each. The window is not a feature by itself; it is less a window than a glazed space in tracery which would take its present shape whether glazed or not. And even the upright bars separating the sides from the centre compartment are carried through in the spandrel of the pier-arch, and the cusping is repeated, as though the designer would have no internal rivalry anywhere, but all should be ruled by one purpose. Nor is this all. So strongly is the artist dominated by the sense of harmony, so exalted is his perception of the beauty of order, that the whole structure becomes one grand piece of harmonious toil. Not only is the division multifold, as I have said, but each part has its multifold division, in principal and subordinate members; the eye never rests on a fragment, but is led to see the whole. The structure is one system of energetic, copious life, the vertical moulding of the wall-pier rises like a tree from the ground, to burst into branch and flower in the lierne vaults overhead. On every possible count, then, the Perpendicular nave at Winchester differs from the Norman, and hence the significance of the example.

How so many amateurs in Mediæval times contrived to design buildings is incomprehensible, especially if we judge them by a nineteenth-century standard. The mystery is not so obscure in the case of WILLIAM OF WYKEHAM. He was so long connected with building works, the wonder is how he attained the knowledge which was desirable for a bishop. WILLIAM was a brave man, and CARLYLE was justified in his admiration of him. The next bishop was HENRY BEAUFORT, who is generally considered to have been the chief cause of the evils which befel England in the reign of HENRY II. But the Cardinal was not so black as SHAKESPEARE represented him, and if he did not make many changes in the cathedral, he was munificent to the Hospital of Holy Cross. WAYNEFLETE, who followed, was a quiet man, whose thoughts were occupied with Magdalen College, Oxford, of which he was founder. COURTENAY erected at least a bay in the cathedral, but LANGTON was less ambitious. To RICHARD FOX, who was rewarded by HENRY VII. with the bishopric, Winchester was indebted for the great screen, which J. D. SEDDING considered was unrivalled for its canopies, for he maintained there is more imaginative power in the central canopy than in a score of modern churches—it is a miniature cathedral. Fox was the last of the prelates who might be called building bishops, and he was a fitting follower of WALKELIN and WILLIAM OF WYKEHAM.

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**The Executive Committee** for the erection of a memorial of Archbishop Benson have recommended that a sum not exceeding 2,500*l.* be set apart for the monument in Canterbury Cathedral, and that the balance of the sum collected be devoted to some definite portion of Truro Cathedral, the details of this being left to the Truro committee. The designing of the monument in Canterbury Cathedral and the superintendence of its execution is placed in the hands of Mr. T. G. Jackson, R.A., the execution of the effigy being entrusted to Mr. Thomas Brock, R.A.



## NOTES AND COMMENTS.

WE lately offered some remarks about the new method of dispensing with a contractor which has found favour with philanthropists in several countries of Europe, and showed that wherever tried it was followed by failure. The last report of the Department of Public Works in New South Wales affords another example. The engineer for roads, in describing the relief works which were undertaken in the neighbourhood of Sydney, says:—"In carrying out these relief works, the co-operative or butty-gang system was adopted, and had a fair trial. The whole of the work done was let to small gangs at prices based on departmental estimates, and although 380 men were employed in small gangs, averaging from ten to twenty-five men, the whole experiment, as far as the men were concerned, was a failure. The system in theory is very good, and, under a capable leader, hard-working and competent men should not only make wages, but have in addition what would otherwise be the contractor's profit. Experience has shown, however, that in most cases in choosing their ganger the men have made an unwise selection, and his authority has been practically nil. Further, that in almost every gang there have been so many loafers that the average earnings of the workers have been reduced by 20 per cent. This system has been tried in other parts of the colony with similar results." It would be fortunate if the unwise selection of leaders was confined to New South Wales, but the same cause operates still more in England. But if working-men will confide their interests to incompetent hands, what is to be expected? A man may pose as an oracle and remain a windbag, but a mischievous one.

It was announced a few days ago with befitting ceremonial that the President of the Royal Society of Painters in Water-Colours would be allowed to wear an official chain and badge at any Court ceremonies he attended. Immediately afterwards the President of the Society of Painter-Etchers states that a similar privilege awaits himself. In one case the badge has been designed by the versatile Mr. HERKOMER, R.A.; the Painter-Etchers appear to consider the work as too important to be entrusted to an individual. According to the mystic Professor TEUFELSDRÖCH, "All visible things are emblems; what thou seest is not there on its own account; strictly taken, is not there at all. Matter exists only spiritually and to represent some idea and body it birth." What idea does the new badge stand for? It might be supposed something of the kind was needed as a sort of label to distinguish so venerable and worthy an artist as Sir JOHN GILBERT amidst a crowd of beribboned and bespangled old gentlemen. But the badge is in reality taken to be a sign of victory over the Royal Academy. The Academicians offered no respect to water-colour drawings, and now water-colour artists have their Royal society, and their president is on a footing with the successor of Sir JOSHUA REYNOLDS, and can display no less brilliant a badge on his bosom. The Academy received engravers, but the doors are closed to etchers. The etchers now in turn constitute a Royal society, and will shortly possess insignia for their president. The office of President of the Royal Academy is therefore hardly worth acceptance, for the holder of it is no longer a unique personage in one of the crowds at Court. He is only one badge-bearer among several. Happily neither painting nor etching will gain or lose by the struggle for a badge, for the temporary possession of one does not make a man handle a pencil or a needle with more dexterity.

THE French Académie des Beaux-Arts is compelled against its inclination to recognise that art follows a course which is not determined by the rules and regulations which were formulated by the early members. Occasionally, however, an opportunity is offered for the Académie to reassume its ancient character without incurring any responsibility. The selection of subjects for prize essays is generally utilised for that subject. For example, it is arranged that the Prix Bordin will be given in 1899 to the author who produces the best essay (in an academical sense) on the following subject:—"The conditions, from the point of view of art

and of special qualities, which distinguish engravings from the results obtained by various heliographic processes, as well as the characteristics of the different schools of engraving when opposed to the fatal uniformity of mechanical productions." The Académie does not attempt to be impartial, and supposes that essayists are no less indifferent. The line which is to be followed by all who aspire to gain a prize is clearly defined. Anyone who is not disposed to believe, for a time at least, in the worthlessness of all photographic reproductions in comparison with any sort of an engraving has no chance in the competition. If it were said that long before heliogravure was employed Mr. RUSKIN expressed there were only two engravings in the world which could be considered as worthy of the pictures they represented the Académie des Beaux-Arts would be unmoved. How many French painters have approved of engravings from their works? The success of lithography in France is mainly owing to the dissatisfaction of artists, who have felt that the roughest drawing on stone, so long as it suggested the "values" of the original, was preferable to the most laboured engraving. The English mezzotints of the last century were another indication of revolt against engraving in the ordinary sense of the word. There is no more mechanical reproduction than some of the prints which once were popular. If they have ceased to be admired in France one of the reasons is that painters preferred photographic reproductions. We doubt if any of the members of the Académie des Beaux-Arts, with the exception of the few engravers, are very partial to the ancient art, but in their corporate capacity they are obliged to sacrifice their principles as individuals.

THE Duc d'AUMALE is busily occupied with the preparation of the catalogue of the contents of his palace at Chantilly. Buildings and works of art are to become the property of the Institut de France, and the prince is desirous that doubts shall not arise hereafter about the authenticity or the history of any object with which he has enriched his country. While the Duc d'AUMALE will write a general history of the château and its treasures, he has obtained the co-operation of specialists for the detailed descriptions of the different sections. M. GEORGES DUPLESSIS, a member of the Académie des Beaux-Arts, has undertaken the catalogue of the engravings. M. BOUCHOT, of the Bibliothèque Nationale, will write about the pencil portraits dating from the sixteenth century. The archaeological examples will be described by M. LÉON HEUZY; the libraries are to be entrusted to M. GEORGES PICOT, and the manuscripts to M. DELISLE. Sculpture, furniture, bijoutry, &c., will exercise M. GERMAIN BAPST's great learning, and M. GRUYER will deal with the paintings. The catalogue will consequently become a work of authority which can be consulted by experts.

THE French scaffold builders are proud of their constructions, and therefore are more opposed to their demolition than men who employ stone or brick in building. Sanguine people imagined when they found the forest of timber around the Arc de Triomphe was removed, in order to allow the Czar to have a glance at CHALGRIN's work, that they would be able to enjoy once more the fine prospect in which the arch was an element. But they were doomed to be disappointed. The scaffold builders, with the approval of the authorities, have selected the time when crowds of Parisians once more have to pass by the Arc de Triomphe for another display of their handiwork. It is to be hoped they will condescend to remove the timbers before the international exhibition of 1900 is closed, so that some strangers at least may have an opportunity to see the most remarkable example of a triumphal arch which the world possesses. If the *Départ des Volontaires* by RUDE can be preserved, the Parisians would not object to a temporary concealment of the masterpiece; but it is remarkable that while figures which express the revolutionary spirit more emphatically than any history should be decaying, the lifeless *Résistance* of ETEX should be invulnerable to all that time and weather can do.













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## THE ENTHRONEMENT OF CHARLEMAGNE.

FROM THE WALL PAINTING IN THE PANTHÉON, PARIS

BY M. HENRI LEVY.











Chor. Architekt. Man. 5<sup>te</sup> 1897







PHOTOGRAPHED BY S. D. BOLAS & CO. 11, LUDGATE HILL, E.C. 4.

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CATHEDRAL SERIES, No. 15.—WINCHESTER: SOUTH AISLE, LOOKING WEST.













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## ILLUSTRATIONS.

## THE ENTHRONEMENT OF CHARLEMAGNE.

**A**MONG the paintings in the Panthéon of Paris is a very big one in three compartments, by M. HENRI LÉVY, representing the *Coronation of Charlemagne*. Our readers will remember the large illustration of it which we have published. An additional bay had afterwards to be filled, and in it M. LÉVY has painted the work we now reproduce. It is in keeping with its larger companion, and presents the courageous composition and brilliancy of colour which entitle the artist to be considered as a worthy follower of RUBENS.

A print of CHARLEMAGNE is not so much out of place when in company with a view of Winchester or the cathedral as it might appear to anyone who had not considered the subject. EGBERT, who was the first great king of Wessex, of which Winchester was capital, spent at least three years under CHARLEMAGNE. The Emperor's Court was a refuge for ambitious refugees. When BRIHTRIC was elected to the throne of Wessex his rival was EGBERT, who, on failing to secure the majority of votes, fled for safety to Aachen. There he was initiated into the arts of war and government. On the death of BRIHTRIC the claim of EGBERT was recognised by the West Saxon thanes. During nineteen years he gradually extended the power of Wessex until his rule was accepted over the greater part of England. The Saxon Chronicle describes him as "the eighth Bretwalda," or sovereign of Britain, his predecessors being ÆLLA, CEAWLIN, ETHELBERT, REDWALD, EDWIN, OSWALD and OSWIG, most of them resembling shadowy beings rather than brave men who endeavoured to bring order in our British chaos. EGBERT had to contend not only with rebellious vassals, but with the terrible seakings, the sight of whom compelled CHARLEMAGNE to weep. In 833 a fleet of thirty-five of their vessels appeared at the mouth of the Dart, and the West Saxons fled. EGBERT then organised a system of defence, and when the invaders next appeared he met them at Hengstone Hill and was successful. He returned in triumph to Winchester, which he had preserved from the northern rovers; there he died, and it is believed his dust is to be found in one of those mysterious coffin-chests which are placed on the choir-screen of the cathedral.

It would be ridiculous to attempt within the limits imposed upon us an estimate of the character of EGBERT's master, the great emperor who is claimed by Frenchmen and Germans as their special ruler and compatriot. Few men can have so good a claim as CHARLEMAGNE to be numbered among those monarchs who still rule, as it were, from their tombs. Europe continues to be under his power. He was forced to be severe. In one day, for example, no less than 4,500 Saxons were decapitated at Verden by his order, but withal he was held in so much veneration, it was found necessary to remove his remains from the tomb in Aachen in order to prevent an undue reverence to them by people who considered him to be a demi-god. There is, however, one trait in his character which has been too much overlooked even by writers who have devoted large tomes to CHARLEMAGNE. We mean his recognition of architecture as an agent in civilisation. We can have evidence of that characteristic in the simple pages which were composed by his son-in-law, EINHARDUS or EGINHARD, an ecclesiastical dignitary whose revenues appear to have been always applied to good uses.

According to EGINHARD, the emperor, although constantly occupied with the carrying out of his vast designs for the extension of his empire, "undertook numerous works in various places for ornament and utility and was enabled to complete several of them. Among them were the basilica of Aachen, and a bridge 500 paces in length across the Rhine. A fire consumed his bridge in the year before CHARLEMAGNE's death. There was no time to repair the disaster, but the thought of a new bridge was constantly in the emperor's mind, and he was desirous to employ stone instead of timber in its construction. CHARLEMAGNE also began two remarkable palaces. One was not far from Mayence, and near the domain of Ingelheim; the other was at Nimeguen. But the erection of churches throughout the whole extent of his kingdom was above all things the object of his care. As

soon as he heard churches had fallen out of repair he gave orders to the prelates and religious communities to restore them, and he appointed commissioners to insure that the work was done." In another place EGINHARD relates how the emperor adorned the basilica at Aachen with gold and silver candelabras, screens and doors of massive bronze, and how he had columns and other works in marble brought from Ravenna and Rome. He presented a large number of vases in gold and silver to the church, and most sumptuous vestments. It is mentioned by EGINHARD that the "porters," who formed the humblest grade of the ecclesiastical order, were not overlooked, and were so well provided with special habits, they never had to wear ordinary dress at any of the functions. He was eager to see Rome reassuming its ancient preponderance among the cities of the world, and although he was unable to visit St. Peter's on more than four occasions during forty-seven years, he endeavoured by his gifts to make the basilica supreme in ornaments and riches.

In his will he announced that all the gold and silver, precious stones and regal ornaments in the treasury had been divided by him into three great portions. The first and second were subdivided into twenty-one parts, corresponding to the number of archbishoprics in his kingdom. One of the parts was to be handed over to each archbishop, who was to apply a third of the value for the use of his own church and to distribute the remainder among his suffragans. In order to avoid confusion, each part was placed by the emperor in a coffer duly labelled. The third part comprised not only an equal amount of gold and silver, but a large number of vessels, arms, vestments, tapestries, woollen stuffs, and whatever else was to be found at his death in his own robing-rooms and chambers. If in the chapel there were any treasures which were not specially devoted by CHARLEMAGNE to its use, or which were not inherited, they were also to be sold, in order to increase the amount to be given in alms. The large quantity of manuscripts were to be also sold and the proceeds bestowed on the poor. In the arrangements we can see that CHARLEMAGNE, although he might leave kingdoms to his heirs, believed it was right to comply with the doctrine of sacrifice and distribution of goods. There is particular mention of three silver tables in the will. One, on which appeared a view of Constantinople, was to be presented to the basilica of St. Peter in Rome; a round table with a view of Rome was destined for the cathedral of Ravenna; the third, which was heavier and more beautiful than the others, and was remarkable for the art with which the universe was shown on it, was to be sold for the benefit of the poor, and the emperor's golden table was destined to the same purpose.

From his will we see that CHARLEMAGNE was a collector, and he may have had the excusable selfishness of his class and could not think with satisfaction of other princes enjoying his treasures. That may have been one of the reasons for his generosity. In his time collecting was not a financial speculation as it is nowadays. Being a collector, we may conclude he was an amateur, and from the style of the will with its description of various objects that conclusion is confirmed. Was he an artist? That may be answered by another question, Was he a poet? There are noble hymns, such as the "Veni Creator," still in use which are attributed to him; and as men were versatile in those old days it is not impossible that CHARLEMAGNE could design. At least he was a better judge of fitness than some architects of the time, for it is said he found great difficulty in preventing columns from being fixed in a reversed way, with their capitals below and the bases above.

EGINHARD we know was an enthusiast for architecture, and probably the art was one of the links between the emperor and the religious. One of his letters to his son VUSSIN suggests that around CHARLEMAGNE there was a love of art which helped to redeem the general character of the Dark Ages. EGINHARD writes:—"I have sent you a list of some words and obscure phrases which are found in VITRUVIUS; in fact, as many as I was able to gather up to the present. I hope you will endeavour to seek out the meaning of these for me. I imagine that you will obtain some help in the solution of them from the casket which was made by the artist E., for it has ivory columns which are imitated from antique examples. As to what



VITRUVIUS calls "scenographio," it would be well to consider VIRGIL's lines in the third book of the Georgics:—

Jam nunc sollemnes ducere pompas  
Ad delubra juvat cæcosque videre juvencos,  
Vel scæna ut versis discedat frontibus, utque  
Purpurea intexti tollant aulaea Britanni."

It is remarkable to find the grandson of CHARLEMAGNE occupied with an exposition of VITRUVIUS, that venerable authority who is likely to remain a puzzle to all generations of men—it may be because he was not possessed of a practical acquaintance with the subjects he dared to treat. EGINHARD could be made to furnish many other fragments of news of a technical kind, as well as some relating to different subjects in the ninth century. But we have already said enough to justify admiration for CHARLEMAGNE by an English architect.

WINCHESTER CATHEDRAL.—SOUTH AISLE, LOOKING WEST.

SHAKESPEARE THEATRE, LAVENDER HILL, S.W.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

AN ordinary general meeting of the Institute of Architects was held on Monday evening last, the president, Professor Aitchison, A.R.A., in the chair.

The minutes of the last meeting were read and confirmed.

Mynheer P. J. H. Cuypers, of Amsterdam, was elected the Royal Gold Medallist for the current year.

Mr. Owen Fleming moved and Mr. Hooper seconded, "That it be referred to the science standing committee to consider the desirability of formulating a definite standard size for bricks."

Regarding the question by Mr. Robert Williams as to whether "the Institute of Builders have agreed to abide by the provisions of the form of contract sanctioned by the Institute," Mr. William Woodward said first-class builders had refused to sign the conditions, and it seemed to him the observations he had made before on the same question were accurate, and that the best thing for the Council to do would be to withdraw the conditions from circulation, which would not impose much of a loss on the Institute.

The President said the Institute could not well take any action in the matter.

Mr. John Slater read Professor Eidlitz's paper on

### The Educational Training of Architects.

During the last half of the present century the questions "How are Architects to be Educated?" and "Are we ever to have a New Style?" have been prolific sources of discussion. The answers to the first of these questions vary between the two extremes—"Architects shall not be educated at all," and "They shall be taught to know everything"; and to the second, that "We will probably never have a new style, but that such a thing may happen in the course of time"—a long time. These discussions are carried on with mutual forbearance and good feeling, but without any other result than an expression of opinion by the majority of the disputants that students of architecture shall learn something of the technique of building, if this can be done without the suppression of inherent genius. Genius in this case means a lively poetic imagination, capable of remembering, selecting and combining existing forms into a whole which shall be picturesque. It has been observed by practical architects that an extended mathematical and scientific training breeds able constructors (engineers), but is detrimental to the artistic perceptions of the students. Existing forms may be repeated or combined by human imagination, but new forms can result only from new functions logically developed. Up to the thirteenth century architects were builders who arrived at progressive methods of construction mainly by practical experiment, the laboured results of which were stored up as rules-of-thumb by guilds and individuals, and modelling and decoration were mainly matters of feeling, but of the feeling of men who thoroughly knew their methods of construction. The guilds and their rules are past and gone, but during the last century the science of mechanics has been developed. This science enables us to compute with precision the strains caused in all combinations of matter which have served, or may hereafter serve, to form structural elements. To illustrate briefly, We know, a certain distribution of weights being given, which is to be sustained between two points of support, what is the line of pressure caused by these weights, hence what the form of the arch to sustain them with the least amount of material. Or the form of an arch being given, what is the ideal distribution of loads which corresponds accurately to its resistance? Or, again, the form of an arch

being given, which we know not to correspond with the distribution of its loads, what will be the magnitude of the strains produced in any part of it, and how are these strains to be resisted? We know exactly what is the lateral pressure of a given arch, and what is the stability of an abutment needed to resist it. We can compute the transverse strength of a beam or a lintel, the bending moment of a pillar, or the deflection of either, under loads so small that it cannot be measured. Now, we are all ready to admit that this knowledge is useful, and perhaps necessary to the student of architecture, to enable him to construct buildings that shall be stable and enduring; but many of us doubt that it has anything to do with architecture as a fine art, which means with the composition of architectural monuments which shall be beautiful to look at and expressive of their purpose and meaning. I presume that all architects agree that form, modelling and decoration constitute the elements of beauty and expression, and that of these *form* is the most important. If we imagine every piece of sculpture carved decoration and moulding removed, say, from the cathedral at Amiens, so that nothing remains but the bulk of piers, arches, vaults and buttresses, the ruin will still express a Christian monument of great beauty. Now, the ecclesiastical expression is owing to what in music would be called the *motif*, which is Christian in character, lofty in its conception as a House of God and in the grouping of its parts, which designate worship in the chevet, the presence of officiating priests in the transepts, the people in the nave, the aisles with their processions, chapels and confessionals; while harmony is certainly due to a just and accurate treatment of structural parts and their mechanical value, which is determined by local strains. In music neglect of a strict mathematical relation of sounds results in discord. So in architecture harmony of form can be obtained only by a strict observance of the mathematical relation of strains. Harmony of strain means that stress should be always resisted by a proportionate amount of material—no more, no less. This does not mean that there should be no more material used than is absolutely necessary to perform a given amount of mechanical work, such, for instance, as we consider proper in economic structures, factories, warehouses, tenements, &c.; but whatever the amount of material to be used in a given architectural monument which, in the opinion of the architect, is commensurate to its character of stability, dignity and elegance shall be proportionate to actual strains throughout the whole design. To be explicit, each building material sustains a certain amount of strain at the breaking point. The actual strain permitted in any structure in practice is but a fraction of the ultimate strain of the material at the breaking point. This fraction is known as the factor of safety, and should, for the same material, vary in different buildings, in accordance with their dignity. The architect may use one factor of safety for a school-house, another for a library and yet another for a church. The factor of safety so chosen becomes the keynote of his design, and a constant reference to it insures harmony. Factors of safety vary with the different materials, and more or less depend on limits of elasticity, methods of construction, probable effects of the weather, corrosion, &c. Strain is the sum of weight, its direction and resulting bending moments. It appears from the above that the greater the ultimate resistance of the material, the greater is the admissible maximum strain, hence the more elegant the structural forms. It occurs that in the use of modern rolled iron form becomes attenuated far beyond the limits of the forms the architect is familiar with. It may be asked here, and doubtless many a respectable member of our profession would ask, What the author could have done with an ugly iron or steel pillar rivetted up of rolled material? Without discussing that question at this time—although it may be asserted with confidence that a post of that description is not at all outside the pale of æsthetic possibilities—it may be suggested that a cast bronze column was perfectly practicable, and so was a granite column of sufficient diameter to carry the load. What the architect had in mind, however, was not the question of mechanical work to be done, nor the question of relative strains, and an harmonious architectural development of forms, but the beauties of the Greek portico, which must be preserved in spite of new conditions and the invention of new material. Of course, no new style of architecture can be expected when new conditions, such as a twenty-five storey office building—or the invention of a new material, such as rolled steel—are referred to the Greek portico instead of the law of gravitation.

A great stumbling-block to the student of architecture is the constant and exclusive reading of its history, which is tacitly presented by schools, and avowedly accepted by students to be a system of building which serves all the purposes of a philosophy—or a science and art—competent to teach building scientifically and artistically under conditions which never occurred in the history of the past. The mathematical training in modern schools and universities is usually sufficient to enable the student to devise methods of construction, and when devised, to compute with accurate resulting strains. Students who then enter an architectural course are turned over to



special teacher of architecture, who tells them to design buildings of any kind—from a storehouse to a cathedral—not in accordance with their acquired knowledge of mechanics, but in accordance with methods pursued by the Greeks, the Romans, &c., who were not at all familiar with the science of building as now understood, but who constructed merely in accordance with their practical experience. For further information the student is referred to "Art History." Now the Greeks, the Romans and the master-builders of the Middle Ages, though not scientific in the modern sense, understood form, because they practically knew the mechanical function of structural elements, and had a realising practical sense of the relation of masses, hence also of the form, modelling and decoration of these masses. The modern student of architecture has no experience in building, and when he enters the academic course discards from his mind his previous scientific attainment, which never existed in the shape of forms, but merely in an aggregation of mathematical reasonings. He is not taught how to refer to that reasoning in developing forms, but instead is asked to study forms in the abstract as presented in history. The system of the *Ecole des Beaux-Arts*, which is imitated in many schools outside of France, is utterly subversive of possible logical architecture. Students are required to prepare sketches, often of important architectural monuments, in from six to sixteen hours. By rules of the school, these sketches may be measurably foggy, as long as the finally completed drawings can be construed to be somehow indicated in the original sketch; this means that the process is a matter of composition of form and not a rational development. Criticism of these designs by teachers admits transgression against good construction as comparatively pardonable, but insists on observance of traditional treatment of form as imperative. The study of architectural history (more especially if perused critically) is doubtless beneficial to the architect, but should be postponed for a post-graduate course, or should be left for private reading after the academic course is completed. A future text-book of architecture for universities, polytechnic schools and academies of the art of architecture, will doubtless bear the title "The Theory, Practice and Art of Building." What is meant by architectural scales may be best illustrated by one or more examples, for instance:—Given a pillar of a certain length and the load it supports in pounds, what will be its sectional area and what its form, modelling, carved ornament and colour decoration (if any) in a warehouse, a public school, a library, a court-house, and a parish church, when the pillar is made of wood, cast-iron, wrought-iron, bronze, brick, sandstone, marble or granite? The text-book would answer these questions and illustrate the answers by drawings and diagrams. It would state how variations of treatment would accrue by reason of difference in the length of the pillar, also how pillars of similar nature have been treated in notable monuments of the past, and discuss the merit of such treatment and point out its material defects. Wall piers considered as pillars would be treated in the same way. Then would follow the consideration of braces, capitals and corbels. Further, that of lintels, arches, groins and cupolas, and the resulting lateral pressures and abutments, and also of roofs, stairs and incidental structural elements. Assuming the architectural scales to comprise the first part of the text-book, the second part will treat of the construction of single cells and the combination of these into piles. The students would attend lectures on the *rationale* of structural elements and composition, but would devote most of their time to drawing structural parts and finally entire buildings and monuments, not by copying from the text-book, but by an individual treatment of the subjects contained therein under the guidance of a professor and his assistant or assistants. The latter would see to it that adherence to strain is strictly pursued. By this process, students would in their work be corrected and helped daily, and would progressively acquire a habit of referring design to building and its mechanical import. That monuments thus conceived and designed will be expressive of their meaning and the individuality of their author cannot be doubted; nor that they will be harmonious in themselves and will vary from the forms of the past in the degree as new wants, new material, new methods of construction vary and excel those handed down to us in history. When a natural organism decays and dies it still exists in its elements, though not in its original form. These elements under different environments combine again into new organic forms of different function. Science and art obey a similar law. Principles established by experience continue to live as accepted truths, when the forms of artificial organisms which they originally developed have ceased to be fitting or useful to human needs, more especially when those principles first crudely announced have become accurately determined by quantitative analysis. The cross-bow and modern rifle, the spinning-wheel and the present spinning-machines, and ancient galley and the armoured steamer, all serve as practical illustrations of the above. Architecture alone, of all human pursuits, retains obsolete forms, and neglects underlying principles and organic laws. It must be re-

membered, however, that this was not the case prior to the fourteenth century. Five hundred years of decrepitude leads thinking minds to question a possible resuscitation, and when now and then such a possibility is seriously contemplated we talk of centuries and generations because past progress has consumed such periods of time. But when we consider the great strides of the present century owing to the knowledge and application of positive scientific methods—the metamorphosis of Japan, for instance, within the last generation purely by the acknowledgment and practical acceptance of these methods—we must come to the conclusion that a period of one generation is quite sufficient to initiate renewed rapid progress in architectural art, always provided that we are willing and helpful to refer it to its true and fundamental principles, and to teach it rationally.

Mr. H. H. Statham, who proposed a vote of thanks to Professor Eidlitz, considered some of the suggestions in the paper valuable, but he thought they would share the fate of many other clever theories on the same subject. If architectural students could be isolated on some desert island the new style might be evolved, but as long as people had any knowledge of old forms, and books containing and explaining examples were within their reach, the human mind must partly imitate the old. The teaching of the *Ecole des Beaux-Arts* was the best training for architects, and Mr. Hamerton was right when he said "there were more living architects in France than any other country in the world."

The vote of thanks was seconded by Mr. Emerson, hon. sec., who read the following remarks by Mr. Arthur Cates:

The educational training of architects, with which the Institute is concerned, is clearly not one in which "they shall be taught to know everything," nor is it one the aim and object of which is to produce the evolution of "a new style," whatever that once much-used phrase may mean. The educational training which is now organised aims at fitting the student for the acquisition of the knowledge necessary for the satisfactory practice of his profession in developing his natural artistic and scientific ability, so that he may apply both to the expression of his ideas in design and in the realisation of his conceptions. In the complex conditions of the practice of the day the architect must aim at acquiring the power to attain success in designing buildings which shall be of convenient and appropriate in arrangement, shall be of stable construction, and shall be of suitable and beautiful design, both as regards masses, form and detail. The first studies of the aspirant should be devoted to a mastery of Classic and Mediaeval work—intelligently studied, with a thorough acquaintance with form and detail—leaving the Renaissance and later developments to a subsequent period, when he can bring to bear on their consideration the knowledge acquired in the first years of his studies. In both periods the sedulous cultivation of the art of accurate and effective delineation, and of sketching detail and ornament from buildings and from memory, thus bringing eye and hand and brain into harmonious and mutual action, is of the highest importance. Concurrently with this, the study of the history of the several periods of architectural art is of the greatest value, not as a mere matter of dates and names, but as giving life and interest to the subjects studied, connecting them with the actual social life of the people by whom they were evolved, and with the political, social and religious influences which controlled their design. These historical studies train the mental and artistic powers, and by giving a keener appreciation of the excellence of excellent things, and of the causes of such excellence, refine the taste and strengthen the judgment. It has been well said by Professor William R. Ware—"I cannot help thinking that this discipline is calculated to calm the anxiety of those who fear that too prolonged courses of academic study may enervate the powers instead of stimulating them, and, as in a hot-bed, bury or burn out all seeds of originality through too rich a culture. I fancy that these fears have in general but little foundation, and that it is not through over-education that talents are lost to the world and fail to bring increase to their owners, so much as through their lying neglected, or, as sometimes happens, being too carefully tended by their possessor lest their original brightness should be tarnished. Still it is true that in the conduct of life, and especially in the practice of the arts, which is but the finer kind of living, it is the special personal quality, the spark of individuality and originality which lights every man who comes into the world, that has intrinsic value, and though the risk of extinguishing the flame is too strong, and a draught may be exaggerated, it is not possible to exaggerate the importance of fostering and magnifying it. There is no knowing what fire it may not kindle. If ever you have a new idea, however slight and unimportant it may seem to be, cling to it, cherish it, develop it, and some day you may awaken and find yourself immortal." This immortality, if to be one of honour, is not likely to be attained by the study of the suggested "future text-book of architecture for universities, polytechnic schools and academies of the art of architecture, which will doubt-



less bear the title 'The Theory, Practice and Art of Building.' It is not easy to comprehend what would be the exact nature of this text-book, which would profess to give the "form, modelling, carved ornament, and colour decoration (if any) for pillars, and probably other details in a warehouse, a public school, a library, a court house, and a parish church." And out of this text book are to be evolved monuments that are to be expressive of their meaning and of the individuality of their author. The Institute has an excellent opportunity to afford encouragement to the study of the means of satisfying new wants, by the use of new materials and new methods of construction, and the more extended application of those materials with the existence of which we are familiar, but of whose capabilities in, perhaps, unexpected directions we have no appreciation. The Soane Medallion and its accompanying travelling studentship is in the free and uncontrolled disposition of the Institute. At present the only qualification of competitors is that they shall be "British subjects under the age of thirty years," with the result that each year shows a great amount of misdirected and wasted energy on the part of untrained competitors who have entered on design before they have mastered the essential principles which should govern it. By altering the conditions to secure that these principles should have been mastered, and even by securing that the competitors should have had some reasonable training, by making associateship or qualification there for an express condition, the results would certainly be more satisfactory, the cause of the educational training of architects be greatly advanced, while some new developments of design arising out of the application of new materials might possibly arise. The questions raised by the "Text-book" suggestion were considered a short time ago from a different standpoint by the committee of education of the American Institute of Architects, and Professor W. R. Ware, in the paper above quoted, says in relation thereto:—"The committee on education expressed the hope that if the study of the historic styles were systematised and co-ordinated in the schools, such an effective concentration of intelligent effort might aid in developing a system of architectural form that should be nationally characteristic, and should be more accurately adjusted to the expression of modern American life than those now in vogue. We do not feel that it very much concerns us to exert ourselves to any such end; we do not see that we have any cause to map out the future, to cast a horoscope, or to attempt to influence events towards issues indicated by any astrology that can be devised. We distrust the science which, in our present state of ignorance, undertakes to foretell or to control the architectural weather. All we can be sure of is that the architecture of the future will be good or bad, noble or ignoble, fair or foul, according to the personal character and professional prowess of the men who have it in hand. All we can undertake to do is, if possible, to inspire the young men who come under our hand with a certain measure of good sense and good taste, teaching them by precept and the example of history that in art, as in life, temperance and refinement of conduct come from firmness of mind and elevation of spirit, and that these are the only sure means to these ends." All reasonable men must agree with the conclusions so well expressed by Professor Ware, and be content to await the development which must follow carefully-conducted educational training kept free from mere academic influences; and this Institute need not look further ahead than to continue steadfastly in the course already adopted, and thus eventually secure that all its members shall have had that thorough and systematic artistic, scientific and practical training, based on a sound general education, which will insure that the title of architect and membership of the Institute shall imply that its possessor may reasonably be expected to be a reliable and trustworthy adviser on all artistic and practical details, and also a well-educated man, standing at least on a level with the average of his clients in knowledge of all ordinary topics of art and general history, and superior to them in his special and technical knowledge. An architect will then, so far as personal characteristics may permit, in some degree combine the imagination of the artist, the intellectual clearness and precision of the mathematician, and the experience and readiness of the practical man with the culture and refinement of the educated gentleman.

The President put the vote of thanks, which was carried unanimously.

It was announced that at the next meeting, on March 15, Mr. W. St. John Hope, F.S.A., would read a paper on "Heraldry in conjunction with English Gothic Architecture."

**The following Artists** have been awarded gold medals at the Florence Fine Arts International Exhibition:—(1) Leon Bonnat, *Portrait of Ernest Renan*; (2) Hendrick Mesdag, *A Landscape*; (3) Aimé Merot, *Picture of St. Jerome*; (4) R. Lepsius, *Portrait of Ernst Curtius*. Mr. Frank Dicksee's *A Reverie* was classed next in order of merit.

## GESSO.\*

**G**ESSO work, so called, one of the minor byways of art, is a means of embellishment which touches on the one hand painting decoratively combined with a treated surface, and on the other modelled relief decoratively combined with colour.

On the labels attached to many specimens of gesso work at the South Kensington Museum (chiefly on the west side of the Italian Court) the two terms gesso and stucco are used almost indiscriminately. One reason for this may be in the fact that it is by no means always easy to tell whether a piece of work was executed in gesso or stucco, using the terms with a distinction which I shall hope to explain.

In the substances usually employed by the gesso worker, all the binding, the hardening, the cohesion is given by the drying and hardening of glue and oil; in stucco, on the contrary, these ingredients, so far from being necessary, can be injurious. It is the difference between carbonate and sulphate of lime, calcium the metallic basis of both. In gesso proper, whitening or chalk is used, the carbonate, which may be washed away by water; in stucco the sulphate is used, such as plaster of paris, which will set under water. Stucco depends on the re-formation of gypsum by uniting with water, sulphate of lime being present in one form or another in all true stucco. It follows, therefore, that gesso would not be used for exterior decoration. Much that is executed in stucco can be equally well executed in gesso. It is usual, however, to execute heavier modelling and higher relief in stucco; for although in stucco has been executed very fine work, it is true the slightest fine raisings of surface are rendered most happily in gesso, contrasting them not as to methods of manipulation, but as to nature of substance. It is roughly true that gesso is for the brush and stucco for the modelling tool, yet gesso can be used very stiff and stucco very thin.

Not only the methods of manipulation, but even the substances insensibly pass from one to the other. Plaster of paris will mix with gesso that has oil in it, and yet will seem to retain some of its self-setting power, and a considerable portion of whitening may be mixed with plaster (1 in 3) without injuring its setting. He who works gesso in higher and more modelled relief will find himself ere long working also in stucco. Yet the gesso worker will be surprised to find how much more than brushwork he can do with gesso, and still be using substantially gesso only.

To give the derivative meaning of the two words gesso and stucco would perhaps make the distinction clearer, but an Italian dictionary does not elucidate the matter. It only tells what gesso and what stucco is. It does not say what were the meanings of the words before they were used by the artist, or how the use of the words came about. (I shall be gratified if anyone in the audience can enlighten us at the end of my paper.)

Though the subject of this paper is gesso it has nevertheless seemed useful to touch on kindred stucco-work, and especially since it is very difficult to speak of either historically apart from the other. The term gesso, however, will, whatever the manipulation, be employed only for that which has not lime in it in any active form.

The glue or oil, or both, which have been already spoken of must have something to bind, which also will give them substances such as whitening, powdered chalk or killed plaster of paris. Other substances have at times been added, such as pumice powder and many others. At one time, so we are told, German artists used to mix finely-ground honestone with their gesso. Resin may be melted in the oil, and to resin, oil and glue may be added a very small quantity of pitch melted in turpentine. The resin in the oil helps to give the gesso a hardness. The oil and the pitch dissolved in turpentine at least help to protect it from injury by moisture. Very little of the oil is required, less resin and still less pitch. It may be remarked that many leave out the resin, some leave out the oil, and very few use pitch. By shaking them together, water and oil form a mechanical mixture of a milky appearance, used by some as a vehicle in oil-painting. To this mixture add whitening, and a gesso is formed which hardens into putty as the water dries out of it. The proportions for a pot of gesso are 10 oz. of glue, 2½ pints of water, 8 oz. of resin, 1½ pint of oil, 2 oz. of pitch, ¼ gill of Venice turpentine; of these take 6 parts of the glue-water, 1 of the resin oil, and 1-16th part of the pitch. One use of the pitch is that it helps keep the glue from going bad. If the glue goes sour the gesso of course, will not harden; but gesso may be kept for months after being made and yet remain good. A rough rule for the consistency of the glue-water is to make it so that it will only just set into jelly when cold. For the convenience of weighing the glue, it may be remembered that Scotch glue has the property of becoming flexible without getting sticky, after soaking in cold water for twenty-four hours. In such condition it may easily be cut with scissors, and it is convenient to keep

\* A paper read before the Applied Art Section, Society of Arts, by Matthew Webb, on Tuesday, March 2, 1897.



it in store in small weighed parcels and labelled. A store of jellied glue may be kept for some time by putting in a few drops of creosote or oil of cloves. When remelting a little water must be added to allow for evaporation in heating. White resin is the best, and if the student would be very particular he may use Venice turpentine in which to melt the pitch; but as a matter of fact the ordinary oily turps at the bottom of the tin brush-washer will do very well. Some put in Venice turpentine without pitch. Then there are, to be melted separately, resin in oil, pitch in turpentine, and glue in water. Having thrown these together and heated them up again, into the mixture stir whitening either carefully rolled and crushed in the dry state or previously well soaked. If soaked less water may be required in the solution of glue. The whitening sold as "gilders' whitening" is the best to buy, and the student will be surprised to find how much whitening the mixture will take before the gesso loses its very decided liquid character. Stir the mixture with the whitening in it well together, and always when possible keep it covered from the air till it is cold, otherwise the skin which would form is tiresome. With whitening glue is made a gesso for use with water-colour. At the consistency for the brush, gilders call this "thick white." A similar gesso was frequently used under gold by the illuminator in days when a page was not only for perusal, but for the pleasure of the eye. Gilders' stopping is whitening and glue at the consistency of dough. The ordinary trade "compo" with which frame makers make the ornament on frames is practically gesso, and may be softened for use by steaming. (Exhibit steamer with soft thick gesso.) Putty used by glaziers contains oil and whitening; with the addition of glue this would be gesso. In the resin varnish of commerce there is resin dissolved in oil, and at a pinch some of the various driers made for the house-painter's use would make gesso with glue and whitening added. Once get hold of the principle and there are many things which can be adapted.

Gesso will be required at different consistencies for different purposes. Naturally, if the proportion of whitening is increased so also is the stiffness of the gesso; it may be necessary, in order to make it bind, to put more glue in proportion to water, and an extra proportion of oil to keep the whole from cracking as it hardens. This gesso would be used for heavier relief. In thin gesso, for very fine work, such as the patterns on borders of robes, the oil may be left out altogether, with the glue also weak. As a rule, in working gesso the stronger glue is wanted in the earlier stages, the oil rather in the later; there it helps to give a finer surface finish if needed, and to protect the surface from moisture. With water and oil the final surface, if desirable, can be polished quite as fine as ivory, not that it is suggested there is any advantage in smoothness. It is always unsafe to put gesso strong of glue over gesso weak of glue; and fresh gesso over old dried gesso, without stopping the suction first, courts disaster. The dried gesso has an absorbent surface, which is just what gesso does not well adhere to. The suction may be stopped by shellac, thinly or thickly dissolved in methylated spirits or naphtha, or by thin glue water or both. The white polish of commerce is practically thin shellac, and patent knotting thinned with naphtha occasionally answers the same purpose, which is to choke the pores of gesso up with a hard gum, left behind after the spirit has evaporated. It is not possible to exaggerate the importance for the durability of the work of this incessant stopping of suction. The student may be impatient of the trouble, but safety is insured by stopping first with very thin shellac, and just before laying on the next gesso damping the old with very thin glue water. It is true that it will discolour the work, as will the oil in the gesso, but where the gesso is not depended on for colour, but will ultimately be finished with paint or gold, the discolouration will not be harmful.

Having made the gesso composition, the student wants a ground to work on and non-absorbent. Gesso will adhere readily to wood, straw-board, papier-mâché and similar foundations properly prepared with shellac, &c. To unprepared wood gesso adheres not too well, but firmly to glass and glass to it. Whenever practicable, however, the best of all grounds is one itself of gesso laid into canvas, the meshes of which afford hold to the gesso, while a wood panel, if it be underneath the canvas, is to some extent secured against cracking.

The coffer-front, No. 318 in South Kensington Museum, shows canvas under the gesso.

In a description of process it is always interesting, if not positively instructive, to instance from old work. Earlier paintings, in so far as they were "temper," were in a sense in water as distinct from oil colour; they, together with the later, though still early oil pictures, were mostly painted on panel. These panels were faced with a gesso priming, the gesso frequently laid in canvas over the panel. In the National Gallery, in room II., may be seen work of the early part of the fourteenth century by Duccio di Buoneseugua, by Pietro Foreuretti and others, which show this practice. In these pictures the panel is incorporated with the frame, and the ravages of time reveal, not only canvas underneath the gesso

facing of the frame, but also underneath the gesso priming of the panel—a finely woven but, compared with the size of the panels, a stoutish canvas.

It may be something too much of a fashion to trace methods back to the valleys of the Nile and Euphrates, but the nineteenth century, like the sixteenth, has its Renaissance; and though in a revival one may make the paralysing mistake of seeking too much in the past for authority and precedent, it affords a respectable sense of establishment to be able to discover in the land of the Pharaohs gesso traditions. In one form or another gesso they used for the surface finish of their sarcophagi. Where better shall the student look for the use of canvas with gesso than to the Egyptians who used linen so much, and habitually manipulated soaked linen for embalming purposes? Speaking of gesso as a priming, it has from time immemorial been used to cover wood, carved or not, intended for colouring—see carved wooden statuettes in South Kensington Museum—and this practice may have suggested the priming of picture panels. The frame-maker to-day covers wood with what is practically gesso before proceeding to gild it. It was also used to give surface finish before colouring to stone-carved effigies, such as those to be seen here in London, in the Temple Church, Westminster Abbey, &c.

While on the subject of these grounds one treatment of gesso may be taken into consideration which, in early work especially, gave such interest and value to the effect. The dry gesso ground very well takes a kind of engraving which, when gilded, yields a delightful play of light. When the Florentines would paint a wing, the pattern on robe, curtain, or cushion, rays of light, or a repeated diaper on background, the knife, stylus, or punch came into use. The glory you see radiating on the figure of the Christ in an *Assumption of the Virgin* (see Fra Angelico) is done by engraving ruled lines into hard gesso ground, a method which was turned to many accounts. The lines were of course engraved before the gilding and execution of the painting; and you often see, even in so careful a painter as Fra Angelico, that the painting has not been too nicely allowed for, and has had to encroach on the graven lines.

We need the glint of gold to get a full play and change of light and effect; radiating lines would be of little use in the glory unless the background were gilded afterwards. (See Fra Angelico.) Over the gold very beautiful effects of colour have been obtained by glazing. Very fine lines, especially in illuminated manuscripts, could be pressed in after gilding; but it should be remembered that gold leaf at that time was used thicker and richer than the leaf ordinarily used to-day.

This treatment of the ground is that found much later than the middle of the fifteenth century. In that beautiful work in the National Gallery by Lippo di Dalmasio (Room V., Ferrarese and Bolognese School), a Madonna and child, with sun-glory, a moon and angels, in effect broad and decorative, in design almost archaic, the painting is without any treatment of the gesso ground by incision or otherwise.

For examples of this incising, attention might be called to the following works in the National Gallery:—The large Fra Angelica Annunciation, on the wing of the Angel Gabriel (Room II.); the background of the Cinabue (Room III.); rays round the figure of Christ in the long Fra Angelico Predella (Room II.); Madonna of French work, fifteenth century, in the background, and in a halo which is placed high round the head, elaborately-chased diaper, or more properly punched (Room XIV.); Marriage of Virgin towards end of fourteenth century, Siennese School, Nicolo di Buonaccorso, frame and panel incorporate, frame brush, panel chase and punch, even under draperies (Room II.).

There are others which there will be occasion to speak of later.

At the consistency of cream gesso will flow from the brush, constituting what is called "brush modelled gesso." A long thin brush is best for most purposes. I prefer a hog; never a quill. The "rigger" brush used by coach painters is a good one. As the available brush is practically the drop of gesso hanging from below the hairs, you will see that long lines of slight or no curve are not easy to do. Some of the processes by which china may be decorated with modelling partially illustrates the manipulation of brush gesso. Some of the work is a little like painting on with slip. The projections and gradations of form can be got by brush stroke after brush stroke, somewhat after the manner of *pâte sur pâte*. Another method is to lay with the brush what I might call cloisons of gesso round a form; and then when the walls are dry and stopped flood gesso into the interspace, rather after the manner of cloisonné enamel.

Except as a diaper or in thin floral decoration this brush-gesso work is of course hardly suitable for design intended to cover any large area, for large character of work, or for work which aspires to distinction or elaboration as modelling. The work is beautifully shown on Italian marriage coffers, of which we have such fine specimens at South Kensington Museum. In them the gesso-worker was generally contented to leave decorative details, more or less high, soft and fat as they flow



from the brush. Sometimes sharp edges to angular facets suggest a 'supervising scraper' with a knife; and, indeed, for a similar purpose the worker may find it useful to keep by him different finenesses of sand and emery papers. Frequently when the outline was required to be sharp the ground was punched with little dots. These not only gave difference of texture, but being brought up to the floral or ornament sharpened the drawing. The dot can be made in gesso still soft, but a line cannot well be scratched or chased except into hard gesso.

In the case of the human figure, the face and features were generally left to be made out later by the paint-brush; the head being a mere general shape, vaguely and softly raised in gesso on the ground.

Many of the ornamental forms and conventions on archaic pottery are eminently adaptable to gesso work, and the very manipulation of the long thin brush, charged with fluid but thickish paint, after the manner of such decoration, is suggestive of brush-gesso.

Before quitting this part of the subject attention may be called especially to the principle that brush-gesso is typically gesso-work. It thus constitutes an art which a painter can naturally take up, for it is in very low relief, largely depends on drawing rather than section, and is first and foremost brush-work.

Both more quickly and more satisfactorily than by brush-gesso, heavier modelling and higher relief to any desired projection may be obtained by incorporating with the gesso various fibres.

These, such as tow, cotton-wool, horsehair, wood-shavings, &c., may be pulled out or cut up and soaked in the creamy gesso. In a similar way even paper and rag may be manipulated and left stiffening in the hardening gesso to a required shape. Remembering that gesso and non-absorbent substances will adhere to each other, many things offer themselves to the worker's ingenuity, such as wire, and indeed any pieces of metal and glass. Cardboard or strawboard and wood of course may come in useful, first painted over with shellac; knotting or glue. String may also be mentioned as frequently of use.

For the use of string, probably wood, and glass with gesso, reference may be made to the raised work in the St. Peter of Creveillé's big altar-piece in the National Gallery. (Room VIII.)

There is another mode of using gesso, not perhaps as interesting as it is instructive. With or without fibre, gesso may be mixed stiff enough to take squeezes in. Naturally in this stiffer gesso, to keep it from cracking as it hardens, stronger glue is required with more oil to bear out the increased bulk of whitening. The following proportion would be a very strong gesso for squeezing in:—6 lbs. of glue in 4 pints of water; 3 lbs. of resin in 3 pints of oil;  $\frac{1}{2}$  lb. of pitch in 1 gill of Venice turpentine.

(To be concluded.)

#### GLASGOW ECCLESIOLOGICAL SOCIETY.

THIS Society met on the 23rd ult. in Woodside Parish Church Hall, the Right Rev. Bishop Harrison in the chair. A paper was read by the Rev. David Watson, Woodside, on "Some Aspects of Recent Church Architecture." The lecturer spoke of the present-day revival of sacred art. The long years of neglect and the many causes of distrust and suspicion of everything ecclesiastical have somewhat taken end. But there is no society or corporate body to which an appeal can be made for sympathetic and intelligent guidance in the erection of ecclesiastical edifices on right lines. A cry is raised for the erection of a church; a sum of money, less rather than more, is subscribed; the usual grants are promised by certain trustees or committees in authority, and in a short twelvemonth thereafter the congregation is worshipping within the church walls. In too many cases the builders of these edifices are summoned together again because a great renovation is required; not because the church has become too small, but because the congregation's conception of the fitness of things has outgrown the place they sit in. What is often wanted is a catholic ideal to start with. It is the district that is to be served and enriched by the structure that is proposed to be built. Some other *raison d'être*, therefore, than rivalry or contradictoriness should determine the size and decide the style. It is not meant as a plaything for a short-lived decade or two, but meant to be the home and trysting-place of all that is reverent and humble, all that is highest and best for generations yet unborn. At the door of every effort at church-building stands the solemn interrogatory, To what great purpose and chief end? For faith or belief, for emotion or understanding, for priestcraft or the preaching of the Word, or both it may be? We too often set about to build church edifices not so much in response to the religious consciousness of the country as in imitation of the achievements and methods of the past. We do not seem willing to acknowledge that churches, like children, outgrow their clothes; and that what was fitting and appropriate 500

years ago is simply unwearable and absurd in these days. The rule of nave, chancel and transept may be quite as admirably suited to Protestant purposes as it suited the sacerdotal purposes of the Middle Ages, but not without a large measure of readjustment, in response to the intellectual and religious attitude of to-day, quite as much as that same all-important factor dictated this particular design in its day. And hence the mistake of playing at a pretentiousness quite meaningless in Presbyterian churches, as, for instance, the erection of a rood-screen where no distinction between the clergyman and the people really exists; the attempt at a reredos where no reredos can possibly be wanted; the use of gable turrets as chimneys and the erection of chancels too diminutive for any real use. We are told betimes that the main purport of church-going is for worship, but those same people do not seem to know that the soul may be filled with a rapture and a reverence which are the very embodiment of worship far more readily by a manly and wholesome ministry of the Word than the mere singing of so many verses of doggerel to a languishing or a lusty tune as the case may be. The shunting of the pulpit to one side and the placing of a communion table or so-called altar at the farther end of a church is not only not in accordance with primitive custom, but is no furtherance of the church's chief use. The paper gave rise to a lengthy discussion, in which some of the views of the lecturer were subjected to considerable criticism. A very hearty vote of thanks was given to Mr. Watson for a lecture of great interest and excellence.

#### SOUTH KENSINGTON MUSEUM.

A COMMUNICATION from M. Charles Yriarte, inspector-general of Fine Arts in France, several of whose books have been noticed in *The Architect*, has been handed to the Paris correspondent of the *Times*, who gives the subjoined translation of it. M. Yriarte was commissioned to guard and classify the works of art collected in France by Sir Richard Wallace and now bequeathed to the British nation. On behalf, therefore, of the artistic patrimony of the world he thinks it right to intervene in the question of the completion of South Kensington Museum, and Englishmen will doubtless applaud such intervention by a foreigner actuated by a love of art and a desire to serve it. He writes:—

To whatever country he belongs a foreigner cannot remain insensible to the spectacle offered by the outburst of affectionate gratitude of an entire people, eager to celebrate the jubilee of the reign of their sovereign by an act of beneficence for the nation itself. It is, however, only from the point of view of the interests of art, of the development of taste, and of the technical education of artisans of every class and every country, that I would plead after so many others the cause of the completion of the South Kensington Museum. Lord Playfair's proposal responds to an imperious necessity, and the occasion of realising it is propitious. Consider the state of things in England at the beginning of Her Majesty's reign as regards the education of the art-worker and what is known as public taste. In 1837 there was a museum of decorative art and a special school for drawing. In 1857—a year doubly celebrated in the history of art in England—the Queen and the Prince Consort inaugurated the South Kensington Museum, and in Manchester was opened that prodigious exhibition of England's art treasures to which the leading French artists and the most celebrated critics went as on a pilgrimage, to return astonished at a spectacle which was to them a veritable revelation.

The South Kensington Museum soon began to develop. Whole collections were bequeathed to it; the treasure augmented day by day. Amateurs consented to place there for long periods precious collections enlarging the field of study. The directors of the Science and Art Department, ingenious in the search for the means of propaganda, opened annexes, multiplying thereby centres of public instruction and the objects destined to awaken thought in the minds of the artists and artisans, and—an instance of popularisation unique in Europe—they had the idea of the itinerant museum, to be transported from town to town, to stop in each place long enough to be seen and appreciated, and thus to place under the eyes of the artisans in every centre the objects best adapted to the genius and tradition of the country.

The exhibitions of the English schools, by the evident progress made by their pupils, soon recompensed these efforts. The level of public taste was much raised. Art applied to industry becomes the great preoccupation, and powerful minds, fertile imaginations, daring disinterested writers and artists, take the lead of the movement and turn it into new channels. There was too great a tendency towards archaeology. With fresh and renewed efforts everything is transformed. Mérimée, our great writer, archaeologist, artist, general inspector of historic monuments, returns from London thoughtful, and in a famous report to the Minister of Education utters a cry of



alarm. Our decennial exhibitions had given us for some time the first place. Our great art industries now became uneasy. England had overtaken and was about to outstrip us. The movement did not slacken. Who would think, in presence of such results, of denying the share in them of the South Kensington Museum, which had become the most fruitful source, the most colossal dépôt, of *objets d'art* of all sorts and the most varied and complete types and examples, capable of favouring the development of artistic taste, from its simplest forms, as seen in the artisan who overcomes common material, transforming it into a precious object, to the creators, the architects, painters and sculptors, who embody their dreams and fancies, giving them form, colour and life, and awakening thought in us while making a sanctuary of the home where we live?

To-day for all of us foreigners South Kensington is a Mecca. England there possesses the entire art of Europe and the East, their spiritual manifestations under all forms, and Europe has been swept into the stream in imitation of England. Berlin, Budapest, Vienna, Nuremberg, Basle, Madrid, St. Petersburg, Moscow, the large towns of America itself have now their South Kensingtons; but in the original one of England still unfinished, where the splendour of the start (excessive, as it seems to me) contrasts with the inertia of the last fifteen years, the inconceivable treasures are becoming so much heaped up as to be a veritable obstacle to study. How is it possible to study this extraordinary series of textiles of all times and countries, ranged one upon another, overlapping and hiding one another, without proper perspective and proper light? And the draperies, the embossed Italian and Spanish leathers, the carved wood, the ironwork, the *cassoni*, the lacquer, placed at such an elevation that one is obliged to mount steps to study their form and colours. And the unrivalled collection of casts of ivories from antiquity to the present time, the precious work of Layard, that unique cast the plaster of which is equal to the original. The collection of musical instruments is quite invisible in a miserable light like the *azulejos*, the mosaics, and the decorative tablets of the Persians. There will presently be no knowing where to stow the model, one-third size, of the execution of the Camerino of Isabelle d'Este, Marchioness of Mantua, where after three centuries we have reproduced the works of Mantegna and Costa, which fate has brought to our Louvre museum.

It is not for me to give an opinion on the architectural part of the work to be accomplished. South Kensington is especially a museum for study, and for study a mere box is sufficient, spacious, well-lighted, with as few projections as possible, of no exaggerated height, easy of access, but, above all, with space and light, and lastly, from due respect for art, with decent surroundings, a fine entrance and no unsafe neighbouring buildings. The architects will be unable to protest. They know that in architecture the external expression of a requirement fulfilled, a form appropriate to the object aimed at, inevitably gives a monument its character. Ornament is neither in the material employed nor on the wall, where it sometimes distracts attention; it is especially in the art object itself, and imagination can find ample scope outside. I desire, therefore, for the entire nation the realisation of Lord Playfair's proposal, the completion of the Victoria Museum for the advantage of art studies and the development of public taste, and this out of gratitude for the facilities of every kind found by foreigners of all nations in the great English public dépôts.

#### ST. GABRIEL'S CHURCH, PIMLICO.

THE Bishop of London consecrated, on March 1, the additions which have been made to St. Gabriel's Church, Pimlico. The church is a well-proportioned Gothic building with three aisles, chancel and western tower and spire, but the beauty of the building was not a little disfigured by the unsightly side galleries which have just been removed. During the incumbency of the late vicar, the Rev. J. H. Ellison, some improvements were made, and the removal of the galleries was contemplated. This has now been accomplished by the present vicar, the Rev. Canon Rupert H. Morris, D.D., through the liberality of the Duke of Westminster, the patron of the living, Lord Ashcombe and others.

The additions, which consist of north and south aisles, a new south chapel in memory of the late Rev. Brymer Belcher, the first vicar, a west gallery and a west porch, the gift of Lord Edward Pelham Clinton, have been carried out by Mr. John Thompson, of Peterborough, at a cost of some 6,000*l.*, from the designs of Mr. Arthur Baker, F.R.I.B.A., of the firm of Messrs. Baker & Turrill, in harmony with the original design, and have added to the size and dignity of the church.

The extra width given by the additional aisles and the double arcade on each side of the nave have increased the picturesqueness of the interior, which has also been enriched by the groining of the aisles' roofs and by the richly carved oak front of the west gallery carried on a stone arcade. The chancel has also been beautified by a new east window, designed by Mr. Kemp.

#### LEICESTER SOCIETY OF ARCHITECTS.

THE annual exhibition of students' work and distribution of prizes in connection with the Leicester and Leicestershire Society of Architects was held at the Museum Buildings on the 23rd ult. The prize drawings of the local students, together with a number sent down from the Royal Institute of British Architects, were exhibited in one of the Art Gallery rooms, and formed a most interesting collection. Mr. Chas. Baker (president) occupied the chair, and there was a numerous attendance, among those present being Messrs. E. Clephan, A. H. Paget, S. P. Pick (hon. secretary), A. Spencer, C. Kempson, A. H. Hind, H. H. Thomson, W. A. Catlow, W. H. Topott, J. W. Simpson, and a number of students and friends.

The President, after opening the proceedings, called upon Mr. Paget, who gave a very able review of the students' works.

The prizes were then distributed by Mr. Clephan as follows:—For a design for entrance lodge and gates, the first and second divided equally between Mr. Shirley Harrison and Mr. A. Herbert; for measured drawings of old work, first Mr. A. Herbert, second Messrs. A. B. Widdowson and Traylen (bracketed together); for architectural sketches, first Mr. A. Herbert, second not awarded.

A vote of thanks was passed to Mr. Paget for his review of the students' works, to which Mr. Paget replied. A similar vote was also passed to Mr. Catlow for his duties as secretary of the prize committee, and to Mr. Baker, the president, and the proceedings terminated.



#### Architecture and the Public.

SIR,—Will you permit one of the laity to utter through your columns a mild protest against the continual girding of some architects at the public for their lack of interest in architecture, and their absolute want of taste in the architectural art? The accusation is neither just nor wise, nor is it altogether true, and it is sometimes expressed in a way that becomes a little offensive.

As a matter of fact, there is nothing except our ailments and perhaps our politics, in which we average men take so much interest as architecture. We will confess at once that it is not a very enlightened or intelligent interest, which is perhaps the fault of our teachers rather than our own, but it is a keen one all the same.

If the average man visits a new town he spends his leisure looking first at its old churches and then at its modern public buildings; if he revisits it he is eager first of all to see what new buildings have been erected, and when he comes away it is always with the best photographs he can get (if in France with those large ones of detail, which seem nowhere obtainable in this country except at Southwell).

Further, the printsellers say that etchings of buildings go off more quickly than almost any other portion of their stock, while the public reference libraries of our large towns contain certainly a due proportion of works on architecture, which the librarians can testify are as much consulted as the books of any other department.

Of course the average man knows nothing about the science of architecture, that he wisely leaves to the expert, knowing that the amateur lawyer has a fool for his client; his interest is æsthetic, antiquarian and historical, and of the outlines of the history of the art and of the characteristics of its main divisions he knows about as much as the general run of its practitioners. If he can afford it he is pretty sure to have Ferguson on his shelves; if not, there will be the handbooks of Messrs. Roger Smith and Poynter, or the more recent works of Statham or Fletcher, and possibly a monograph on the great church of his neighbourhood.

As to the oft-repeated taunt that the public loves excess of ornament, plenty for its money, this is grotesquely untrue. What the average man does like is simplicity and repose; his grievance with so much modern architecture is that it is *jumpy* and after passing through some recent West-end streets he finds it refreshing to take a walk even down Harley Street.

The man who thinks of building himself a house has a clear idea of what he wants, but he does not often get it, as he is influenced by his architect, who is not always a Shaw, a George or a Bidlake. His ideal of a home is a house like those late Stuart or early Georgian houses still common in the country and around London, square and solid, of warm red brick, with narrow windows whose panes are small and their bars thick and painted white, the whole crowned by a great overhanging cornice to give it dignity, and he may or may not have an individual preference for a central pediment and pilasters. This sort of house he calls comfortable and dignified, or he may use General Ople's solecism and describe it as gentlemanly. To this ideal he has remained constant through good report and



ill report, and it was pathetic to see the middle-aged men of the "fifties" and early "sixties," when architects had come under the influence of Mr. Ruskin or the thumb of the Cambridge Camden Society, pretending to admire the eccentric habitations they were forced to live in, with their pointed windows, their excrescences, their roofs of parti-coloured slate and their top-heavy crestings; or, a little later, the early vagaries of the Anglo-Dutch style. Fortunately, there are signs that some of our best architects are coming round to our opinion.

With regard to street architecture in towns, we plead guilty to an affection for the architecture of the Bloomsbury estate, as originally planned—each block treated as a whole, with a long straight massive cornice, relieved, as in Russell and Tavistock Squares, by a more ornamental treatment of the centre and extremities. This is, no doubt, an evidence of Philistine taste, but it is, too, an evidence that we are by no means indifferent to the art.

I should say more, but I fear I have already trespassed too far on your space.—Your obedient servant,  
A LAYMAN.  
March 1, 1897.

SIR,—After reading the report of the lecture on "The Architect and the Public" lately delivered by Mr. Bidlake before the Architectural Association in London, and which is well worthy of perusal, I could not help thinking that many of the difficulties the profession have to contend with, and the lack of respect it should command, can be traced to the actions of individual members of it. I will give you a case in point. About a year ago I was commissioned by the vestry of a church, of which I am a member, to get carried out reseating, painting, ventilation, and other works. My plans were approved of, contracts were entered into, two of the contractors, the painter and an ironmonger who got the contract for the heating alterations, being both members of the said vestry. Now everything went on smoothly, the joiner's work was made and ready for fixing in position, when a change unfortunately took place in the rectorship. Shortly after this event I was obliged, in discharge of my duty, to write to the painter for an explanation as to why his men were not allowed to make up tints to my satisfaction, and also to the ironmonger in regard to defective work done by his men. The painter did not reply to me, but went to the ironmonger, who came and wished me to go and allay the irritation of the painter. This request not being acceded to, the painter took my letter to the rector, and the rector, after consulting the ironmonger, decided to have a meeting of the vestry, which meeting I attended, as did also the painter and ironmonger. The rector stated that after consultation with the ironmonger it was considered advisable to call the meeting to appoint a committee to confer with the architect when anything took place (the reader will understand what that meant). I, seeing the state of affairs, asked to get read my letter to the painter; the rector would not allow this, but said that I (the architect) had no right to give any instructions to the workmen but only to the contractors; forthwith there was a committee appointed, the painter and ironmonger taking part in the selection, and after this committee was appointed it was proposed that ladies should be consulted as to the painting, and the painter who had signed my specification and agreed to do the work according to my instructions strongly supported the proposal. I naturally objected to the proceedings, but was told by the rector that I had no right to dictate. I did not attempt to do so, but took the more effective course of sending in my resignation the following day. This caused a hastily summoned council to be held, at which one of those present said that I had not left them a way to get out of it; consequently I received a letter saying the vestry felt keenly the position my action had placed it in, and as it had no alternative, my resignation was accepted, and I was requested to send in the contract documents. This I answered by sending in my account, which was paid before I complied with the request. Then a deputation went architect-hunting, made arrangements with one of the most respectable firms in Ulster, but when the said firm came to understand the matter it declined to have anything to do with it, and so the contractors had a free hand for more than a month, until a member of the vestry got an architect to come, and when asked if any of my work was condemnable he had to admit that it was not; but he wished to change the pitch pine gallery front for one of open ironwork. This pill was rather large to swallow, and he had to pocket it. Not getting his own way in this, he refused to take the work in hand; but after a short interval he came back and got my work carried out. Now the facts of the case are well known, and I leave it to your readers to say if it was a gentlemanly and professional action to take my place under the circumstances. However, I can afford to be generous, as I know what has taken place since, and I have had the satisfaction of being told by several of the leading members that the vestry very much regretted that I was treated as I had been. I may also say that some time back this same architect, through

a friend of his, tried to oust me from my position in another place, and, in order to secure the appointment, offered to prepare plans for a certain sum, and to allow part of it to merge in the commission should the work be carried out, and this at a time when I was actually engaged getting work done for the same institution, which work, and that previously done by me, gave entire satisfaction. I may add that where I practise is more than thirty miles from where my plausible friend hails from, and if this comes under his notice I hope he will reply, as I will then have an opportunity of referring to some of the work done by him.—I am, sir,

AN ULSTER ARCHITECT.

#### Cathedral Series.

SIR,—It seems hardly possible for me to add to the arguments or supplement the earnest requests of your gifted correspondents for you to print all the Cathedral illustrations separately; yet may I suggest that if this were done on thin paper, similar to that used for the letterpress, the cost would be infinitesimally increased, the patchwork of the "two numbers" suggestion obviated, and the value of the series greatly enhanced.

May I also be allowed to remark that some years ago when a number of correspondents pointed out to Messrs. Cassell & Co. that the letterpress behind the centre art picture spoilt the clearness of the same, they immediately fell in with our suggestion, and afterwards printed the second art plate without the letterpress backing.

Could you see your way clear to fall in with these views for the future, and would reprint the text blocks at a nominal cost—say 1s.—I feel positive that thousands would avail themselves of the opportunity and obtain a series which undoubtedly forms an epoch in the history of illustrated journalism.—I am, sir, yours obediently,

CHAS. BEETLESTONE.

4 Oak Terrace, Bushey Hill Road,  
Camberwell, S.E.: March 2.

#### GENERAL.

Sir A. W. Blomfield, A.R.A., has prepared plans of a massive tower to be erected at the south-west end of the parish church of St. Mary's, Chatham. The new tower will form part of a general scheme of restoration, which is estimated to cost about 8,000l.

Mr. H. S. Eele Shaw, Professor of Engineering in University College, Liverpool, is to receive the honorary degree of LL.D. from the University of St. Andrews. Another recipient is Miss Eugénie Sellers, editor of Furtwängler's "Masterpieces of Greek Sculpture" and other works on art.

A Bust of the late Lord Randolph Churchill is to be placed in the precincts of the House of Commons. The commission will probably be given to Mr. Waldo Story.

The Bill seeking powers for making a railway from Praed Street, Paddington, to Willesden, which was to be worked by electricity or cable power, has been withdrawn.

The Gold Medal presented to Dr. Nansen by the Royal Geographical Society was designed and modelled by Mr. Allan Wyon, F.S.A. On the obverse is a portrait of the explorer, on the reverse a representation of his vessel, the *Fram*.

The Goncourt Collections of drawings and other examples of the art of the eighteenth century have realised at the Hôtel Drouot, Paris, 925,526 francs, which will be available for the proposed Academy.

C. A. Sainte-Beuve, who was the greatest of the modern critics of France, was born in Boulogne in 1804, and was the most distinguished man of letters produced there. It is proposed to erect a bust of him in Paris; but all that Boulogne has contributed towards the cost is a sum of 50 francs.

In Venice the penny steamers which run on the Grand Canal have proved so convenient to the inhabitants that the municipal authorities have made an arrangement with the steamboat company for the running of the steamers from Rialto's bridge to the railway station up to midnight.

The Building Trades' Exhibition at the Royal Agricultural Hall will be open from March 20 to 27. The Right Hon. the Lord Mayor, accompanied by the Sheriffs of London, will open the exhibition on Saturday, March 20, at noon. The following official visits will be paid and meetings held during the week:—Saturday (opening day), visit of the Architectural Association, at three o'clock; Monday, visit of the Association of Municipal and County Engineers, at four o'clock; Tuesday, annual meeting of the Institute of Clayworkers; Wednesday, visit of the Builders' Merchants' Association of London; Thursday, conference of House Painters and Decorators, at 7.30. Architects' drawings on exhibition, also loans from South Kensington Museum, Corporation of London, City companies, &c.



# The Architect.

## THE WEEK.

THE annual general meeting of the subscribers and donors to the funds of the Architects' Benevolent Society was held on Wednesday afternoon in the council-room of the Royal Institute of British Architects, Professor AITCHISON, A.R.A., the president, occupying the chair. The annual report of the Council stated that the progress of the Society was maintained. Forty additional annual subscribers had joined. But as applications for assistance were made from all parts of the country the sum received was still inadequate. The sum expended in relief was 604*l.* 15*s.*, while the subscriptions amounted to 460*l.* 15*s.* In addition, pensions to the amount of 70*l.* were paid. The Council expressed regret at the resignation of the honorary treasurer-ship by Mr. ARTHUR CATES, who was not only a liberal donor, but promoted the usefulness of the Society by time and labour. When he accepted office the subscriptions amounted to 308*l.* They are now 453*l.*, and the invested capital has been increased from 7,426*l.* to 9,893*l.* Mr. W. HILTON NASH was elected as Mr. CATES's successor. The following members of Council were elected for 1897-98:—The President of the Royal Institute of British Architects, president; Messrs. WM. KIDNER, GEO. SCAMELL, ZEPH KING, GEO. INSKIPP, Colonel R. W. EDIS, ARTHUR CROW, E. A. GRUNING, G. T. HINE, ARTHUR CATES, ASTON WEBB, H. L. FLORENCE, J. T. CHRISTOPHER, SYDNEY SMIRKE and WM. GRELLIER, with Mr. PERCIVALL CURREY as hon. secretary. The President testified to the great benefit which had been derived from Mr. CATES's long official services. Mr. CATES, in replying, trusted that the Society would receive more liberal support from the architectural profession than had hitherto been the case. A vote of thanks having been passed to the auditors, Mr. HENRY HALL and Mr. WM. WOODWARD, and to the President, the proceedings terminated.

APPARENTLY the first approach to a legal definition of "rateable value" was given in the schedule of the Parochial Assessment Act of 1836, where it is supposed to be synonymous with "net annual value." In the Valuation Act of 1869 rateable value is said to be "the gross value after deducting from it the probable annual cost of repairs, insurance and other expenses, if any, necessary to maintain the property in a state to command the rent." In the Water Rate Definition Act of 1885 there is a return to the phraseology of 1836, for "annual value" and "rateable value" are taken as equivalents. The decision of Judge LUMLEY SMITH, Q.C., in the Westminster County Court, which has created much interest in the Metropolis, does not therefore strain an accepted phrase from its ordinary acceptation. The Grand Junction Waterworks Company sought to recover 32*l.* from Mr. MAXWELL DAWSON for water supplied to No. 161 Piccadilly. The question in dispute was the basis of the charge. In 1871 the rateable value was 160*l.*, and the amount charged was 2*l.* 5*s.* for the supply. In 1871 there was a change in the rateable value, and the water rate worked out at four guineas per annum, and that amount was paid. In 1882 the rateable value was again raised, and it was arranged that so long as Mrs. DAWSON lived on or occupied the premises the amount should not be increased. In 1893 the rateable value was raised to 250*l.*, and in 1895 to 334*l.* Under section 46 of the Companies Act of 1822 the company could charge 4*l.* per cent. on the value not exceeding 200*l.*, and 3*l.* per cent. if over 200*l.* Defendant said the amount he ought to pay was 4 guineas per annum, which was fixed during his mother's lifetime. His counsel argued that Mr. DAWSON was partner with his mother when the agreement was made, and could only be altered by the consent of both parties. The four guineas were paid for three years after Mrs. DAWSON's death, and were accepted without prejudice. The company had tried for 7*l.* a year, 7*l.* 14*s.*, and as much as 9*l.* The Definition Act said nothing about the raising of the amount from time to time with the rateable value. Had that been intended the Act would have stated it clearly and not left it to be inferred.

At the present time the company was supplying less water than they used to do, and yet they wanted to be paid more money. The Judge said that as the rateable value varied the water rate varied also. The agreement came to an end when Mrs. DAWSON died. Judgment was given for the plaintiffs for the amount claimed with costs.

AMONG the artists who appear to be survivals of a primitive state of manners in Paris was HENRI PILLE. He might have belonged to the times when it was a crime to draw from a living model, and therefore was obliged to assume a garb which suggested he was not entirely sane. There are strange figures to be seen in the Salon on vanishing days mixed with others who are embodiments of the most recent fashion plates, but PILLE continued to be unrivalled. It was well known that *concierges* sometimes hesitated before they allowed him to ascend the staircase. PILLE seemed to delight in shocking conventionalities, but the real cause of his get up was his indifference. His mind was absorbed by his art. A painter who could produce not only historic scenes which were correct in all their details as well as in expression of character, but was no less competent in dealing with illustrations for comic journals, might be excused if he were careless about his appearance. Too often men who adopt such mannerism as PILLE's are charlatans, but the painter was a hard worker as well as a man of genius. His outer aspect did not recommend him to the authorities, for he was not selected for any of those public commissions which he could have carried out with advantage for Paris or for the State. He found compensation in his presidentship of the Société des Artistes Illustrateurs, an appointment he worthily filled.

THE office of an expert or valuer in connection with the sale by auction of works of art is a desirable one in Paris. Everybody remembers the sale of the SPITZER collection a couple of years ago which attracted buyers from all parts of Europe. The amount realised approached 9,000,000 francs. The auctioneer paid M. MANNHEIM no less than 300,000 francs commission. The representatives of the late owner of the collection were dissatisfied that so large a sum should be deducted from the amount received from the collection. Accordingly an action was brought before the French Chambers for the purpose of reducing the sum. In defence it was maintained there was no excess in the amount received by M. MANNHEIM, whose valuation was borne out by the result of the sales. The judges are considering their decision.

CANADA has to depend mainly on imported cement. During the year 1895, out of 255,000 casks which were used no less than 223,000 casks were imports. England supplies about 45 per cent. and Belgium 25 per cent. Up to March 1866 the duty was 20 per cent. of the value, now it ranges from 33 to 52 per cent. In some cases the duty is found to exceed the cost of the cement. In consequence an immense quantity of inferior cement is employed in Canada, and ordinary mortar is substituted for cement. Protection may have its advantages in a country like Canada, but if within a few years bridges on railways and roads and other public works can no longer exhibit sound masonry, the cost of repairs will be more than an equivalent for any gain derived from an excessive tariff. If Canada cannot produce cement there is no native industry to be protected, and therefore, for the sake of a fiction, the country is saddled with the expense of upholding a kind of construction that would not be tolerated in Great Britain.

THE Dean of Peterborough announces that the portion of the north-west gable of the west front of the cathedral which it was found necessary to reset has been taken down, and that the work of resetting will be at once proceeded with. The stones have been found to be in an excellent condition, and will, with few exceptions, be replaced in their original positions. The mortar in which they were set had entirely lost its cohesive properties, and was reduced to a condition of fine loose powder. Dr. INGRAM adds that sufficient funds have been received or promised to complete the work at the gable, but there is still needed a considerable sum to carry out the architect's recommendations for securing the permanent safety of the entire fabric.



## QUANTITIES.\*

IT is imagined by some architects that if the public in general could be persuaded to read a history of architectural styles, or a treatise on building construction, or an investigation of the æsthetics of form, it would be an advantage for the architectural profession. But how can an ordinary reader be expected to realise the connection between the house in which he lives and the Parthenon, Beauvais Cathedral, the Whitehall Banqueting House, or other admired buildings? Nor in his home can he discover any difficulties of construction which were overcome. He may know by experience that parts somehow require repairing from time to time, but as he could not explain how the roof, stairs, floors are held together, or the variety of joints which may be in the hall door, he is likely to conclude that the science of construction can only be exemplified in works of a different class. As to æsthetics he is sure to believe the principles have more connection with the Japanese fans, bulrushes, blue plates, bows on chairs, and other discoveries of our time than with an architect's work. Better than any of the books we have mentioned as an aid to the conversion of the uninitiated would be a treatise on quantities. The best of all means would be the bills of quantities for a house which the person in darkness was about to build. But they affect him so closely, he could not be expected to take a philosophical interest in them, and he would have, too, a misgiving that the study of them was a snare. A book like Mr. LEANING'S, on the other hand, would be a revelation to him, no less astounding than the late Professor HUXLEY'S volume on the "Crayfish." Let us suppose he opens it by chance, as we did, at page 257. He will find there the quantities for "No. 1 Step-ladder." The name may at first puzzle him, but he will conclude it means stairs of a simple sort. He finds that a precise quantity of fir framed in cube feet is required, besides different areas of planing of  $1\frac{1}{4}$  inch rough batten landing, with open joints; of  $1\frac{1}{4}$  inch deal rough lining, and treads of rough framed; of 2-inch deal rough-framed strings; so many feet run of labour to rounded edge to 3 inches fir. There are, too, housings of treads, ogee cut ends to bearers, ends of bearers, &c., cut and pinned into wall. After the discovery of the elements of the "step-ladder," let him be informed that the amount of work required could not be ascertained unless all was shown on drawings, and it may then dawn upon him that if a whole building has to be treated in like manner the architect's commission for the preparation of drawings is not so easily earned as he imagined. When he also learns that the architect has to ascertain that the varied work described for the stepladder is carried out to the inch, it must be no less evident that so much microscopic scrutiny is also worth paying for. After going through the pages the representative of the public will discover that the "step-ladder" type is not continuously followed; there are some which are simpler and others more difficult. But it is sufficient to suggest how numerous are the distinct parts which are required before the simplest house is brought to completion.

The fact is, there is an analogy between houses and organic structures. The animal frame is concealed by an outer skin which in no way indicates the intricate construction which is beneath; and in houses the paint, plaster, room-paper, &c., cover a multitude of examples of constructive skill. How many occupants of houses are able to form a definite notion of a framed partition? They generally consider it to be a flimsy division between rooms which would not have existed if an honest system of building prevailed. An ordinary client is generally sceptical if the details of a window are put before him. They seem to him to be a case of much ado about nothing, or misapplied ingenuity, for he is confident that if he tested the drawings it would be discovered that the nails were somehow represented in plan and section. Until people are convinced that buildings are not the simple things they appear to be, that there is a veritable hiding of skilful work on which the stability of the building depends, they will not believe in the importance of architecture. They should

reason from the seen to the unseen, and the latter is the more important.

The ignorance of the public on the subject is revealed whenever men who are distinguished, and especially literary men, have to refer to buildings. CARLYLE was a mason's son, and might therefore be expected to know a little about construction. But on those occasions when he broke out against modern buildings he seemed like a child whose doll's house had come to grief. It might be supposed that when the Chelsea sage walked abroad of an afternoon, he was compelled to walk circumspectly on account of the houses which fell as he passed. In fact, nine tenths of the complaints against builders will be found to be inspired by ignorance of all that has to be done, and to remove that ignorance there is nothing to surpass a bill of quantities, even if it is only partially comprehended.

We are afraid, however, a long time must elapse before the public will consider it a duty to study such a book as Mr. LEANING'S. If he has been fortunate in reaching a third edition, the purchasers must be surveyors or aspirants to that profitable profession. The subject is now a common one in the evening technical classes, and so many are attracted by it there is a likelihood of many subsequent editions. Mr. LEANING and his publishers have undoubtedly earned the success they have obtained. It was announced in the second edition that "the system of measuring suggested in this book is for the greater part that adopted by Mr. THOMAS M. RICKMAN, and consequently needs no further recommendation," and since then no better system has been evolved. But it should be known by would-be surveyors that a book alone will not make a thoroughly practical surveyor. There must be some experience of the actual things which are anticipated in the bills, and of the time and labour needed in their production. It is not ideas merely which the surveyor has in his mind; he should be able to realise whatever is inventoried as if it existed.

That facility in discriminating between the time which is required for two or more classes of work, that to ordinary eyes may seem to be identical in value, is not easily acquired, unless there is a long period of concentration given to it alone. For that reason there is more likely to be perfect quantities when they are taken out by an independent surveyor than by the architect or whoever prepared the plans. In one case form or arrangement must be predominant, in the other cost rules. The architect cannot well devote himself to a consideration of the fractions of time which differentiate various sorts of work, while the surveyor should be able to make as close an approximation to the minutes, hours or days which will be needed as any builder. There cannot be too little guessing in preparing estimates for tenders, and without the amplest bills it is difficult to see how guessing is to be avoided. Moreover, owing to the facilities of communication, competitions for a contract are no longer confined to the district in which the work is to be carried out. In order that all of them may have fair play it is becoming yearly more necessary that uniformity in the bills should be insured. That end does not seem attainable if there is a rough-and-ready sort of grouping imposed on the competitors which they cannot all equally appreciate. Without exhaustiveness there cannot be such uniformity as is desirable. On this subject Mr. LEANING says:—"The adoption of a code of rules by the Manchester Society of Architects, which differs in many respects from the best London practice, is to be deplored, for though some differences are at present unavoidable (local customs being difficult to change), yet united action on the part of that and other societies would have resulted in the removal of some of the divergencies if they had thought it advisable, which it is presumed they did not. One recognised system of measurement throughout the kingdom should certainly be the object which the profession should strive to realise."

The liabilities of a surveyor are not to be encountered with a light heart. It is true, as Mr. LEANING says, "when a properly qualified surveyor prepares quantities, he makes remarkably few mistakes;" but, on the other hand, it is absurd to have quantities paid for, and yet to expect a builder to accept them entirely at his own risk. So inequitable an arrangement would be nullified if it were made to form part of the contract, as is desired by

\* Quantity Surveying for the Use of Surveyors, Architects, Engineers and Builders. By J. Leaning. Third edition revised and enlarged. London: E. & F. N. Spon.



quantity surveyors as well as builders. There is little doubt the more fair arrangement would have been generally adopted long ago if it were not for the Council of the Royal Institute of British Architects. The fear of offending the least of the members has upheld a practice which, to say the least of it, is more honoured in the breach than in the observance, and one, too, which leads to other evils. On the subject of responsibility, as well as on the procedure in London offices in relation to quantity taking, the student will find definite information in Mr. LEANING'S pages.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### MEASURING INSTRUMENTS.

**Ammeters and Voltmeters.**—There are several classes under which ammeters and voltmeters can be broadly placed, but those mostly used act either by electromagnetic, electrostatic, or heating effect.

It may perhaps be useful to briefly describe the principle upon which these instruments work and their defects.

**Electromagnetic.**—The most common of all instruments are the soft iron needle, which come under this heading, and it may perhaps be advisable to describe them fully.

The usual form consists of a circular coil, which constitutes the magnetic field; in this coil is a piece of soft iron of special shape which is connected to a nearly-balanced pointer and pivoted. The pivot centre does not, however, coincide with the axis of the coil, but it is nearer to one side. When a current is passed through the coil the iron is attracted to the side (of the coil). The shape of the iron determines the amount of attraction for, say, every ampere flowing through the coil. The iron is attracted because the tendency of every magnetic system is to become as short as possible, and the iron improves the circuit when it moves nearer the side of the coil. There are many types of this kind of instrument, some with unbalanced moving parts, and consequently a gravity control; others with the moving parts balanced and a spring control; but they may be all summed up as being rather inaccurate. The sources of error are numerous; the moving parts are heavy and must be suspended on pivots, consequently there is a considerable amount of friction and the needles are apt to stick. If the iron is not absolutely pure and soft it will retain its magnetism after the current is turned off. Suppose that it has an appreciable polarity such that it opposes the coil, it will then read low when the current in the coil is increasing, but it will read high when the current is diminishing; thus the readings will lag behind the current. These instruments are much affected by outside magnetism, as the magnetic circuit is very open, and are not really accurate enough for voltmeters, although they are often used for the purpose; but it will well repay the extra cost if a meter of the type about to be described is used, as unsteadiness in voltage increases the lamp renewals considerably. They are, however, very suitable for dynamo and other ammeters where 3 or 4 per cent. error is not of any consequence, as they are strong and capable of withstanding the rough usage they are subject to for such use.

The instruments under this heading also include the Weston (spring control) voltmeter, which is now gaining universal favour for dead beatness, sensitiveness and small current used. A permanent magnet is employed with a cylindrical air-gap, in which is a rectangular coil of wire wound on a silver or copper former working lightly on jewelled pivots. To produce a uniform field this coil encloses a soft iron cylinder. A fine hair-spring is fixed to each end of the coil, one serving to lead the current in and the other leading the current out of the coil. These springs form the control which is proportional to the angle of twist, and they also keep the coil central, taking the strain from the pivots; in fact, in the standard horizontal dial form of instrument the top pivot is used to take the thrust when the coil is shaken, the bottom pivot only being used, and the coil is kept vertical by the spring. Friction is thus reduced to a minimum. The forces, however, are very great, as the magnet may be made as strong as necessary, independent of the

number of turns on the coil, the only counter effect being to increase the weight; thus the instrument may be made extremely sensitive. There are many other forms of the same instrument, but none have met with such favour as the Weston, and this is almost entirely due to the great permanence of the magnet, and the perfect workmanship.

The defect which is common to all electromagnetic instruments is that electromagnets and currents outside the instruments affect the readings. In this last-described instrument, however, this defect is reduced to a minimum in consequence of the extremely powerful magnetic field and the small air-gaps in the circuit; and they are consequently suitable for main voltmeters.

**Hot-wire Instruments.**—The hot-wire type of instrument is considerably used, the best known, perhaps, being the Cardew and the Ayrton & Perry. The action in both instruments is due to expansion caused by the heating effect of the current, a wire being employed in the former and a twisted strip in the latter.

The Cardew instrument consists of a long length of wire running in small pulleys, one end being attached to the pointer and the other to an adjusting screw. This wire is encased in a long tube to keep off draught as much as possible, and it is usually placed horizontally to prevent continual movement of the pointer caused by variation in temperature. The tube is, however, sometimes placed vertically when the vibration of the pointer is not objectionable, as it is not so liable to stick as when horizontal. The Ayrton & Perry instrument consists of a flat strip fixed at the two ends and twisted in the middle (while very hot). The elongation of the strip, due to the heating, causes the middle point, to which is attached the pointer, to twist. This instrument is practically frictionless and more accurate than the Cardew.

The great objection to this type is that they are usually affected by draught, and they waste a considerable amount of energy. There should always be a standard instrument to check them if they are used as voltmeters for installations.

**Electrostatic.**—Electrostatic instruments are used largely for high voltages. They consume no current and are simple. They consist essentially of two sets of plates, one movable and the other fixed, so arranged that in trying to move together they must twist the movable ones round; in fact, the principle of this arrangement is very similar to that of the iron and coil already noted, if the inner surface of the coil is taken as one set of plates and the iron as the other. These voltmeters have lately been improved so greatly that they may be used on 100-volt circuits. The forces are, however, very small and the instruments delicate, but they are extremely good as standards in the hands of trained electrical engineers. I would not, however, recommend them for private plants, as the attendant is not often sufficiently skilful.

### METERS.

The action of supply meters may be also briefly described. There are two chief types used in this country—the motor and the clock meter. The motor meter is now the most used in houses taking current from a supply station; but for private installations, the fact that the clock meter must be wound up is not a disadvantage, and there are many points in favour of the latter.

**Motor.**—The motor meter consists essentially of a motor with a brake. The speed of the motor must be proportional to the energy passed through it. Fluid friction or Foucault currents form the brake, the former examples being the Ferranti and the Schallenger, the latter being the Hookham, the Thomson, and the Perry.

In the case where the torque is proportional to the current the brake mechanism must run at such a speed that the particular kind of brake used will give a retardation proportional to the speed; the motor will then run at a speed proportional to the current.

Those meters using Foucault currents run at a slower speed than those using fluid friction, because, although Foucault current friction is always proportional to the speed, they usually have mercury accumulators, etc., and consequently fluid friction as well, but this law is only strictly true of fluid friction at extremely low speeds. In the Ferranti meter the speed is high, and such that the friction is proportiona



to the square of the speed ; but as the torque in this meter is proportional to the square of the current, the speed is proportional to the current. Solid friction plays a more important part in high-speed than slow-speed meters, and owing to the uncertainty of solid friction, due to dust, &c., they are more liable to get out of order and run slow.

To prevent any misconception, it may be stated that a "high"-speed meter makes from two to three revolutions per second as a maximum, a slow-speed meter about one. At the speeds at which these motors run the back pressure is absolutely negligible, and consequently the ordinary laws of a motor do not apply. The torque is the only important factor, and the speed is regulated by an entirely different apparatus, the brake as described.

*Clock.*—Perhaps the most suitable form of meter for private installations is the clock meter, and that known as the Aron is the most used. In this form there are two clocks with pendulums, one of which has a coil of fine wire or shunt on it and swings above a series or main coil. As the pendulum swings over the coil the reaction between the series and shunt coils makes the clock go faster or slower, according to the way they are wound and the directions in which the current is flowing. A differential gear is placed between the two clocks, and this actuates the dials, which thus record the difference between the two, and this is proportional to the units passed through the coils.

#### SWITCHBOARDS.

The arrangement of a switchboard for a private plant will most probably be on the two-wire system, but it might be advisable for a mill, factory or large mansion to adopt the three-wire system when there is a large area to be covered and the length of wire used is considerable.

A two-wire installation should always be switched from one wire only, even if the two conductors are insulated, and the battery should be earthed at the other pole. The positive wire is the one that should be insulated, and the other earthed. The best way to earth a wire is to bury a copper plate in coke, rammed hard, with a wire brazed to the plate leading to the terminal. When this is done it will be perfectly safe to carry out all switching on the positive pole, and this saves the cost of half the fuses, switches, &c.

Every dynamo must have an ammeter, single-pole fuse and single-pole switch ; the accumulators should have a charge and discharge regulation switch, an ammeter and single-pole fuse ; the ammeter and fuse should, and in fact must be, on the negative end of the battery, as the current cannot be measured as it enters the regulation cells. An automatic switch should be placed between the dynamo and the accumulators, so that the circuit is made when the dynamos are at a slightly higher voltage than the accumulators, and the circuit broken when the dynamo pressure falls below this.

It is desirable that the main voltmeter should have a wide open scale near the normal voltage, and the pointer should be visible from the furthest part of the dynamo-room. A thick black mark on the dial or the glass front at the correct position will show at a glance whether the voltage is high or low.

The arrangement of the fuses, switches and instruments should be such that the use of everything can be seen at a glance, and it is advisable to keep all the instruments together on a separate slab for each dynamo. The accumulator instruments should also be kept together, as also the main ammeter switch and fuse. Spare fuses must also be kept for each fuse terminal, of the correct size.

The accumulator ammeter should have an evenly divided scale, the zero being in the middle. The instrument will then show at a glance whether the cells are charging or discharging, and with what current.

Two supply meters reading in Board of Trade units should be used, one connected to the dynamo circuit and the other to the main circuit. The efficiency of the plant can then be obtained immediately by dividing the reading on the main meter by that on the dynamo circuit ; also the amount supplied to the lamps can be seen and a check on the wasteful use of current can be made.

If the installation is far from any large town or place where standard meters are kept, it will be advisable to have a portable voltmeter of the best class, which can be checked

occasionally with a standard one, and then compared with the main voltmeter when desired. Ammeters can also be calibrated by a low-reading voltmeter if a standard resistance is used, and the fall of potential taken across this resistance.

To be really fireproof, no wood should be used in the construction of the board. Slate or marble slabs containing the instruments should be fitted and bolted to T iron vertical bars, kept together by horizontal iron stays. The board should be kept well away from the walls (at least 2 feet) and from the ceiling.

The walls, roof, floor, &c., near the switchboard should be of concrete, and rubber mats should be placed on the floor, to insulate the attendant. If these precautions are adopted, it may be certain that a fire originating at the switchboard will be practically impossible, and the switchboard will be the last place to be destroyed in case of fire. It is, however, generally recognised that a fireproof switchboard is of little use if it is surrounded by matchboarding or other inflammable material.

#### OUR ANCIENT CATHEDRALS.

THE first of a series of popular lectures on "Matters Connected with Building" was given on Wednesday, February 24, at Carpenters' Hall, by Professor T. Roger Smith, F.R.I.B.A.

In the unavoidable absence of Professor Aitchison, the chair was taken by Mr. Alfred Preston, a past-master of the Carpenters' Company.

Professor Roger Smith said :—It is a pleasure to deal with a subject of so great and so varied interest as that of "Our Ancient Cathedrals," or, in other words, cathedrals erected during the Middle Ages. Cathedrals are too numerous to be all included in a single lecture ; indeed, within such a limit it would not be possible to thoroughly exhaust the details of one.

A cathedral represented the dignity and greatness of its master the bishop, a prelate whose rank nowadays is little less than that of a prince, but whose power in Mediæval times was often greater than that of princes.

Cathedrals played an important part in the lives of our forefathers ; indeed, it is hard for us to realise what they were to the people who built them. At a time when there were no printed books, no newspapers, no steam-engines, no machinery, and no means of travelling, when there was scant comfort or beauty in the dwelling, these wonderful buildings, their architecture, shrines, tombs, mosaic and carving, were keenly criticised and appreciated.

Not only in England, but in every city in Europe similar buildings were being erected. Viollet-le-Duc bears testimony to the great number building at one time in France, including those of Paris, Rouen and Chartres. They were undoubtedly the greatest engineering works of their age, and when we consider how few the appliances, and how much less the available wealth in comparison to the present day, we are compelled to think their erection must have heavily taxed the people among whom they were built. Cathedrals were used for many purposes—for meetings, for the performance of miracle plays, but chiefly for religious services in an age when the hold of religion on the people was very strong.

When the year 1000 passed without any noticeable change, and there was no longer the expectation of a speedy ending of the world, a great revulsion of feeling took place. The same kind of religious ferment in men's minds which gave rise to the Crusades found an outlet in the building of cathedrals. We may compare it, in some small degree, to the desire of the present day that there may be a Board school in every village, or a public hall in every town.

In England the first impulse came from the Norman Conquest. For nearly two centuries Norman architecture dominated our cathedrals—a style massive, even heavy in character, the windows short in proportion and without tracery. In the end of the twelfth century there was a gradual transition to the style known as Early English, a style which became the most beautiful and the most graceful of English styles, and which attained its greatest perfection in the thirteenth century. Simple tracery was introduced in the windows, which were higher than in the previous style, and pointed arches were first used. The tracery developed through a series of circular patterns into more or less purely geometrical forms, until, at the beginning of the fourteenth century, these give place to the flowing curved lines which characterise the following style, that known as English Decorated. Then follows the style known as Perpendicular, sometimes termed with less accuracy Tudor. Here the curved lines of the tracery are changed for rectilinear lines, the mullions are carried up to the top, and horizontal transoms are introduced. In the Perpendicular style there is much dignity, combined with a certain degree of formality and



squareness. This style prevailed during the whole of the fifteenth and part of the sixteenth centuries.

Although thus divided into various styles, we have for a period of four centuries and a half gradual changes going on, the merging of one style into the other, the new style reaching its zenith and giving way in turn to the succeeding style. In the Norman work ornamentation is restricted to certain parts of the building; in the Early English the building is much more covered by architectural features, and heavy masses of intricate mouldings are skilfully used, giving that wonderful play of light and shade which so essentially distinguishes all Gothic architecture. Additions were constantly being made to these buildings by men who worked according to the taste of their own day and not according to the plan on which the buildings were begun. Buildings which we should think very good were pulled down to be rebuilt in the newer fashion, with as little hesitation as a lady would have in discarding an old-fashioned bonnet.

Few buildings were completed in any one style. The cathedrals tell the tale of their growth by the styles imprinted on them. Salisbury alone shows a uniform style throughout. This was because the bishop's chair was transplanted, and a new cathedral entirely rebuilt. At Old Sarum, the original site of the bishop's church, the same variety may have existed, but the monks and the soldiers could not agree at Old Sarum, and the monks made themselves a new home. Notwithstanding this diversity of treatment the result is very rarely inharmonious, thanks to the fine feeling for art of the men who did these works.

Norman naves were mostly covered by timbered roofs, but in all subsequent work vaulted stone roofs were constructed, many of which are of great beauty. To support these roofs the outside walls were fortified by buttresses. These were either built against the walls or in the form of piers at some distance from the walls and connected to the walls by a bridging arch. These latter were termed flying buttresses. A system of thrust and counter-thrust is peculiar to Gothic architecture, and the study of the means by which equilibrium was secured is one of great interest.

Generally the whole tendency of the main lines is upward, and for this purpose towers or spires were always intended, though not always built.

The lecturer, with the aid of a fine series of views of English cathedrals, then pointed out the distinguishing features peculiar to each. Durham Cathedral, with its splendid towers and fine situation, the interior with the massive stone Norman piers cut up into shafts, or variously scored with spiral or zigzag lines, the whole a good example of the Middle Norman period. The Galilee is of later date, with more slender columns and more ornate treatment. Carlisle Cathedral has been more than once devastated by fire, but the remaining east end shows one of the finest windows of fourteenth-century work. York Minster displays great size and dignity, but much of the interior vaulting is a fairly good restoration done early in this century after the partial destruction of the old work by fire. Lincoln is claimed by many as the finest of all our cathedrals; if not the finest, it certainly has few to surpass it. The three towers are nearly in one style, and originally were all surmounted by spires. Two were destroyed by lightning, and the third was removed to prevent its meeting a similar fate. The interior shows a beautiful example of the triple division into great arcade, triforium and clerestory, while the choir justly enjoys a high reputation; and the Early English tracery in the east window is very fine. Lichfield is specially distinguished for its spires. Compared with spires towers appear low, but towers are unquestionably fine features. The west front with its numerous niches and figures has a very rich effect. Lichfield has an apsidal choir but no triforium. The west front of Peterborough is unique, as offering the only English example we can present in comparison with the very elaborate doorways common on the Continent. Anyone practically acquainted with building can have no reasonable doubt that the best method is being adopted for its preservation. The Norman interior has a fine painted ceiling. The remnant of Norman work in the beautiful doorway on the south side of Ely Cathedral was compared with the Early English doorway on the west front of the same building, where are also two windows inserted at a later date—one being a good example of Decorated and the other of Perpendicular work. The central octagon at Ely, constructed by Alan de Walsingham, is a unique feature and one of great beauty. The arcading of the lady chapel in a white stone almost like alabaster has a pleasing effect.

Norwich Cathedral, with its central tower and spire, strikes the eye agreeably, the long lines of the roofs leading up to the great central mass very successfully. The interior arcading is a good example of Norman work, the vaulting being of later date. Probably there was originally a painted ceiling as at Peterborough. Westminster has a perfectly unrivalled interior, the apsidal east end, the great beauty of the triforium, and the elegant diaper-work on the wall spaces in the spandrels adding

refinement and delicacy to the whole. Sir Christopher Wren found the spire of Salisbury Cathedral to be 2 feet out of the perpendicular, and the mark he made has been preserved. More recent examinations show that it has not gone over any farther.

Concluding with a series of views of Canterbury Cathedral, in one of which the amount of plain wall space and the thin pilasters at the angles of the Norman transept was strikingly contrasted with the more decorated wall and heavy angle buttresses of Perpendicular work, the lecturer was greeted by a large and appreciative audience with much applause.

Mr. Preston, in moving a vote of thanks (which was enthusiastically given), said, "We must all earnestly desire that these ancient works shall be preserved in their integrity, so that we may long have the opportunity of admiring and recognising the ability of our forefathers in their construction."

## THE LATE H. MACALLUM.

A MEMORIAL of the late Mr. Hamilton Macallum in the form of a monument of Portland stone and a bust by Mr. Onslow Ford, R.A., was unveiled at Beer, South Devon, last Saturday. The memorial was subscribed for by the friends and brother artists of Mr. Macallum, and Beer was selected as its site because it was his chief resort for many years, and he died there last June. The memorial was unveiled by Professor Herkomer, R.A., in the presence of Mr. Macwhirter, R.A., Mr. Onslow Ford, R.A., and Mr. Colin Hunter, A.R.A. Wreaths were placed on the memorial by Mrs. Macallum, the memorial committee and others. Professor Herkomer spoke of the immortality of art, and said that no painter of eminence who had a thought to convey to his fellow-creatures through his art could die in the common sense of the word. The man was often irreconcilable with the artist, and the artist, more than most workers lived a dual life, but the work of Hamilton Macallum was as welcome to the art world as his manly character was to his friends. The greatest art had no worm-wood, and they were grateful to the painter who painted the effects of nature in her joyous moods. As men and women passed by that beautiful monument they would reflect upon the reason why it stood there facing the sea, and when they knew would look at the sea with the eye of the painter whose life was symbolised in that monument. Mr. Macwhirter and Mr. Onslow Ford also spoke. It should be stated that the monument, in addition to the bust which faces the sea, has upon one side a barometer, which it is thought will be of service to the fishing community of the place.

## GREEK MONUMENTS AND GREEK HISTORY.

THE first of a course of three lectures was delivered on the 4th inst. by Professor Percy Gardner, at the Royal Institution, on "Greek History and Extant Monuments." It was to some extent introductory, and dealt with the relation of the monuments to Greek history. In his succeeding lectures he will deal with the Athenian Acropolis as a background of history, both before and after the Persian wars. At the commencement of his lecture Professor Gardner dwelt on the terms "antiquary" and "archæologist." Formerly these terms were applied to fossilised students of the type of Mr. Oldbuck, familiar, of course, to all who have read "The Antiquary." The modern archæologist was nothing if not progressive and up to date. Like the man of science he rejected the textbook of a few years back, and was constantly revising his theories as new facts were brought to light. The idea of evolution was, he said, a corrective of scepticism, and a further check was to be found in archæological research, which appealed to existing fact in prehistoric archæology, in that of Egypt, of Greece and of modern times. In the case of Greece we had an abundant literature to compare with the results of excavation of the contents of museums, and in comparison with what we knew of Ancient Greece from the histories of Polybius and Herodotus modern excavation could add little to the existing stock of our information. All it could do was to fill up the background, and to help to realise more vividly the literature and art of Ancient Hellas, her poets and orators. The lecturer referred to the large part played in Greece by the imitative arts. We in this country expressed our emotions rather in poetry and music than in the plastic arts. With us sculpture as a mode of expressing thoughts, feelings and emotions did not exist. With the Greeks it was different. They expressed in painting and sculpture their strongest emotions. They thought and felt in stone and marble. We never dreamed of expressing our emotions after a great battle in sculpture, and yet to the Greeks this was the most natural thing in the world. Professor Gardner then proceeded to enumerate some of the results of museum work in the field of numismatics and of painting, referring to the recovery of the style of Polygnotus. He also dwelt on the services



rendered to classical archæology by those highly-trained scholars who did not actually excavate themselves, but who extracted from the raw materials the grains of gold that were really of importance. The recent excavations at Delphi were then dealt with, and slides illustrating these were thrown on the screen. A few years ago Delphi was hidden by squalid buildings, but now the French archæologists had succeeded in laying the site of the ancient town bare. The situation of Delphi and its surroundings were shown, and views were also shown of the Castalian springs, the trophies of Marathon and Ægospotami, the treasures of Sicyon, Siphnos and Athens, &c.

## TESSERÆ.

### Heraldic Mottoes.

THE origin of heraldic mottoes might probably be traced to two sources, in themselves diametrically opposed to each other—religion and war. "Extremes," we are told, "sometimes meet," and certainly these two feelings did coalesce in the institutions of chivalry, if we may be allowed to prostitute the holy name of religion by identifying it with the frenzy which possessed the human mind in such enterprises as the Crusades. It is uncertain whether we ought to deduce the origin of mottoes from those devout ejaculations, such as "Drede God!"—"Jesu mercy—Lady helpe," which occur on ancient tombs, or from the word of onset, employed by generals on the battle-field to stimulate their soldiers to great feats of prowess. The preponderance in point or number of religious mottoes would incline us to the former supposition; but the general opinion of our best authors favours a military origin. The war-cry known in Latin as the "clamor militaris," in French as the "cri de guerre" and in the Scottish language as the "slughorn" or "slogan," is of very remote antiquity. In early scripture history we have an example in "The sword of the Lord and of Gideon," the word of onset employed by the Hebrews against the Midianites in the Valley of Jezreel. Among barbarous nations at the present day it has its representative in the war-whoop, or yell, employed as well to animate the courage of their own party as to inspire terror in the hearts of their enemies. From an early period the phrase "a boo" was employed by the Irish for these purposes.

### Sculpture and Painting.

Those arts which represent by the organic natural forms derived from life are essentially imitative, and depend on the artistic study of nature as only the actual, organic, natural form stands in that necessary and intimate connection with spiritual life, possesses that universal significance from which art takes its rise. But the artist is capable of attaining a conception of the organic form which shall stand above individual experience and find therein the fundamental form of the most exalted ideas. Now these arts are distinguished from one another in this, that the one, sculpture or the plastic art, places bodily before us the organic forms themselves, only that the difference of material often makes change of form necessary in order to attain a similar impression, and that the other, design or the graphic art, merely produces by means of light and shade the appearance of bodies on a surface, inasmuch as the eye only perceives corporeal forms by means of light and shade. Colour, so far as regards possibility, can indeed be combined with both arts, but in sculpture it operates with so much the less advantage the more it tries to approach nature, because in this endeavour to represent the body completely the want of life only strikes us the more disagreeably. On the other hand, it enters quite naturally into combination with design which in itself represents more imperfectly, and does not represent bodies, but merely the effects of light upon them, to which colour itself belongs, and elevates design to the art of painting. Colour, in its nature, effects and laws, has a great resemblance to sound. The relation of sculpture and painting, as regards their capabilities and destination, is already hereby defined in its main features. The plastic art represents the organic form in its highest perfection, and justly holds by its apex, the form of man. It must always represent completely and roundly, and leave nothing undefined—a certain restrictedness in its subjects, but on the other hand great clearness belongs to its character. Painting which immediately represents light, in whose wonders it rightly shows its greatness, and in exchange is satisfied with the appearance thereby produced in the corporeal form, is capable of drawing much more into its sphere and making all nature a representation of ideas; it is more suggestive, but does not designate so distinctly. The plastic art is in its nature more directed to the quiescent, the fixed; painting, more to the transient; the latter can also, in that it combines far and near, admit of more movement than the former. Sculpture is therefore better adapted for the representation of character, painting for expression. Sculpture is always bound to a strict regularity, to a simple law of beauty; painting may venture on a greater apparent disturbance in detail, because it has richer means of again neutralising it in the whole.

### James Gillray.

Gillray, the caricaturist, like his great predecessor Hogarth, was apprenticed to a writing engraver, and acquired the use of the graving tool under the celebrated Ashby, who then resided at the bottom of Holborn Hill. Many a choice specimen of penmanship was copied by young Gillray in sweeping flourishes on the copper from the incomparable pen of Tomkins, of Sermon Lane. This was used to say that "the early part of his life might be compared to the spider's, busied in spinning of lines." Like Hogarth, too, whilst occupied in this mechanical drudgery, the incipient original artist was discoverable in certain humorous scraps which he sketched on the borders of the examples of round hand and text. Quitting the bench of Ashby, he became a pupil of Bartolozzi, and here his eccentric humour displayed itself, for during his studies in that school of super-Italian softness and elegance, verging on beautiful insipidity, did he display the rudiments of that daring species of dramatic design, that extraordinary graphic hyperbole, which almost met in its highest flights the outposts of the creations of Michel Angelo. It was not likely that such an original would be content to sit year after year over a sheet of copper perpetuating the renown of others, whilst with a restless and ardent mind bent upon exploring unknown regions of taste with the bill of genius in his vigorous grasp he could open a way through the wilderness of art, and by a short and eccentric cut reach the Temple of Fame. He set to work, and this labour he achieved to the astonishment of the goddess, who one day beheld this new wild votary unceremoniously scampering up the steps to her altar. The inventive faculties of such a mind as his—its aptitude to seize upon the most prominent features of passing events; the exhaustless fecundity of thought that occupied the remotest corner of his crowded compositions; his comprehensive knowledge of the human visage, its passions and expression; his original perceptions of physiognomy as exhibited in a never-ending variety of masks, so easily likened to all and copied individually from none; his characters, like Shakespeare's, though creations of his own brain, yet fitting and consistent in form, action and attributes—all those faculties surprise the more, centering as they did in such a man, one of his slouching gait and careless habits, who with all his capacity for creation and power of execution, with such apparent energy of thought and deep reading in the living book of human action, appeared scarcely to think at all, and to care no more for the actors in the mighty drama which he depicted, nor for the events which he so wonderfully dramatised, than if he had no participation in the good or evil of his day. Gillray was one of those unaffected wights who accomplished what he undertook without scientific parade, and even without the appearance of rule or preconcerted plan. His best designs were off-hand compositions, and although he knew that these effusions of his graphic skill were superior to those of his compeers, he was so little wrapt in his own conceit that he supposed another might do as well as himself if he tried. He used to smoke his pipe with his early employers, and would exert his faculties more to win a bowl of punch than to gain ten pounds. Holland, a print-seller in Drury Lane, was one of his first encouragers. Collectors are aware of a plate etched by Gillray for Holland dated 1779. The subject is discreditable to the taste of the publisher and the artist. In this early work, however, it is discoverable that he benefited by his sojournment with Bartolozzi; there is a freedom united with a graceful execution of the needle that proves he had worked in the school of a master. The drawing, too, is marked with character and spirit. The early political caricatures of his prolific hand were generally directed against the Government party. These he was hired to do, usually at a small price, stipulated according to the will of his employers. The acquirement of wealth, however, it seems, on the authority of those who knew him most intimately, was the least object of his consideration. Many stories related of him, too well authenticated to leave a doubt of the facts, declare him to have been a stranger to the feelings of friendship, and sometimes meanly mischievous in his contracted circle.

### Blondel's Theory of Architecture.

The use for which an edifice is intended almost always gives the architect an idea of its extent and the number of its parts, provided he have common sense to distinguish what in each case is suitable to the time, place, or persons. To him is entrusted the distribution of the parts, and the plan of the whole. In this he must be directed by certain principles, lest he should form a wrong judgment of beauty. He must also be experienced, that he may know how to apply this powerful auxiliary in all cases, its fundamental rules being by no means determined. The theory of architecture performs this; it gives two sorts of rules, some necessary, which are indispensable to observe, without committing the most offensive and revolting errors; others accessory, which may be omitted without rendering the work defective, but must prevent its being beautiful. The rules of the first kind, and which theory must determine, are reduced to justness, regularity, order and symmetry.



remove these attributes, and the work is incorrect. But it is not sufficient that a work be without defects, it should also be beautiful, and to be so there must be an exact union of the pluralities with the unities; and this depends on the variety of the parts and the number and justness of the proportions. Theory, then, teaches the manner of disposing the whole of an edifice and combining a number of parts so as to produce correct harmony and beautiful proportion. Some are scrupulous in making the metopes square and equally high with the triglyphs, and yet this is not essential; but they will not scruple to cut the pediment and put it where it should not be; this is against the necessary rules, founded on the nature of construction. The accessory, or accidental rules, are the result of *à coup d'œil* and of sentiment, to which no precise limits can be assigned. The Greeks having this precision of sight, their proportions please and their ornaments are graceful; but no one can affirm that these are unalterable, and that they may not be superseded by others still more agreeable. The necessary rules must be rigorously observed, without attempting to alter them; the accidental ones may be taken from the best monuments, and from Vitruvius, but some liberty may be allowed.

#### A Set Scene by Inigo Jones.

First for the scene (according to Ben Jonson) was drawn a *landschap*, consisting of small woods, and here and there a void place filled with huntings, which falling, an artificial sea was seen to shoot forth, as if it flowed to the land, raised with waves which seemed to move, and in some places the billows to break, as imitating that orderly disorder which is common in nature. In front of this sea were placed six tritons, in moving and sprightly actions, their upper parts human save that their hairs were blue, as partaking of the sea-colour, their desinent parts fish, mounted above their heads, and all varied in disposition. From their backs were borne out certain light pieces of taffeta, as if carried by the wind, and their music made out of wreathed shells. Behind these a pair of sea-maids, for song, were as conspicuously seated, between which two great sea-horses, as big as the life, put forth themselves, the one mounting aloft and writhing his head from the other, which seemed to sink forward; so intended for variation and that the figure behind might come off better; upon their backs Oceanus and Niger were advanced. The masquers were placed in a great concave shell, like mother of pearl, curiously made to move on those waters and rise with the billow; the top thereof was stuck with a chevron of lights which, indented to the proportion of the shell, struck a glorious beam upon them as they were seated one above another, so that they were all seen but in an extravagant disorder. On sides of the shell did swim six huge sea-monsters, varied in their shapes and dispositions, bearing on their backs the twelve torch-bearers, who were planted there in several graces. These thus presented, the scene behind seemed a vast sea, and united with this that flowed forth, from the termination or horizon of which (being the level of the state which was placed in the upper part of the hall) was drawn by the lines of perspective, the whole work shooting downwards from the eye, which decorum made it more conspicuous and caught the eye afar off with a wandering beauty, to which was added an obscure and cloudy night piece that made the whole set off. So much for the bodily part, which was of Master Inigo Jones's design and act.

#### Rubens, Correggio and Claude.

The genius of Rubens was strongly turned to the picturesque disposition of his figures, so as often to sacrifice every other consideration to the intricacy, contrast and striking variations of their forms and groups. Such a disposition of objects seems to call for something similar in the management of the light and shade, and accordingly we owe some of the most striking examples of both to his fertile invention. In point of brilliancy, of extreme splendour of light, no pictures can stand in competition with those of Rubens; sometimes those lights are almost unmingled with shade, at other times they burst from dark shadows, they glance on the different parts of the picture and produce that flicker (as it sometimes is called) so captivating to the eye under his management, but so apt to offend it when attempted by inferior artists or by those who are less thoroughly masters of the principles of harmony than that great painter. All these dazzling effects are heightened by the spirited management of his pencil, by those sharp, animated touches which give life and energy to every object. Correggio's principal attention in point of form was directed to flow of outline and gradual variation; of this he never entirely lost sight even in his most capricious foreshortenings, and the style of his light and shadow was so congenial that the one seems the natural consequence of the other. His pictures are always cited as the most perfect models of those soft and insensible transitions of that union and effect which above everything else impresses the general idea of beauty. The manner of his pencilling is exactly of a piece with the rest, all seems melted together, but with so nice a judgment as to avoid by means of certain free, yet delicate touches, that laboured hardness and insipidity which arise from what is called high finishing.

Correggio's pictures are indeed as far removed from monotony as from glare; he seems to have felt beyond all others the exact degree of brilliancy which accords with the softness of beauty, and to have been with regard to figures what Claude was in landscape. The pictures of Claude are brilliant in a high degree, but that brilliancy is so diffused over the whole of them, so happily balanced, so mellowed and subdued by the almost visible atmosphere which pervades every part and unites all together, that nothing in particular catches the eye; the whole is splendour, the whole is repose, everything lighted up, everything in sweetest harmony. Rubens differs as strongly from Claude as he does from Correggio; his landscapes are full of the peculiarities and picturesque accidents in nature; of striking contrasts in form, colour and light and shadow; sunbeams bursting through a small opening in a dark wood—a rainbow against a stormy sky—effects of thunder and lightning—torrents rolling down, trees torn up by the roots and the dead bodies of men and animals are among the sublime and picturesque circumstances exhibited by his daring pencil. These sudden gleams, these cataclysms of light, these bold oppositions of clouds and darkness which he has so nobly introduced, would destroy all the beauty and elegance of Claude; on the other hand, the mild and equal sunshine of that charming painter would as ill accord with the twisted and singular forms and the bold and animated variety of the landscapes of Rubens.

#### Drawings by Great Masters.

The drawings of the great masters have a peculiar charm. By them, more than by works of any other kind, you are introduced into the secret laboratory of art, so that you may follow a painting from the first germs, through its various stages and changes, till it attains its perfect form. Von Rumohr, with his usual refined sense of art, directs attention to the sure mechanical taste with which these old masters always employed, in their drawings, the material which was best adapted to the object they had in view. If they wanted to sketch upon the paper a first thought just as it arose in the fancy, they usually chose the red Italian chalk, with which sketching is so easy, or the soft Italian black chalk. The breadth and softness of the strokes immediately give to such a first sketch something picturesque and massy; and, at the same time, the material allowed of further finishing, in a high degree, if it were desired. But if they wished to arrest a rapidly passing effect in nature, as it was fresh in their fancy, to seize an accidental, happy, quickly changing cast of drapery, or to mark sharply and distinctly the main features of some character, they preferred the pen, which allowed them to unite the easy flowing line with the sure and distinct indication of the form. If they desired in the portrait, in a study, in the composition, to express the most delicate movement of the form, the fine play of the surfaces lying within the outlines, they generally took a rounded silver pencil. On paper covered with a mixture of white lead and pale yellow ochre, verdigris, or some red, such a pencil marks but lightly and softly, and therefore allows of changing and improving *ad infinitum*, and by leaning harder, at length to mark decidedly among all the others the design in favour of which the artist has determined. If they wished to decide on the main distribution of light and shade, the full camel's-hair pencil dipped in sepia or Indian ink, with its elastic point, its bold fulness, led the most rapidly and surely to their object. In such drawings the outlines or the forms are often not marked, but result only from the limits of the shadows; when it was required at the same time to mark the form, the use of the pen was added. Lastly, for a more detailed marking of light and shade, coloured paper afforded them a middle tint, by the help of which they produced, with black chalk in the shadows and white in the lights, a very delicate gradation and a great relief of the parts. On account of these many advantages this mode of drawing has been very commonly used. It is not till after having seen from a great number of such drawings in how many sides a picture has been conscientiously prepared that we can understand the great perfection and extraordinary composition of so many pictures of the times of Raphael; and it is not till we have learnt to consider such pictures as the final result of a long series of studies of the most highly gifted minds that we are penetrated with a due sense of their great value.

#### The Original Drury Lane Theatre.

The King's Theatre (the stage on which Nell Gwyn performed), or "The Theatre" as it was commonly called, stood in Drury Lane, on the site of the present building, and was the first theatre, as the present is the fourth erected on the site. It was small, with few pretensions to architectural beauty, and was first opened on April 8, 1663, when Nell was a girl of thirteen. The chief entrance was in Little Russell Street, not as now in Catherine Street. The stage was lighted with wax candles on brass censers or cressets. The pit lay open to the weather for the sake of light, but was subsequently covered in with a glazed cupola which, however, only imperfectly protected the audience, so that in stormy weather the house was thrown into disorder and the people in the pit were fain to rise.



## NOTES AND COMMENTS.

THE Massachusetts State Legislature at the end of the present session should possess a tolerably complete knowledge of building. Among the Bills presented is one which proposes to limit the height of buildings in Boston to 80 feet, public buildings, churches, grain elevators and factory chimneys being exceptions. Another Bill will authorise the use of concrete for every purpose in building construction, provided the ingredients have been tested by the American Society of Civil Engineers. By a third Bill fireproof stairs must have at least one opening of an area of 5 square feet through the exterior wall on each storey. There is also a very remarkable Bill by which absolute power would be conferred on the head of the Building Department, for he can reorganise it without referring to civil service or other law. Desperate diseases require desperate remedies, and we suppose Boston must be in a bad official condition, or is the old tyrannic Puritan spirit again coming into fashion? A Bill for the regulation of stables might be copied and introduced in England with advantage. It prescribes that before permission is sought for the erection of stables, advertisements must be inserted in the newspapers and notices served on the owners and occupants of premises abutting on the proposed buildings. Plumbers have to be registered annually in Boston, but the arrangement is not found to be advantageous, and one of the Bills is intended to relieve plumbers from the obligation. A hint appears to be taken from the London Building Act, for there is a Bill to prohibit the erection of bay windows and oriel windows over any public road or square. There are some other Bills for the regulation of buildings which we need not mention. The series suggests that a great many authorities are concerned in the control of such work, and that "omnibus Bills" appear to be unknown in Massachusetts.

WHENEVER there is a recognised custom in a trade it should not be readily set aside in a law court. What is the basis of the common law of England but custom? A man may plead his ignorance of trade customs, but if SELDEN'S maxim, "Ignorance of the law excuseth no man," be acceptable, why should not a similar principle be applicable to the local laws of a trade? His Honour Judge PERRY, in the Manchester County Court, did not show that respect for custom that is desirable. The plaintiffs, who are timber merchants, claimed 4*l.* 12*s.* 6*d.* for sawing poplar trees into boards, which they had undertaken at 4*s.* 6*d.* per 100 superficial feet. According to the custom of the trade in Manchester and other towns, the centre cut of the tree was taken in making the measurement. The defendant said that, although he was to some extent in the trade, he was not aware of the custom referred to, and he contended that the plaintiffs were bound by their estimate and could not, by reason of a custom of which he knew nothing, charge him 4*s.* 6*d.* for 85 superficial feet instead of for 100 superficial feet. The Judge said that if the transaction had been between two timber merchants who knew all about the custom of the trade it might have been different, but under the circumstances stated the custom could not be read into the contract. He gave judgment for the plaintiffs for 4*l.* 0*s.* 9*d.* The plaintiffs, in view of the judgment having gone against them on the only point in dispute, said they would not ask for costs. The difference between the two amounts is not large, but as a principle is involved the case is important. Why should it be supposed a knowledge of the custom of the timber trade is to be restricted to timber merchants? If the transactions were limited to those between merchants that would be reasonable, but as business is rarely done with men who use timber, we cannot understand why there should be one set of rules for dealers and another for builders.

MR. J. ROMILLY ALLEN, the editor of the *Reliquary* and other publications, has just rendered another important service to prehistoric archaeology. The Society of Antiquaries of Scotland possesses a fund given by Dr. R. H. GUNNING, and by means of it Mr. ROMILLY ALLEN has been able to visit the various localities in the district south of the Esk, and to make arrangements for the photo-

graphing of a series of the most characteristic examples of sculptured stones for reproduction as illustrations to the forthcoming work on the "Early Christian Monuments of Scotland," which will shortly be issued by the Society. He has prepared a report on the condition of the more important monuments in the counties of Forfar and Perth, and also in some of the more prominent localities where efforts had been made for the better preservation of the groups of monuments, as at St. Andrews, Meigle and Govan. In some cases portions of the sculptured faces of the stones had been disclosed to view which had not been seen before, and are therefore absent in previous illustrations. Thus through the liberality of Dr. GUNNING the Society has now acquired a very valuable series of negatives and reproductions of typical examples of the early sculptured stones of Scotland. In his report Mr. ROMILLY ALLEN has urged the desirability of forming a complete collection of permanent prints and negatives, not only of these early sculptured stones, but of other classes of antiquities.

THE ingenuity of French legislators appears to be exercised of late years in devising new taxes. To obtain additional sources of supply would be an advantage in a country which has to meet so many demands on the public purse. But apparently what seems to inspire the search is not so much the expected addition to the national wealth as a desire to put as many people as possible to inconvenience, in order to exemplify the principle of equality. The most recent fiscal proposition is to levy a tax on painters. Why, it is asked, should they be exempted when so many classes of Frenchmen have to pay special taxes in order to be allowed to work? They are supposed to make large incomes in an easy way, and as, unlike most citizens, the principal part of their training was obtained from schools which are upheld by means of taxation, it is only justice that they should make a more liberal return in the shape of contributions to the state than ordinary citizens. There is a great difference between proposing taxation and making it compulsory. There may be no immediate impost levied on painters, but they are not confident of escaping in the future. Some painters believe licensing would have its advantages, if by its means the incompetent men could be eliminated, but that suggests the freedom from taxation which artists have hitherto enjoyed. A tax-collector who is paid a percentage on the money he brings in would not object to the contributions of the humblest amateurs, and would be disposed to place them on a footing with academicians.

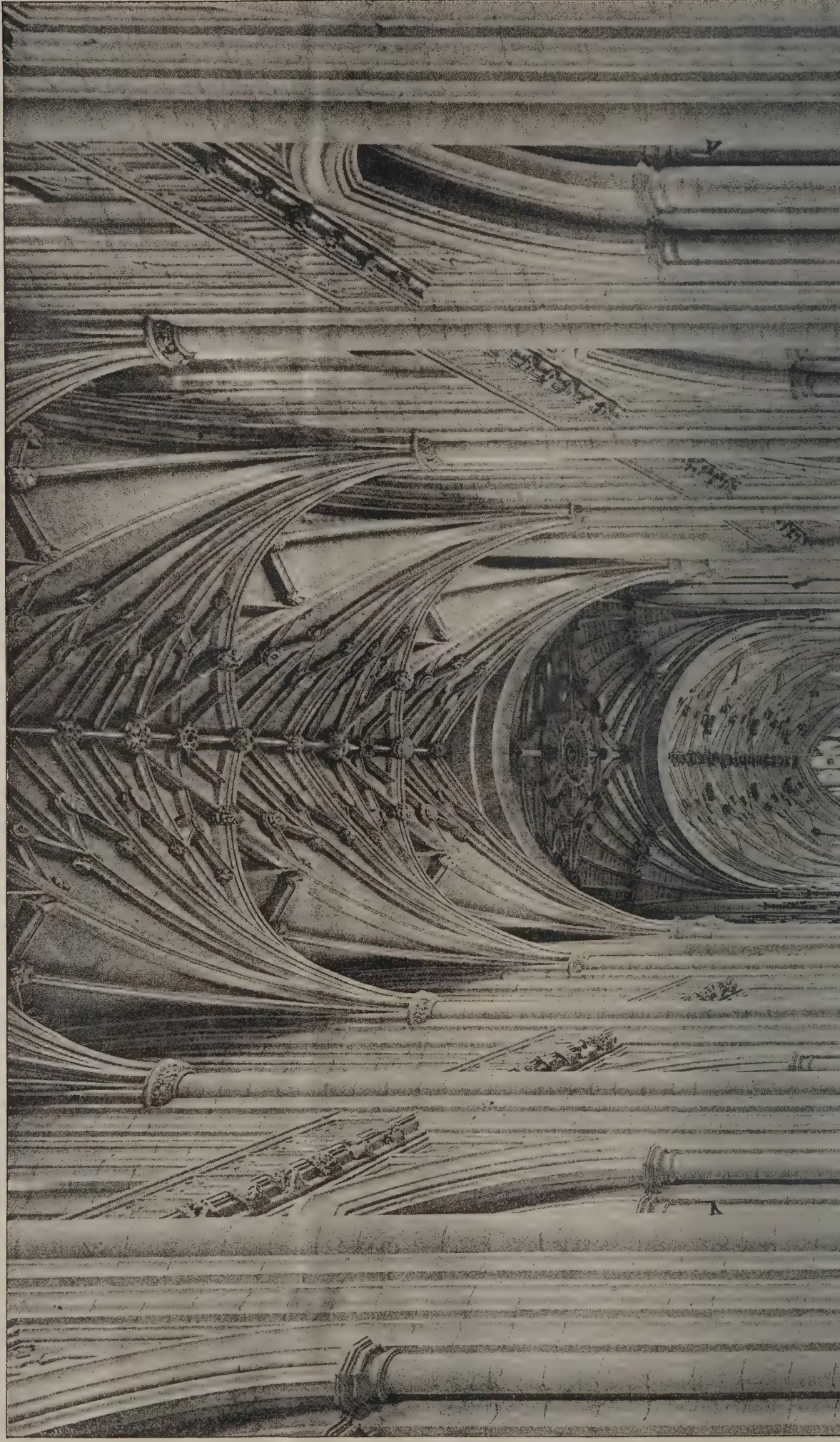
THE last survivor of the band of reformers who formed FOURIER'S Phalanstère has passed away by the death of M. MORLON, a civil engineer, who died a few days since at Nevers in his eighty-sixth year. The history of the experiment must henceforth be a tradition depending on books. It is not generally known how much a question of building determined the fate of the proposed reform. COULOMB GENGEMBRE, whose name is now forgotten even among Socialists, was the man who gave reality to it. FOURIER was one among several theorists who believed the world was out of joint and concluded it was their mission to set it right. He, however, was assured he was gifted with an insight of the secret operations of nature, and what he has said about her quaternions, attraction of existences, polarity, distribution of series in harmonies, &c., is very strange. To him all things, including comets, were alive. He had, too, a notion of development, for he arranged the history of the world in periods, although neither DARWIN nor SPENCER would probably approve of them. The world he believed was not a living but a loving thing, always growing. He followed out his notions to what he believed was their logical conclusion, which was that a common life was the best means of securing the happiness of men, in which everyone would be "producteur, consommateur et associé." GENGEMBRE gave form to the conclusion by designing phalanstères, or big buildings in which eighteen hundred people could work and enjoy life in a sober way. But the excellence of the planning was fatal to Fourierism. The Phalanstère was considered to be worse than a prison, and people soon ceased to be ambitious to become developed as "un arbre passionnel en douze rameaux" in such a conservatory.







The Architect, Mar. 12<sup>th</sup> 1897







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CATHEDRAL SERIES, No. 16.—WINCHESTER: THE NAVE.



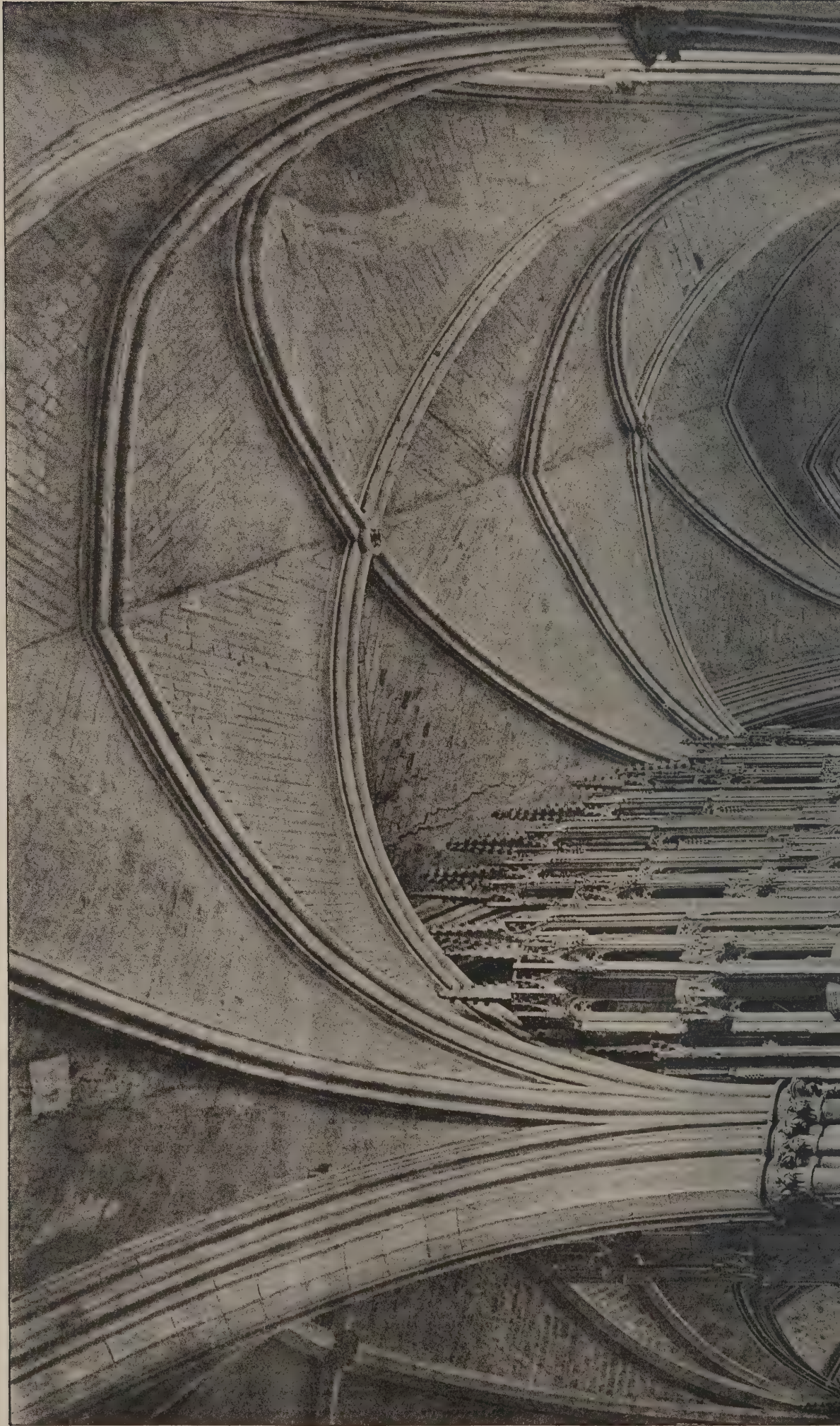








The Architect, Mar. 12<sup>th</sup> 1897







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CATHEDRAL SERIES, No. 17.—WINCHESTER: SOUTH AISLE, LOOKING EAST.













Geddes and Kichen  
Architects Hull.

IN A PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET PETER LANE, E.C.

BUSINESS PREMISES, HESSLE ROAD, HULL.





Gelder and Nichol  
Architects  
Hull.

Henry D. Fothergill  
1896

INK-PHOTO. SPRACUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

BUSINESS PREMISES, HOLDERNESS ROAD, HULL.  
Messrs. GELDER & NICHOL, Architects.











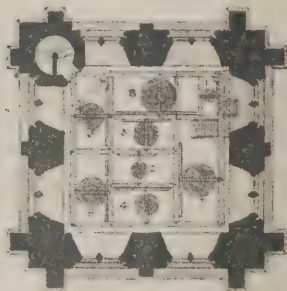
# ✠ CHVRCH • OF • S • MARTIN • Liskeard • ✠

NEW • TOWER : PRESERVING  
CHARACTERISTIC • PORTIONS • OF • PRESENT  
TOWER : AND • RESTORATION • OF • NORMAN  
TOWER ~ ARCH • AND • THE • WEST • DOORWAY ✠

✠ CORNWALL

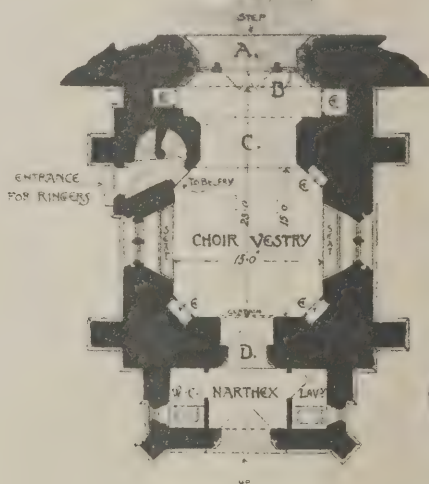
## NOTES

- A. ANCIENT TOWER ARCH - PRESERVED IN SITU AND RESTORED
- B. CARVED OUT SCREEN WITH ENTRANCE TO CHOIR VESTRY
- C. NEW ARCH IN EAST END OF TOWER
- D. OLD PERPENDICULAR DOORWAY FROM THE WEST END OF ANCIENT TOWER - REBUILT HERE
- E. SURPLICE CLOSETS

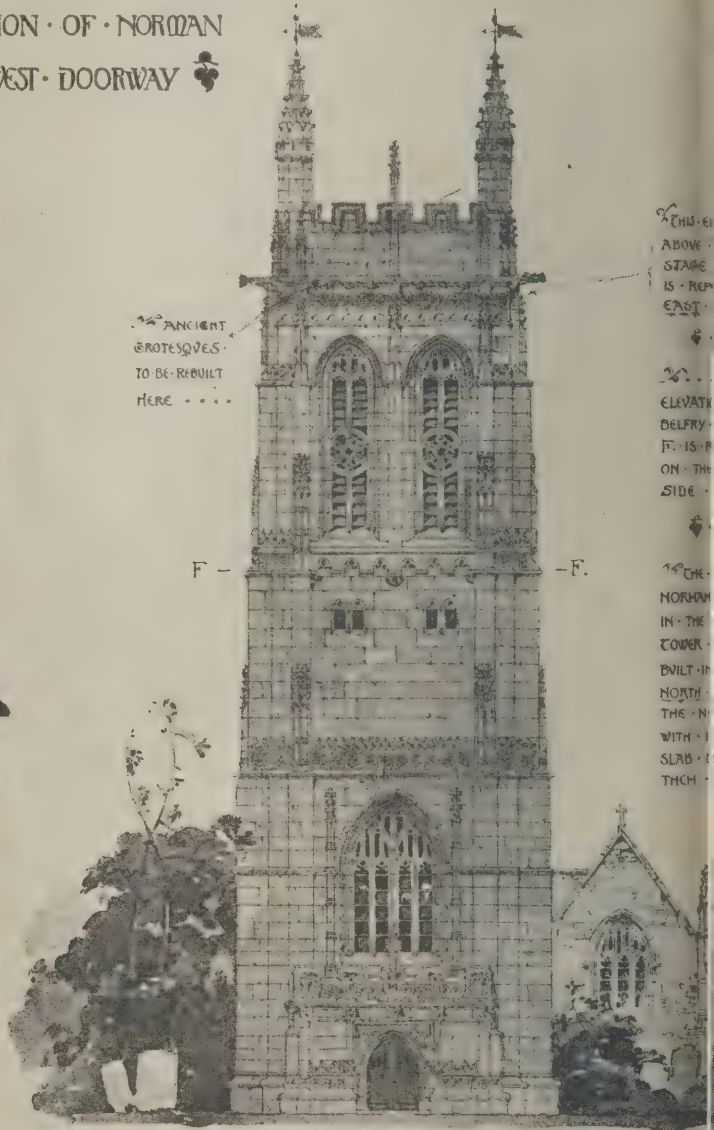


: BELFRY PLAN :

• JUST ABOVE THE BELL-FRAMING •

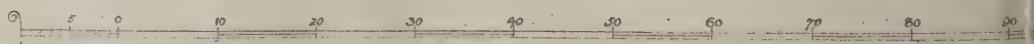


: GROUND PLAN :

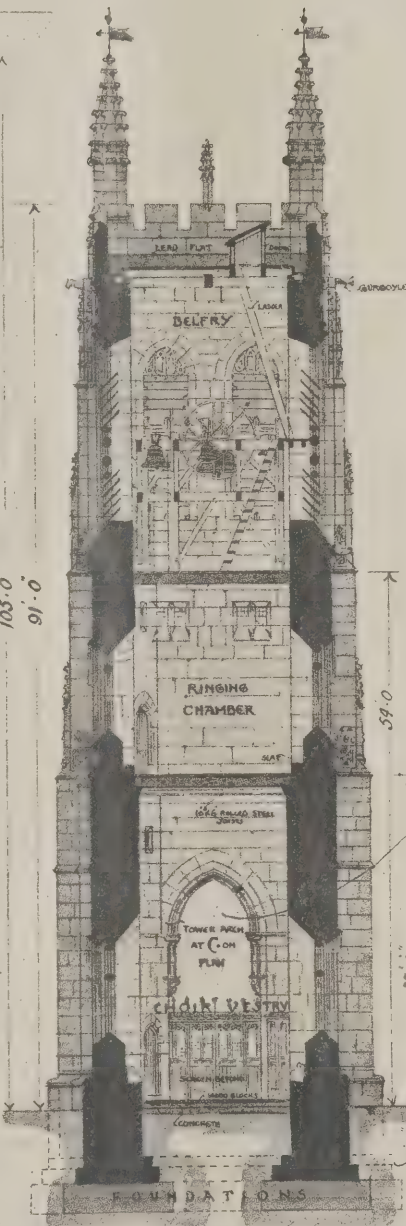
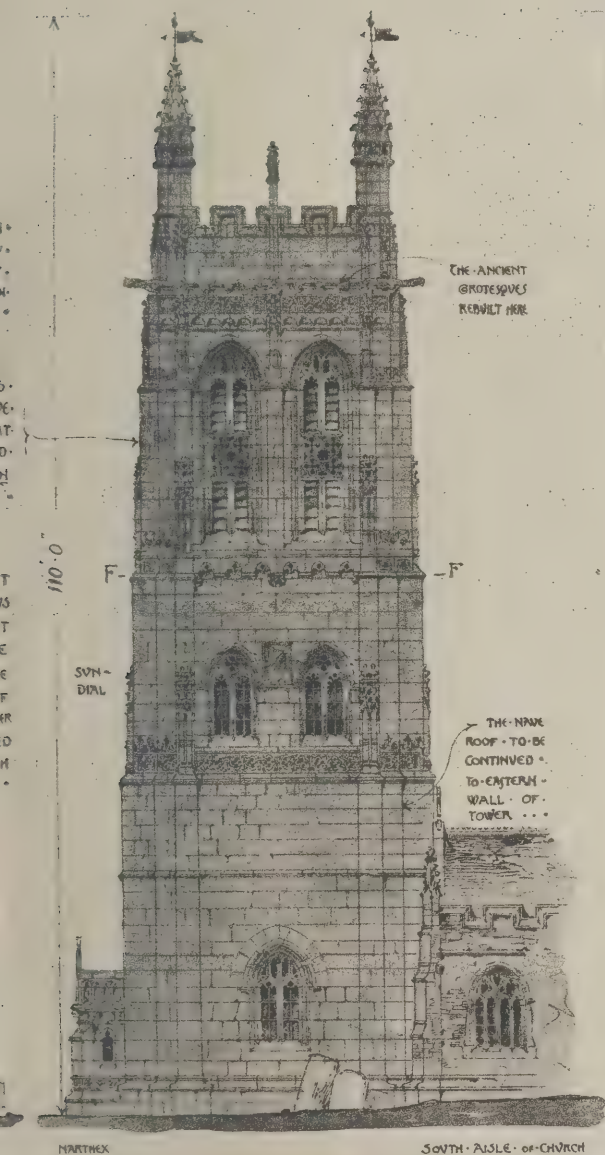


NARTHEX :  
ENTRANCE • TO • CHOIR • VESTRY

: WEST ELEVATION :







55 EACH FLOOR TO BE OF FIRE-PROOF CONSTRUCTION OF ROLLED STEEL JOISTS AND CONCRETE

56 THE FLOORS OF CHOIR VESTRY AND RINGING CHAMBER TO BE FINISHED WITH WOOD BLOCKS

57 FOR POSITION OF ANCIENT TOWER ARCH SEE PLAN AND NOTE A...

58 FOUNDATIONS ARE HERE SHOWN 10 FEET BELOW GROUND LEVEL IT MAY BE FOUND NECESSARY TO MODIFY THIS...









## ILLUSTRATIONS.

WINCHESTER CATHEDRAL.—THE NAVE.

WINCHESTER CATHEDRAL.—SOUTH AISLE, LOOKING EAST.

CHURCH OF ST. MARTIN, LISKEARD, CORNWALL.—SECOND  
PREMIATED DESIGN.

BUSINESS PREMISES, HESSLE ROAD, HULL.

THESE branch premises are now in course of erection at the corner of Cottman Street and Hessel Road, and comprise large shop and ladies' room on ground floor, with commodious stock-rooms and manager's residence on upper floors. The buildings, which are being carried out by Messrs. HOCKNEY & LIGGINS, builders, of Hull, will be faced with red Ruabon bricks, with dressings of Ancaster and Howley Park stones, with a base, 5 feet high, of Swedish red granite, and roofed with Westmoreland green slates. The turret will be covered with red Ruabon tiles and copper dome. The whole of the inside floors will be fireproof. The inside fittings will be in pitch-pine and the shop fronts in polished oak. Messrs. GELDER & KITCHEN, of Hull, are the architects.

BUSINESS PREMISES, HOLDERNESS ROAD, HULL. =

THESE branch premises, which have been recently opened, are built in Lincolnshire red stocks and Howley Park stone, and covered with Welsh slates. The inside fittings are in pitch-pine, stained and varnished. The shop front is executed in polished oak and glazed with leaded lights above the transoms. The work has been carried out by Messrs. HOCKNEY & LIGGINS, builders, under the supervision of Mr. W. A. GELDER, architect, Hull.

## WINCHESTER CATHEDRAL.—III.

THE successor of FOX was THOMAS WOLSEY. He wanted money, and to gain it set aside all scruples about the number of mitres which might appear on his banners, and were suggestive of neglected duties. LINGARD says of him:—"As chancellor and legate he derived considerable emoluments from the courts in which he presided. He was also Archbishop of York; he farmed the revenues of Hereford and Worcester, sees which had been granted to foreigners; he held in *commendam* the abbey of St. Albans, with the bishopric of Bath; and afterwards, as they became vacant, he exchanged Bath for the rich bishopric of Durham, and Durham for the administration of the still richer church of Winchester. To these sources of wealth should be added the presents and pensions which he received from foreign princes." WOLSEY was as ardent a lover of building as any churchman. The presentation of Hampton Court to HENRY VIII., his college at Ipswich, and the foundation of Christ Church, Oxford, those "twins of learning," testify to his munificence. But it is doubtful whether he was ever seated in Winchester Cathedral, and during his two years of tenure he did not attempt to improve the building. STEPHEN GARDINER came next. He might claim to be one of the bishops to whom the cathedral was most indebted, for by his tact and his relationship to the TUDORS he was able to preserve it from injury during the reigns of HENRY VIII. and EDWARD VI. The bishopric was shorn of some of its estates in HENRY's time, and there were changes in the order of services during EDWARD's short reign, but when Queen MARY was married to PHILIP of Spain by GARDINER, the cathedral presented nearly the same appearance as when FOX ruled in it.

But a change was looming. The succession of ELIZABETH caused no rejoicing at Winchester. The first bishop appointed by the Queen, ROBERT HORNE, while disposed to be kindly towards the Catholics, was enraged by the sight of every symbol of their belief. All the statues were torn from their places by his orders. To his mind the chapter-house and cloisters were also associated with false doctrine, and were cleared away, like the images. The dean's garden occupies the site of the chapter-house, and his residence is formed out of the prior's hall. We may form a notion of the violent spirit which inspired sixteenth-century iconoclasm from observations which were made 270

years afterwards. A correspondent of the *Gentleman's Magazine*, writing in 1833, says:—

The pavement of the chapel immediately behind the high altar having been lately removed and lowered, it was found to have been almost entirely composed of relics of figures, niches and other fine carvings, all painted and gilt. Many of the heads are as large as life; they are very numerous, in perfect preservation, and exhibit sculpture more beautiful than that of the figures remaining in this or any other church could have led us to expect. Several of them appear to have been monumental, but the majority were doubtless once enshrined in the altar or chapel-screens. From figures reduced to mere wrecks, in many instances even less entire than these, which were first hurled to the ground, then dismembered, and afterwards buried in the earth, we are obliged to deduce our conclusions of the skill and ability with which sculpture was at different times performed.

JAMES I. resided for a time in Winchester, but he cannot be charged with any depredations in the cathedral. The city was then beginning to feel more acutely the privations which arose from a change in the old order of government. The length of the cathedral was a temptation to indecorum, and the western part served as a sort of public thoroughfare between the parts of the city on the northern and southern sides. The services were carried out with negligence. Winchester was, therefore, one of the cathedrals which called for interference during LAUD's archiepiscopate. CHARLES I. was also a man of taste, and it is not unlikely that he aided in efforts to restore the building. That money was somehow expended is evident from the account of a visit to various cathedrals by three gentlemen from Norwich in 1634. They describe the "brave old mother cathedral, fair and long, with St. GEORGE on horseback on the top of her flat-bottomed steeple," suggesting the prelacy of the Order of the Garter held by the bishop. The roof of the choir is said to be "stately, fair and rich," and it is added that "to beautify the same a great sum of money hath been very lately bestowed." There is reference to stained-glass windows which represented the genealogy of JESSE, the history of the Nativity, and the Revelations. All the precious stuffs of pre-Reformation times were not converted to secular uses, for the travellers mention "many rich hangings and cloths, one of velvet wrought with gold for the high altar, which was given by Bishop FOX; others of cloth of tissue and cloth of gold filled with pearl wire, and a rich and fair canopy of cloth of gold to carry over the king." There was no city in England in which loyalty to the sovereign was more innate than in Winchester, and CHARLES I. and his advisers were aware they could count on it.

In the early part of the Civil War Winchester was therefore a refuge for the cavaliers. It was attacked in 1642 by the Parliamentarians under "that valiant soldier and patriot of his country," Sir WILLIAM WALLER, and captured. The citizens were compelled to pay 1,000*l.* The troops were not, however, to be restrained from attacking ecclesiastical work by any fine, and there is no doubt they entered the cathedral and performed some mischievous acts there. But to what extent cannot be ascertained. One of the officers, Colonel FIENNES, a son of Lord SAYE AND SELE, who as a scholar of Winchester College was indebted to WILLIAM OF WYKEHAM, was able to preserve the bishop's chantry, and probably was no less successful in other parts of the building. The brave officer was not sufficiently rewarded by fate for exhibiting so much gratitude. He failed to keep Bristol from Prince RUPERT, and PRYNNE proposed that he should be tried by court-martial, and if possible shot. Afterwards, when keeper of the Great Seal, and about nine months before CROMWELL's death, he was selected to explain the Protector's views at a time when a Spanish invasion and other troubles were impending. Then he vanishes. After WALLER left Winchester the city again declared for the king. In 1644 the Parliamentary troops who came to attack it met the Royalists at Cheriton, and having overcome them entered the city. The castle, however, held out, and CROMWELL himself was obliged to appear. In his summons to the mayor he said, "I have commanded the soldiers, upon pain of death, that no wrong be done, which I shall strictly observe. Only I expect you to give me entrance into the city without necessitating me to force my way, which, if I do, then it will not be in my power to save you or it." After a breach was made in the wall of the castle the Governor surrendered. The siege of



Basing House followed, where CROMWELL was also victorious. Among the prisoners taken was INIGO JONES, the architect, and if VERTUE be correct, another was WENCESLAUS HOLLAR, the engraver.

The royalism of Winchester did not make the city appear a blessed place in the eyes of Parliament. In order to raise money to meet war expenses it was proposed to sell the lead off all the cathedrals in England, "nay, almost the cathedrals themselves, if any would buy them." The people of Winchester, apprehending danger, presented a petition against the "destroyinge and pullinge doune of Trinitie Church" (the title given by HENRY VIII. to the building) "theare scituate, an auncient and most beautifull structure, the most convenient and spatious place of assembling for the hearinge of God's word, whear many thousands of soules may be served and satisfied." Parliament discovered a way to make ends meet without selling the cathedrals, and Winchester did not lose its most important building. An effort was made by the citizens to raise loans to repair the cathedral, but they were either not sufficiently organised or were too indifferent to be able to obtain an adequate sum.

After the Restoration CHARLES II. condescended to select Winchester as a suitable place to reside in, and Sir CHRISTOPHER WREN was instructed to prepare plans for a royal house, which was to stand on the site of the castle, with a suitable approach from it to the west door of the cathedral. The building was never completed, but the parts which were roofed were used as a prison, barracks, &c. The fire which broke out a few years ago put an end to any scheme for realising WREN's plans. But if the people were friendly towards CHARLES II. they were inspired by hate of his brother, and they were punished by quartering an excessive number of troops on them.

The time was fast approaching when the favour of a king could not do much for Winchester or any English city. Queen ANNE, who was good-natured, would gladly have resided in a place which was connected with so many of her predecessors, and where the violence of contending Ministers would be likely to be subdued. But she discovered that her own desires were not important, and that her place was elsewhere. After ANNE's time Winchester had to submit to fate, and dwindle to the status of an ordinary assize town.

But as long as the cathedral endures it cannot be forgotten for how vast a period the old city was the stage on which the most important personages in English history appeared for a time. In the eighteenth century that sort of renown was not of much avail. Apparently the authorities of the cathedral would gladly have submitted to the influences which obliged the Court to reside elsewhere. The building was supposed to be a relic of a barbarous age. It was, strange to say, JOHN MILNER, Bishop of Castabala *in partibus*, who was the first to reveal the historic interest of the cathedral, and to demonstrate that its various parts also exemplified the development of English architecture. The state into which the cathedral had fallen was, however, enough to excite a sort of pity among archæologists, especially those who were able to realise the appearance of the building when kings and queens were among the worshippers. The following description of Winchester Cathedral in 1789 by JOHN CARTER will suggest the indifference of the authorities at that time:—

The cathedral, though it remains at this day (with little alteration) as it was left after the reign of Henry VIII., yet the neglect and contempt shown for its sacred walls is most glaringly manifest. In surveying this cathedral I was struck with the idea that it appeared in the same state as a building soon expected to be taken down to make way for a new erection; or, at least, to be entirely new modelled and modernised. Therefore, repairs of any kind to the present humiliated and suffering church would be altogether useless. At the west front I remarked that the parapet of the gallery over the three grand porches was in a most ruined state, many parts of it having fallen into the gallery.

On the north side of the nave I everywhere saw broken pinnacles, architraves and mullions of the windows; innumerable quarries of the glass were wanting—all together presenting a scene of general devastation. The appearance of the west front of the north transept is really disgraceful; an entrance into the transept is converted into a receptacle for all kinds of rubbish; a modern convenience usually to be met with in some part or other of our religious structures. It is impossible to command the indignation raised by viewing the groins over the

exquisite monumental chapel of Cardinal Beaufort,\* which are left in such a miserable state that the rain often deluges this wonderful object. Nay, so little is it respected that prodigious quantities of its broken minute parts are thrown by as so much rubbish. Are the revenues for the repair of this cathedral, like those of Gloucester Cathedral, wanting? I cannot pursue my observations on this structure any further. The recollection of the general debased appearance of the whole pile fills my mind with unpleasant reflections which, if communicated, some readers might conclude that I was actuated in my dissertations by motives not consistent with a "Christian antiquary" and an artist. However, I cannot forbear quoting a paragraph from the Rev. Mr. Milner's learned and interesting "History of Winchester":—"Whilst our eyes are yet feasting on the beauties of this unrivalled screen (the high altar of the cathedral), it is proper to mention that proposals have been made to demolish it, together with the oratories behind it, in order to lengthen the choir with the disproportioned aisles of the east end, in the manner that has been so absurdly done in Salisbury Cathedral. If any consideration could console us for the weak and tottering state of the whole east end of the church, from the tower to the extremity, it is that it will not admit of the removal of this stay against the inward pressure of the walls and buttresses without falling in ruins upon the heads of its presumptuous violators."

Some years afterwards JOHN CARTER again visited Winchester, and he found few changes. The west front continued to be neglected. The north transept was cleared from rubbish, but it was still shut out from the rest of the fabric, as if it possessed neither use nor beauty. A few repairs were going on in the choir, but otherwise JOHN CARTER could discover no trace of ecclesiastical care. The continental wars were not without their effect on the restoration of English churches and cathedrals, for people of all degrees were afraid to expend money, as the future was uncertain. But in 1816, when peace was restored, Winchester began to experience a change, as in that year restoration was commenced, and in less than twenty years a sum of about 40,000*l.* was expended on the repairs of the cathedral. Of late years much costly restoration has been also accomplished under the direction of Mr. JOHN COLSON.

## THE ARCHITECTURAL ASSOCIATION.

THE ninth ordinary general meeting of the above Association was held on Friday evening last in the rooms of the Royal Institute of British Architects, Mr. W. H. Seth-Smith, vice-president, in the chair. The minutes of the last meeting were read and agreed to, and several nominations announced. The following gentlemen were elected members:—Messrs. H. W. Currey, S. Holderness and A. Williamson. Mr. T. G. Sankey has been reinstated a member. A vote of thanks was passed to Mr. Owen Fleming for his attention on the occasion of the visit to the London County Council working-class dwellings at Boundary Street, Bethnal Green.

Dr. F. S. Granger, M.A., then read his paper on

### Greek Sculpture and Greek Legend.

When I was asked to read a paper before this Association, I purposely chose a title of some vagueness, in order that freedom of selection might be left me. Let me begin, then, by marking off beforehand the precise subject of the remarks which, with your indulgence, I am about to offer. The sculpture is that of the Acropolis of Athens; the legend is that of Athena, the divine protector of the Athenians; and both legend and sculpture are so intimately connected with the architecture of the Acropolis that I trust you, as architects, will not regard the time wasted which we shall devote to them.

The Greek temple as a whole—taking the building along with its ornaments—has never been surpassed for excellence of design, perhaps has never been equalled. This does not prevent us from agreeing that, as architecture only—building apart from sculpture—some of the cathedrals and abbeys of the thirteenth century are nobler works than even the Parthenon. But if you take the two together—architecture and sculpture—you must assign the palm to Greece. Interesting and beautiful as Mediæval sculpture often is, it falls short of the knowledge and technical skill of Greek sculpture. No one can seriously maintain that Mediæval sculpture, at any rate on this side of the Alps, is comparable to Greek work of the first or even of the second order. And this consideration will affect our estimate of Greek art as a whole. The excellence of the Parthenon, for instance, rests upon a certain balance of subordinate excellences. It is a perfection depending upon the harmony of different elements. I shall try to show how various the elements

\* In *The Architect* last week, when the Cardinal was referred to as the supposed cause of the evils of the reign of Henry VI., by a misprint Henry II. was substituted.



were that entered into this harmony; how architecture, sculpture, both applied to a building and standing free, and colour decoration, united together to express certain religious beliefs and to answer certain religious ends.

We need not be surprised, therefore, that the work of Stuart and Revett, by which Athenian architecture was made known, should have led, at the end of last century, to a revival of Greek architecture, and that Vitruvius and Palladio had to yield to the architects of the temples upon the Acropolis. This revival, however, suffered from the defects of most revivals. The architecture of Greek temples was applied to purposes for which it was unfitted. Moreover, the spirit of the style was misunderstood in a most important particular. Colour decoration was left almost entirely out of account. Greek buildings, on the other hand, showed a brilliant scheme of colour in which the white marble surfaces contrasted with the gold and blue and vermillion of the sculpture and the mouldings. Hanover Chapel, therefore, of which Mr. Paul Waterhouse has given an interesting account in the "Journal" of the Institute, was not a building in a truly Greek style. Architects have tried to convince themselves that certain rules of proportion are enough to insure impressiveness of design. But the public takes little interest in the geometrical recipes of which we have heard so much, and here for once the public instinct is correct.

Greek architecture in England has suffered still more seriously from being used without the sculpture, for which the pediments and friezes offer the frame. Reference is sometimes made to the fact that the entrance to the Athenian Acropolis, the Propylæa, had no sculpture in its pediments. There is reason to believe, however, that the original plan included this sculpture. Greek architecture stands, then, in the most intimate relation with the allied arts, and some of its apparent defects arise from the necessities imposed upon it by this relation. A building in the Greek manner, without plastic ornament and without colour, falls as far short of the true spirit of the style as the pale shadows of the Greek after-world over against breathing men and women.

The very fitness of Greek architecture therefore for its special purposes led to its being found unsuitable under the changed conditions of English life. It furnished very obvious handles for attack to those who admired the Mediæval styles, and much was said about its imperfections. After these two stages, first of indiscriminate imitation and then of equally indiscriminate rejection, there is come the third stage, that of the temper that judges, the critical stage. We are ceasing now to take sides, and are trying to understand. There is a very large public—I speak comparatively—which is interested in the development of ancient Greek art, and the studies of several generations of archæologists are converging upon fairly certain results. I am attempting this evening to focus some of these results upon a familiar field of architectural study, in order that it may appear in its true light. I should be glad to think that we carried away a somewhat clearer idea of the actual achievement of Ictinus and his fellow architects. We owe to Mr. Penrose a more correct idea of the exact structure of the Parthenon. There remain the further and secondary considerations on which I have touched.

It has sometimes seemed to me that when we go back to antiquity, whether of the Greek world or of the Middle Ages, we ought also to carry with us the method and temper of the ancient critics. Matthew Arnold, in his essay upon the "Study of Poetry," has formulated a method which is strikingly in accordance with their precepts. He suggests that the student of poetry should carry in his memory a few fine lines of poetry and apply them as touchstones; not, indeed, because all fine poetry is alike, but because our judgment becomes more acute when it has before it the materials for a comparison. Let us apply this to the criticism of architecture. If we become thoroughly familiar with the design and detail of one or two fine examples in each kind we shall have with us a standard by which we can measure the quality of any work that may be set before us. We shall not, indeed, ask that the details of the building that we are judging shall be like those of the test example. We shall find, however, that the faults of a building of second or third-rate design will be more apparent in the presence of really good work. Such a method, it seems to me, is also the right one for those who are themselves engaged upon design. If the mind is continually refreshed by the study of fine examples, it will become better able to criticise its own work. This is the ancient method of imitation as opposed to the modern. Let us turn back for a moment to Hanover Chapel. We are referred to the Temple of Athena at Priene for the details of the external order, and to the Erechtheum for the general proportions of the front. St. Pancras Church goes much further even than this. The building is like a composite photograph in which half the buildings of Athens are struggling for the first place. "It is a poor temper," says an ancient critic, "that is content to follow closely that which is being imitated." Hence it may be said of most of the buildings of our Greek revival that they are not in the Greek manner. It may seem a somewhat barren conclusion to this part of my

paper, but I do not know how to express it better than by saying that the distinguishing feature of Greek art is a disinterested love of beauty. In contrast with our modern effort to be striking, or to be edifying, the Greek was content to be confined within the limits of his own art and to seek the beautiful. The pursuit of truth for its own sake, and apart from technical purposes, finds little encouragement in the present; the pursuit of the beautiful finds even less. It is the imperishable glory of the Greek mind that it devoted itself with an enthusiasm that has never been surpassed to these two great ends.

Let us now see how the Greek love of the beautiful found expression in the works of art upon the Athenian Acropolis. This oblong eminence was the centre from which the city spread and contained the sites of the greatest sanctity. It was the Mount Zion of Attica. Long before the Persian invasions, long before the building of the Parthenon and the Erechtheum in the shapes in which we know them, Athena was worshipped upon the sacred spot to the north of the Parthenon. Several legends grew up round the place. According to the belief of the Athenians, Athena had originally to contend with Poseidon, the god of the sea, for the worship of the Athenian state, and the visitors to the Acropolis could see the olive tree which Athena made to spring up as a proof of her power. Her rival Poseidon, to show his power, cleft the rock with his trident and a spring of salt water gushed forth from the place. The King of Athens, who acted as arbitrator, awarded the palm to Athena. The contest was represented in the sculptures of the western pediment of the Parthenon.

The eastern pediment of the same building portrayed the birth of the goddess. According to a quaint old legend she was born from the head of Zeus. A black figured vase shows us how the event was imagined by the Athenians of the sixth century. Zeus is sitting upon a throne with a lion's head at the back and a winged sphinx underneath as a support. He is robed in a tight-fitting tunic, and a mantle is thrown round his shoulders. He holds the lightning in his right hand and gesticulates with the left, while from his head Athena springs up equipped with shield and spear. Ilithyia, the goddess of childbirth, stands before Zeus, and moves her hand in a characteristic manner. Still further to the right is Ares, the war-god, armed with lance and helmet and with the Medusa shield. Behind the throne Apollo celebrates the joyful event by music on his lyre, and Hermes, the messenger of Heaven, with his winged shoes, traveller's cloak and broad-brimmed hat, is ready to carry the news to Athens.

There is no reason to doubt that the ordinary Athenians believed sincerely in these legends. So strong was their belief that the tyrant Pisistratus took advantage of it, and by a curious device secured his return from exile. He dressed up a tall woman in the attire so familiar to the city, and the people seem to have been deceived into thinking that their divine patroness was recommending them to receive back Pisistratus when he rode to Athens with the pretended Athena by his side. In the height of the glory of the city the same sincere simplicity of belief was still shown. During the building of the Parthenon a wonderful piece of fortune befell, which, says Plutarch, showed that Athena did not hold aloof, but was helping to accomplish the work. A very active and zealous workman slipped and fell from the scaffolding, and was in a condition so dangerous that he was despaired of by the physicians. Pericles was affected painfully by the accident, but was visited by Athena in a dream and was informed of the remedy. Of this he made use and the man was healed. In order to record the event the great statesman erected a statue to the goddess as the giver of health, Athena Hygieia, and the pedestal of this statue with the inscription is still to be seen at the entrance to the Acropolis. I do not know why we should accuse Pericles of hypocrisy here; other Athenians of the most brilliant intellectual endowments were characterised by the same devout temper as that which in their descendants struck the Apostle Paul 500 years later. Athens was not only the centre of the profoundest culture, it was also one of the most religious cities in Greece. The conclusion to be drawn is a very important one. It was first and foremost through the religious emotion that the masterpieces of Phidias and his contemporaries affected the average Athenian. Only in the second place was note taken of their perfect workmanship. The rude wooden image in the Erechtheum that fell from Heaven, before which the famous lamp of Callimachus for ever burned, was doubtless more revered than the great statue of the neighbouring Parthenon. The artist was not the master but the minister of the religious feeling, and ran great risks if he turned aside from his appointed task. Phidias was imprisoned upon a charge of impiety because he had portrayed himself and Pericles upon the reliefs of the great shield of Athena.

As the character of the Athenian state changed so also did the character of their goddess. When the Athenians were a people of farmers she was thought to give rains and abundant crops. Hence, in the eastern pediment of the Parthenon she is accompanied by the Hours who bring the harvest season and



by the Sisters of the Dew. As the goddess of the sailor she contrived the magical vessel in which the Argonauts sailed to find the golden fleece, and her temple on the promontory of Sunium brought comfort to the ships that beat round that dangerous coast. As the patroness of victory she was called Athena Nike, and in order that she might never desert her people she was represented without wings. But the goddess was more than the patroness of the farmer, the merchant and the soldier; she was the embodiment of wisdom. It was her inspiration that guided Odysseus on his wanderings, and Heracles throughout his labours. This ideal figure which reflected so closely the interests and aspirations of the Athenian state was boldly identified with the democracy, and worship was paid to her as Athena Demotia, the personification of the people. There is a beautiful little relief in the Acropolis Museum; it represents the goddess leaning pensively upon her spear, her eyes fixed upon the memorial stele before her, which may be supposed to contain the names of deceased warriors. This charming design shows that she could sympathise as well as inspire.

We may enter now, perhaps, into the spirit with which the Athenians celebrated every year the birthday of the goddess at the great festival of the Panathenæa, July 28. This began in the early morning with a procession to the Acropolis, in order to offer a new robe, or peplos, to the goddess—a piece of saffron cloth embroidered elaborately with the conflict between the gods and the giants. This robe was conveyed in state along the streets to the Acropolis, and there was hung round the great statue, or perhaps before it, as a curtain. Let us take the ideal figure of Athena as a clue, and let us join, so to speak, in the procession of the citizens of Athens. We shall find that the great masterpieces of plastic art are all, as it were, set to the key of this religious ceremony; the main idea of it—the birth, the power and the honour of Athena—being like a pervading diapason. The sculptures of the Parthenon are not exercises in which merely the skill of the artist is displayed; they are the vehicles of living religious ideas.

As we approach the Acropolis, let us suppose that the magic of fancy has restored to their former splendour the ruins of the entrance and of the temples which lie beyond. By the careful comparison of the actual remains and of the literary evidence the archaeologists of this century have gradually restored the arrangement of the works of art upon the Acropolis, and we are enabled by their aid to substitute for the existing ruins a picture in which the buildings and the sculpture are united into an harmonious whole. The view is taken from the restoration of Thiersch. One of the most prominent objects was the colossal bronze statue of Athena the Defender, which rose to a height of 25 feet. The point of the spear was visible from a great distance, and the sailors, as they were tacking up the Saronic Gulf from Sunium, kept a look out for the moment at which the familiar landmark should appear across the low hills of the coast. This work has perished, without leaving any visible trace, except a rough representation upon certain coins.

As you pass between the columns of the Propylæa on to the rocky plateau, the eye is caught by the rich colour of the crystalline limestone rock. It is of a heavy red or maroon passing into dark purple or indigo. But in some lights the effect is changed. My first view was gained one evening as the sun was nearing the horizon, and the rays of light, which were almost level, so struck the surface of the limestone that it seemed of a light rose colour. Against this the white columns of the Parthenon stood out with great streaks of dull gold where they were stained by the weather, while, behind the rock and the white marble and the weather stains the clear evening sky formed a background. In a well-known passage of the "Seven Lamps," Mr. Ruskin compares to their disadvantage the Greek temples with the coloured architecture of Venice. But nothing can be more wonderful than the strange flickering of the white marble columns as they seem to flame out against the blue. Over this brilliant foundation coloured ornament was applied, like a delicate embroidery, to the chief architectural features. As you pace the summit of the Acropolis you can see many a marble moulding still carrying the traces of this.

Colour was applied to sculpture by the Greeks not less systematically than to their buildings. It is curious that the notion of coloured statuary should be so repugnant to the prevailing taste, and yet there is scarcely a museum of classical antiquities in which traces of colour are not to be found. We saw that, for want of colour, Mr. Cockerell's Hanover Chapel, with all its elegance, was not in sympathy with the true spirit of Greek architecture. Let us proceed to note that the modern schools of sculpture, which professedly derive from the antique, are separated from their originals by a similar interval. I do not mean to assert, of course, that such buildings and such sculpture cannot be of the first order without the use of colour, but I venture to maintain that they are parodies rather than imitations, if we view them with respect to their originals. We have no less an authority than that of Praxiteles, the sculptor of the Hermes of Olympia, for saying that sculpture is

benefited by the application of colour. The recent discovery of the beautiful sarcophagi at Sidon, with their exquisite colouring, has furnished us with a standard by which we may appreciate other works of art that have been less fortunate. "The colour thus applied," says Professor Gardner, "does not obscure the texture of the marble nor the delicacy of the moulding; on the contrary, it makes both more visible by giving a variety to the monotonous whiteness of the surface; it relieves the fatigue otherwise caused by the study of colourless form, and assists the eye to observe many subtleties of modelling which it might otherwise be unable to appreciate." I am quoting from the excellent handbook of Greek sculpture recently published by Macmillan. The author was, until recently, the director of the British School of Archaeology at Athens, and in that capacity has laid many English travellers to Athens under very deep obligations. I had the advantage of Mr. Gardner's company during one or two visits to the Acropolis, and I gladly avail myself of this opportunity of acknowledging my indebtedness. Mr. Gardner has succeeded to the chair of archaeology in University College, London. I hope my paper this evening may lead some of the members of the Architectural Association to follow the subject further, and to take advantage of Professor Gardner's courses.

I am supposing that we have now passed by the great bronze statue of Athena, and that we have the Erechtheum on our left. While the modern architect is struck by the irregular disposition of the building and the refined delicacy of its detail, the Athenian would think of the venerable image of the goddess, of her sacred olive tree, and of the salt water spring of the sea god. The beautiful figures of the southern porch have also a sacred office; they are really representative of the young girls who carried certain sacred baskets in the triumphal procession. Does it not seem as if they, too, were about to fall in with the company, as they stand there with one foot moving forward? If the maidens of the Erechtheum seem to be moving towards us, the figures on the frieze of the Parthenon are keeping pace with us. For between the columns of the Parthenon we catch continually fresh glimpses of a band of sculpture, the marble counterpart of the procession of the Athenian people for ever travelling towards the eastern door. The example is taken from the western frieze, and represents some of the Athenian cavalry. It is specially interesting for the beauty of one of the heads. This type seems to have been imitated widely upon contemporary coinage. But we must not stray very far into the bypaths that open on either side; the procession is still moving on towards the eastern entrance. In the centre of the eastern frieze the chief person in the Athenian hierarchy, the Archon Basileus, receives from a boy the new robe that has just been brought for the divine guardian of the city. When the spectator reached the eastern end of the temple he found overhanging him the great cavernous pediment in which the more than life-size sculpture stood out from the background with almost oppressive reality. Surely there, on the annual festival, as the horizontal rays lit up the sculpture in the early morning, it would seem as if the mysterious birth of Athena were happening. The crude realism of the vase painting which we studied a short time since could not satisfy the great artists who worked upon the Parthenon. Fortunately there is a relief, now in Madrid, which enables us to imagine with some likelihood what the central portion of the group must have been. We may suppose the sculptor to have dwelt rather upon the mystical signification of the old legend; the coming forth of a spirit of wisdom from the mind of the supreme god, wisdom strong in the possession of spear and helmet and buckler—with the spirit of victory reaching forth the olive crown in the sure confidence that it would be earned. It would be difficult to exaggerate the influence which this vivid presentation of their patroness exercised upon the Athenian mind; even the most foolish of the Athenian orators must have been sobered, and the most stupid have had some glimmering of intellect, when from the assemblies of the citizens in the plain below they looked up to the Acropolis and thought of all that it meant. When Constantine in his new capital dedicated his great church to the Holy Wisdom—Santa Sophia—the dedication was in striking harmony with the ideal embodied in Athena. If the influence of the goddess floated down from the Acropolis upon the city below it found its concentrated expression in the great statue of Phidias. Of the statue itself every trace has perished, and we must seek a substitute in the copies that have survived the wreck of the classical civilisation. Of these the most useful is the little statuette found near the Varvakeion Gymnasium in Athens, and named from the place of its discovery. "The statue," says Pausanias, who saw it in the second century of the Christian era, "is made of ivory and gold. In the middle of the helmet is a sphinx and on either side there are griffins. The goddess stands erect, clad in a robe which reaches to her feet. On her breast is the head of Medusa wrought in ivory. With one hand she supports a Victory of about four cubits in height, and in the other she holds a spear. A shield is placed against her feet, and near the spear



is a dragon. On the pedestal the birth of Pandora is represented." The little statuette is concordant enough with the description of Pausanias to make us think it to be a fairly accurate representation of the general composition of Phidias's great work. There are still remaining traces of colour of red and blue upon the sphinx and of red upon the ægis. But the statuette falls far short of the style of the original. Let us correct it by reference to a head found near the Acropolis. It is supposed to be copied from the work of Phidias. The eyes have been represented by a bony material inserted in the sockets, and the hollows of the pupils were once filled in with some gem or enamel. The hair was gilt, as we may see from some traces, and the head was covered with a helmet. I know scarcely any other object which enables the modern better to realise the vivid effect of Greek sculpture; its power "to bring the living features out of marble," a power so poetically figured in the legend of Pygmalion.

With these introductions let us enter the presence of the great statue as Fergusson, I think, has restored it. The details of the restoration are more or less open to question, and although I trust the drawing fails to do justice to our conception of the goddess, it may serve to concentrate the ideas with which we have been occupied.

Let us sum up our conclusions. We began by observing that the architectural surroundings of Greek sculpture were rendered much more vivid by the help of colour than modern architecture designed in Greek styles would lead us to expect. We noticed, further, that the use of colour in sculpture must have produced an effect somewhat unfamiliar to our modern taste. These two considerations warned us against supposing that we have really fathomed all the meaning of Greek art. We noticed, also, that the real source of the artistic unity of the works of art upon the Acropolis was to be found in certain beliefs, of a religious character; beliefs which offer some striking points of resemblance to the Mediæval beliefs which, in their turn, found a similar expression in sculpture.

Let us contrast these conditions with the conditions of the present. There now in England is no general and vivid imagination of sacred personages and events to which the artist can appeal, or to which he can minister. I am not concerned to discuss whether such an imagination does or does not deserve cultivation. I am merely stating a fact which is of transcendent importance for the public interest in sculpture. Secondly and lastly, by foregoing the use of colour, the architect and the sculptor resign the most powerful charm at their disposal. I will ask you to think of the drab stonework and the dull sculpture of the British Museum façade, and when you have done so, to agree with me that Greek architecture and Greek sculpture have never been really revived in England.

The following were among the lantern views shown on the screen:—Hanover Chapel, Regent Street, W.; the Athenian Acropolis from the south-west and north-west; the Parthenon, and sketches of the pediments; the birth of Athena; Athena victorious over a winged giant; Temple of Athena Nike; the entrance to the Parthenon as restored by archaeologists; the columns in the Parthenon; Archæological College, Athens; the Erechtheum and southern porch of same; frieze of the Parthenon; portion of frieze showing the Archon Basileus receiving the robe; relief, in Madrid, representing what perhaps was the eastern pediment; statuette by Phidias, with side view; and fragmentary head found near the Acropolis.

Professor Gardner thought the best way to show their thanks and appreciation of such a paper was to pursue their study a little further. The application of colour was the secret of Greek sculpture, and it was in this loss of colour that our modern Greek imitation suffered. The different conditions of the two countries should be remembered. The dazzling light of Athens necessitated this colouring, otherwise it would have been painful to look upon purely white sculpture. Some believed that when colour was applied its object was to obscure inferiority beneath. This could hardly be the case, as all colour was applied in moderation, and not on broad surfaces. The main surface was never covered with pigment; it was only the small details, such as hair and teeth. The whole garment was never painted, but sometimes a border of flowers on the cloak would be picked out. In this way the small surfaces contrasted with the others. The sculpture gained in expression under this treatment and the figures appeared to live. The conditions in London for following the Greek style were extremely different, but to erect a building devoid of colour was a thing no Greek would have thought of. Colour was used freely on inferior sculpture, not as a contrast, but to cover up the worst parts. He said that if any members of the Association cared to call at his library on Mondays, Tuesdays or Wednesdays he would be pleased to explain and give help to them on the subject. He had great pleasure in proposing a vote of thanks to Dr. Granger.

The Chairman asked whether the Greeks used primary or pure colours instead of secondary colours.

Professor Gardner replied that the Greeks undoubtedly used primary colours, but owing to the extraordinary light of

the atmosphere they did not appear harsh, whereas secondary colours or half-tints would have been very unsatisfactory.

Mr. Skipworth said he was struck on his return to London by the peculiar dullness of the ordinary buildings due to the climate. The British Museum offered varieties of light and shade, but it would be greatly relieved by gilding and colouring, in the same way as buildings in London could be relieved by introducing glazed tiles.

Mr. G. H. Fellowes Pryne, in seconding the vote of thanks, said that one of the lessons to be learnt from the paper was that the craftsman should be more in touch with the architect, who should rely more on the craftsman, who ought to live and work for art's sake, not simply consider it a matter of £ s. d. Regarding the application of colour it was one of the greatest difficulties of the present day. Perhaps we had a right to carry colour a little further than the details, but then the question was how far?

Mr. Banister F. Fletcher also spoke, and the Chairman put the vote of thanks, which was carried unanimously.

It was announced that the next meeting would be held on March 19, when Mr. J. A. Gotch will read a paper on "Eighteenth Century Architecture," with lantern illustrations.

## GESSO.\*

(Concluded from last week.)

TAKING for illustration earlier work rather than that of the modern frame-maker, mention may be made of a small frame in South Kensington Museum, decorated in Italian arabesques in very low relief. The run of ornament must have been squeezed in a mould and laid on while still soft to the wooden framework, and following the curve.

In a similar way small jewel caskets were frequently decorated with groups of tiny figures, each taken out of a mould and laid on separately while soft. You may often see where a figure is pushed up from behind by a part of another figure which it overlays. Frequently in a crowd of figures many of them are absolutely similar, showing that they are but adjustments of squeezes from one mould. Sometimes, where bits of the figures have fallen off, the gold background on which they are laid may be seen passing behind them.

Though clearly put on soft they have not been so soft as to be flattened by the slight pressure necessary to fix them in place, a brush touch of soft gesso probably being first laid on the ground to receive them. The particular kind of sharpness which these figures exhibit suggests the sharpness of the mould, nevertheless they may have been finished with the brush and knife. The outline of the figures is approximate only and squarish, the edges of them after lifting from the mould having needed trimming with the knife. In the South Kensington Museum (No. 317) is a heavily clamped box profusely decorated with squeezes of equestrian figures from three or four moulds. They are beautiful and very sharp, yet the paint-brush was resorted to, to some extent, for the making out of the features.

You can mould in plaster from thoroughly dry and well-oiled gesso, and a gesso squeeze will lift out of the plaster-of-Paris mould well oiled. The ornamental detail of most modern frames is practically "compo" squeezing, frequently from moulds carved in reverse in hard wood, the carving of which forms quite a trade in itself.

From the point of view of artistic principle, obviously in this squeezed work there is danger—the danger of the over-application of it where repetition does not sufficiently justify it, or of its misapplication as to furniture and in other similar situations, where it seems to pass itself off as wood-carving. It has even been grained in paint. Pursuing this thought, it may be surmised that even in the coffer decoration, under consideration above, though the work was certainly executed by hand and brush, a certain haste and wholesale execution and oft-repeated design carried into the workshop a mechanical element. If greed reduces a man to a machine, it will soon be felt that an iron machine, if not cheaper, will do the work more submissively, perhaps with more uniformity; and already, early in the sixteenth century, gesso was being relegated to the squeeze. The preponderance of interest which, during the last three centuries, artists and patrons have taken in picture-painting has also had its effect. It has allowed the preservation of tradition of many of the arts, not painting, to fall into the hands of the manufacturer, and not unnaturally he keeps them to himself. Consequently the student now, harking back to an old craft, has to work on somewhat in the dark; and it will be understood that proportions and recipes offered in this paper are subject to constant revision by each experimenter. The artist must be content to work on along more or less empirical and amateurish lines, but helping to re-establish tradition amid

\* A paper read before the Applied Art Section, Society of Arts, by Mr. Matthew Webb, on Tuesday, March 2, 1897.



an open brotherhood, by adding experience to experience, and giving experience. This he will do, for the ways of art cannot be the ways of commerce; it is on his general capacity as an artist he must rely for success and not on a craft-secret. But it is generosity we may be very sensible of when a firm comes forward to let one, as it were, and to some extent, inside the workshop. Behind an unostentatious shop-front in Rathbone Place, Oxford Street, is a veritable hive of workmen occupied with mould and squeeze, helping to carry on a business established in the last century, which in that day was collaborating with the Brothers Adam in their stucco decorations. It is the business of Messrs. Jackson & Sons, members, I believe, of this Society, who have sent down here for to-night objects to illustrate part of our subject.

To resume consideration of what is of most concern to the gesso-worker, viz. hand-wrought work, it may be explained that squeeze gesso has been dwelt upon at some length, because of the fact that in the consistency for the squeeze the worker has a gesso which may be modelled with some facility by finger and modelling tool, keeping both oiled so as not to stick.

To pass rapidly to the conclusion of the practical part of the subject, it has been seen that gesso will take the graver and knife, for what is that chasing of the gesso ground but incipient carving? It is possible then to model in gesso and then carve it if desired, and so carry gesso-work to further developments. Though perhaps for heavier relief and by the skilful modeller stucco would be preferred to gesso, yet gesso is far more under control, and recommends itself more naturally to the artist who has been in the habit of realising his conceptions in paint.

It may be pointed out, too, that a material like alabasterine, which is a stucco, not a gesso, may, except with care, easily be used beyond the moment when it still retains its setting power, after which it will depend solely on the glue ground up in it for its hardening; whereas in gesso-work it is accepted from the first that hardening shall depend entirely on glue and oil.

Speaking of stucco, there are two or three fine pieces of modelled stucco in South Kensington Museum, and in fairly high relief. No. 4 in the Italian Court, a "Nativity," school of Donatello, and No. 1,619, a "Rape of the Sabines," may specially be pointed out. Many Italian stucco reliefs are, I suspect, really casts. In the Italian Exhibition some years back, at the New Gallery, were two so-called gesso reliefs of "Madonna and Child," so adroitly differenced by painting that only on examining the modelling could you detect that clearly one of them, and more probably both, were casts, more likely in stucco, from a mould.

On marriage chests in the South Kensington Museum there is heavy modelling which looks like gesso. The cracks in it are the cracks which gesso would take, and the forms are still soft and fat, though the relief for gesso-work is high; the surface before yielding smoothed probably with water and brush. At any rate, though roughly executed, there very likely is true work in gesso-duro and in distinctly high relief.

With then the conception he may now have of it, in gesso the painter will find a material with which he may carry work far beyond the limit of decoration: a material susceptible of impress from his own hand, more durable because less breakable than plaster, which hardening does not need intervention of the moulder and remains the artist's own handiwork. Be this work called by some other name than "gesso," or called bad names, modelling and carving tools do give ways of treating gesso, the substance itself so treated is gesso, and to repeat, is connected easily with the painter's previous practice. In it he has sympathetic materials and methods with which to reach some subjects and treatment of subject which, by the closer realism of painting only, would be drawn out of a proper sphere of poetic abstract. For coloured relief is not an increase of realism, but the reverse: coloured sculpture in the round may be, but low relief is necessarily a convention, less realistic as modelling than the round, and yet, by the very departure from the flat, the relief makes it impossible for the painting to be realistic. It is really two removes from realism; by the convention of relief and by the convention of colouring obliged by the relief.

The design should be suitable to expression in relief, and should also need painting. The work should be thought of as one art, where of the full attainment the modelling falls short without the finish of colour, the painting without the underlying modelling. Paint a piece of sculpture finished from the sculptor's point of view, and you spoil it; but in many an old painting on the flat the work seems to suffer a confusion for want of modelling in relief; raise some parts of it, and it would be no less beautiful, no less removed and ideal, but all more rational and intelligible; conversely many a relief, without being exactly bad art of its kind, suffers confusion for want of colour.

Though gesso-work may be left in the raw, and beautifully so, it may be coloured in water, tempera, oil, wax, turpentine, or any of the vehicles ordinarily in use in a decorative painter's general practice, and in lacquers. Oil is likely to be the more

durable, goes better with the nature of gesso and with oil-gilding. About gilding there might be much to say; of course it is not essential to gesso, but gesso is decorative or nothing, on which account gilding is valuable, as it always breaks realism and forces you to be decorative.

But the artist will not stop at paint when he sees that he can fix into the gesso burning points of light by glass or precious stones, as in many an old painting, and as may be noticed in that precious ruin belonging to Westminster Abbey, till lately just inside the gate leading to the south aisle of the choir, part most likely of altar furniture, a piece of work quite at the beginning of the fourteenth century. In this work is, I think, still left one precious stone together with two pearls. There also may be seen left into little troughs full of gesso pieces of glass cut to shape. On the surface of the glass away from the eye, and to be viewed through the glass, has been painted a pattern more or less geometrical; over the entire pattern has then been laid gold, and showing through interstices purposely left in the pattern; when dry the whole was laid gold downwards into the bed of adhesive soft gesso. There were also in this relic many miniature medallions of heads in profile, clearly squeezes from antiques. Whilst I am speaking of this treasure, I may mention that internal evidence points to its being English work. Of so early a date, probably contemporary with Giotto, there is but little painting out of England finer than may be found there in the picture panels. It looks as though England must have had a splendid eminence in art prior to the Wars of the Roses. One reason of the sad condition in which this piece of work belonging to the Abbey now is, may be that the gesso ground was laid, as far as I can see, directly on to the wood, except where the wooden framework and panels of wood have had the joints covered by strips of parchment.

I may perhaps now make some general remarks, though expressive, it may be, more of personal preferences than of general principles.

Where gesso modelling is associated with pictorial art rather than decorative, there should, I think, be either very much modelling or very little. Interesting as is the gesso workmanship in Crivelli's great altar-piece in our National Gallery (Room VIII., early Venetian and Tuscan school), or the big "Adoration," by Gentile da Fabriano, in the Academy at Florence; that it is there at all, suddenly rising out of the painting on the flat, is in doubtful taste, compared with the rude but appropriate ornament on the coffer fronts which have been under consideration. In them though the scheme of colour, not counting the gilding or the faces of the figures, is very simple, confined to black and a transparent red; everything is expressed in the gesso. As a matter of fact, in conjunction with painting on the flat, and as that art progressed, the gesso-raising was early discontinued. In like manner, for backgrounds, the impressed or graven diaper seems better than the raised diaper, and more consistent with recession, some slight suggestion of which the background must still give, even in the most decorative work.

Raised or impressed, the diaper is valuable for this reason: one of the most important elements in pictorial treatment is the sky, with its aerial expression of distance; decorative treatment, on the other hand, is helped by the very exclusion of this element, and the diaper shuts it out and supplies its place in design.

It may be remarked that in the subjects of the various works considered in this paper for their display of gesso processes, there has been, more often than not, the hierarchy of a Mediæval Heaven under contemplation; and, further, it may be objected that the imagination to-day no longer dwells on the outworn story of saint and seraph. But the purpose was to show not pictures but craft processes, every one of which is applicable to the decorative rendering of such impressions as may be derived from present-day life around. It should be remembered too that, though perhaps their surroundings made with more singleness of heart for beauty than do ours to-day, to the artists who executed them, the coffer fronts we have admired may very likely have been up-to-date designs of figures, the originals of which, vivid with life, were passing the shop-door as the brush was dipped in the gesso.

To that part the gesso-worker to-day must turn with even-tender interest; and although art-history is not the business of the artist, it is a study not unprofitable, if from it may be drawn one moral, pathetic, yet assuring. Though individually workers soon pass away, though opportunity and ability missing each other, not many become expert, few are successful and most are soon forgotten, yet by the sum of experiment one generation after another, the art to which the workers gave their lives herself lives, survives and grows, monumental alike to the master and the *pictor ignotus*.

Gesso-work is necessarily rather small work involving rather slow processes; the difficulty therefore of doing within the evening anything in the way of demonstration which should be discernible and not teasing to the attention, has obliged me to confine myself somewhat to a mere talk about gesso-work.

There are, no doubt, many in the room who do gesso, and



it has been impossible to avoid saying what many of you know. So much has been written on gesso, from before the time of Cennino Cennini, among the Giotteschi, down to distinguished artists in our own day, that I have feared to weary your attention over the not generally interesting technical details of making and manipulation. If there should be any who care to ask questions relating to the practice I shall be pleased to answer to the best of my ability.

On behalf of an increasing crowd of workers, as I think, fascinated by gesso-work, I hope I may have awakened or stimulated the patron's interest in the artistic value of what he might possess in hand-wrought gesso. Though, in the very pleading for art I would add, let no one do too much possessing. Life must be simple to be, and to afford to be, beautiful. The modern middle-class average drawing-room spattered all over with art novelties is just so much time, attention, opportunity, money, labour thrown away over unconsidered ends.

That is generically most art which is done by the personal living hand, and has afforded happiness in the doing; but if the artist must accept some privation, and this is true to be an artist, so the patron must accept some sacrifice to enjoy the luxury of art. He who carelessly or assentingly enjoys art at the cost of the artist may gain a world of art treasures, but loses the soul to appreciate and enjoy them.

Addressing the student, always supposing him to approach gesso-work from the previous practice of painting, I would point out that he will see the obvious importance of studying modelling in clay or paste, and of studying the laws of low relief; this, too, without a mistaken conceit that he is really approaching the immeasurably more difficult, and for that very reason, humanly speaking, perhaps nobler, domain of the sculptor's art. Paint he should think of rather as a means of getting harmonious colour than as a means of getting verisimilitude.

He who would design for brush-gesso must do gesso; till he knows very well what he is about it is nearly useless to design in any other material. The gesso-charged brush of itself ultimately determines and reveals that limitation of designing to which he must confine himself.

Accepting the nature of the material and not wresting it by wilfulness, let the artist bear in mind that in any art the truest art of it lies along the path of concession to the nature of the material to be worked in; he may then safely resist tyranny either of material or theories.

This just domination by material is not inaptly expressed by the following lines, with which I conclude my paper:—

With tactile hand; live symbol, human, of activity;  
Sentient sure medium 'tween earth's clod and heaven;  
Link but material to intelligence;  
Man's works shall grow, while his poised soul may see  
That they are Art and his creations good.

## GLASGOW ARCHITECTURAL ASSOCIATION.

ON Monday, February 22, Mr. A. N. Paterson, M.A., in the chair, Professor T. N. Simpson, of Liverpool, delivered a lecture on "Reticence in Art."

All art, the Professor said, had its limitations, but no hard and fast rules could be laid down. The quality of restraint was the best quality an artist could possess, and the power of selection the best proof of a man's strength. No compositions of art, said the lecturer, were more original and displayed more reticence than were to be seen in the paintings and writings of Mr. Whistler. The limitations of architecture were more strict, as the possibilities were greater than the sister arts. A building should harmonise with its surroundings and form a part of the landscape. Old buildings always harmonised with each other, the principal reason being that reticence was given full place to in their design. Over elaboration, said the Professor, was one of the greatest evils of our modern buildings. A building may be a noble monument of architecture with practically no ornamentation at all. Referring to decoration, the Professor stated that the fewer colours used the more satisfactory would be the result. In wall decoration no more than two main colours should be used. In a living room, the Professor opined, the two colours should cover the chairs, hangings and other furnishings—other colours should be used sparingly. The lecturer then treated on the subject of mural decoration; this, he said, was the noblest branch of the painter's art. In England it was much neglected in the past, and was not yet properly encouraged. In Italy mural decoration was to be seen at its best, and the lecturer enumerated a number of the best well-known examples. The worst art in the whole world, said the Professor, was embodied in the modern school of Italian sculpture. Reticence they simply did not understand. In sculpture a greater amount of reticence had to be observed when it was related to architecture than when it stood alone.

Concluding, the Professor said that if the work we do be done honestly, it will be good, no matter whether it be rich or whether it be simple. On the motion of Mr. Wm. Jas. Anderson, seconded by Mr. Chas. R. MacIntosh, a hearty vote of thanks was accorded the Professor for his lecture.

A meeting of the Association was held on the 3rd inst., Mr. George S. Hill in the chair. Mr. D. Theodore Fyfe read a paper on "French Mediæval Fortifications." In introducing his subject the essayist pointed out that past work must be studied with respect to the conditions under which it was created. He proceeded to enlarge on the different types of the domain, a chief's dwelling, showing how this building evolved into the château of later times. The essayist gave a description of a number of the best examples, diagrams of which were ranged round the walls, and showed that every part of these fortifications had its origin in the laws of defence. We have the bartizan, which was primarily erected to strengthen the angles of the tower. Then there was the system of wooden hoardings, built out from the walls. The besieged by this means had an overhanging walk to enable them to defend every inch of their walls. To the development of these hoardings we owe the corbelled parapets which afterwards became so common. The essayist concluded by a reference to present-day architecture. If it is to be real, he said, it must be the outcome of an intelligent understanding of the wants of the age. On the motion of Mr. Alexander M'Gibbon, a hearty vote of thanks was accorded to the essayist. Thereafter the Chairman brought under the notice of members a question of public architectural interest. This was with regard to the proposal by the Lord Provost to commemorate the attainment of the sixtieth year of Her Majesty's reign by altering the present front of the Royal Infirmary, and building a new modern façade, which would possibly project further into the Square. Mr. Hill intimated that the committee had already discussed this question, and were strongly of opinion that no such proposed defacement should be allowed to take place, unless the alteration was to be of real lasting benefit to the patients; then no reasonable objection could be urged. The infirmary was a notable piece of architecture, and as it stood was in perfect harmony with its surroundings. Were this proposed alteration to be carried through that would be the case no longer. The members were unanimous in this matter.

## THE EGYPTIAN PYRAMIDS AND THEIR BUILDERS.

A LECTURE, by Mr. S. H. Capper, professor of Architecture at McGill University, has been delivered in Montreal, on "The Egyptian Pyramids and their Builders."

After noting the physical characteristics of Egypt, which, as an habitable country, consists solely of the bed of the Nile, rendered fertile by the annual inundations of the river, Professor Capper first dealt with the ethnology of the ancient Egyptians. At the furthest point to which we can trace them back in their monuments, some 6,000 years ago, there appear to be two, if not three, distinct races in Egypt, of which the dynastic race, probably the latest invaders, would seem to be allied to the ancient Phœnicians. It is surmised that these "Punic" tribes, leaving their original home on the Persian Gulf, made their way along the coast up the Red Sea, whence, crossing over into the Nile Valley, they conquered and occupied Egypt, becoming the dynastic race known to us in a long and magnificent succession of sculptured monuments. Other waves of this great tide of migration and conquest settled on the coasts of Philistia and Syria (the Philistines of Biblical history being one branch), and made their way further west to the famous settlement of Carthage and its offshoots in the extreme west of the Mediterranean. The Egyptians, when they first become historically known to us, are a people in a very high state of socially organised life, perfectly acquainted with the arts of masonry and sculpture, of carpentry and turning, of working in copper, of pottery-making, glazing, weaving and dyeing; in many respects their workmanship and works have never been surpassed by anything man has accomplished since their day.

Egyptian history begins for us with the fourth dynasty of kings, dating from the earliest years of the fortieth century before Christ. To the time immediately anterior to this dynasty the "Pyramid of Degrees," or Stepped Pyramid of Sakkara, is generally ascribed.

Within the last few years the Pyramid of Sneferu, first king of the fourth dynasty, has been identified at Medum and thoroughly explored. Though much ruined, it is in some respects better preserved than the more famous Pyramids of Gizeh; in particular the temple attached to every pyramid on the eastern side has in this instance been completely preserved, buried under piles of debris. The pyramid at Medum, known to ancient Egyptians as "Kha," is a most interesting link, showing the development of the true pyramid from the



truncated form known by the name of "Mastaba." This pyramid and that at Sakkara are the only instances of successive enlargement, the "accretion theory" of pyramid-building being shown to break down when applied to the great pyramids of Gizeh. Further, the pyramid at Medum was the direct model followed by Sneferu's successor, Khufu, when he built his much grander pyramid at Gizeh, the one having been brought to the true pyramid by a final layer or casing, built at a totally different angle from the original slope of the "Mastaba" core, while the other was built directly to the true pyramid angle. The dimensions of Sneferu's pyramid are: height, 7 by 25 cubits; side of square base, 11 by 25 cubits; those of Khufu's—"The Great"—pyramid at Gizeh being precisely similar, with a length of 40 cubits substituted for the 25 cubits of the earlier monument. This ratio of height to base-circuit, viz. 7 to 44, is precisely equivalent to the nearest simple approximation of the ratio of the radius of a circle to its circumference; and this theory of pyramid building seems to be well established by the most accurate measurements of modern times. The theories and paradoxes sought at various times to be established in regard to the Great Pyramid are almost innumerable; in comparatively recent times they have been chiefly associated with the name of Professor Piazzi Smyth, of Edinburgh, whose excellent work of solid investigation is sadly marred by the fanciful theories in which the learned explorer allowed himself to run riot. Within the last few years Mr. Flinders Petrie has given accurate data for the first time to the world, the result of a most painstaking scientific research illumined by great critical acumen, and in the works of this eminent English Egyptologist are to be found the most recent and most authentic statements of our present knowledge on the subject.

Turning to the pyramids of Gizeh, the lecturer was compelled by want of time to limit himself to a description of the Great Pyramid built by Khufu, the second king of the fourth dynasty, and known to the ancient Egyptians as "Akhet." It is one of the largest and—when completed—loftiest buildings achieved by man, covering some 13 acres with solid masonry, and attaining a height of 481 feet. The side of the base is (within 2 or 3 inches) 756 feet long. The accuracy of workmanship is probably unrivalled in all human building. The most careful modern measurements, taken with instruments of scientific precision, prove that the accuracy of levelling of the casing-stones of the Great Pyramid is equal to "most modern opticians' straight edges" of an equal length; while the descending entrance passage, partly built, partly driven through solid rock to a total length of some 350 feet, reveals an error of less than one-quarter of an inch in the sides and of three-tenths of an inch along the roof. This extraordinary accuracy, however, which is far greater than anything attempted in modern masons' work, is not true of the uppermost chamber within the pyramid, which is considerably out of level, a fact that would seem to indicate that the master builder or architect had passed away before the completion of his work, leaving it to less careful successors to finish. Mr. Flinders Petrie's researches had thrown great light on the mechanical methods of the pyramid builders and the organisation of labour. The remains of what were believed to be the barracks of the workmen still existed on the west side of the Second Pyramid, quite adequate to house from 3,500 to 4,000 men. In all probability some staff of skilled masons would be employed continuously; while during the period of the Nile inundation, when agricultural work was at a standstill and the people ready and thankful for employment, a special levy of perhaps a hundred thousand labourers would be requisitioned to quarry the stone on the east bank of the Nile, and convey it (by water) to the site at Gizeh. There is therefore great probability in the statement of Herodotus that 100,000 men were employed to build this pyramid, working during twenty years for three months at a time. Under the circumstances the pyramid building, far from being an oppressive exaction, would be a great scheme of public works, finding employment for the unskilled population at the season when they would otherwise be idle.

#### IRISH ARCHITECTURAL ASSOCIATION.

A MEETING of the above Association was held on the 2nd inst. in the Grosvenor Hotel, Westland Row, Dublin, when Mr. W. Kaye Parry, M.A., B.E., delivered a lecture on "Drainage and Sanitary Construction." There was a good attendance.

Mr. R. Caulfield Orpen occupied the chair, and amongst those present were Messrs. George M. Ross, M.A.; Albert E. Murray, C.E.; Joseph Holloway, M.R.I.A.; T. Slavin, C.E.; R. Butler, secretary; M. J. Tighe, &c.

The lecturer began by pointing out the most effective system of drainage and the best means to obtain a perfectly dry foundation. Cement alone was not effective in securing a dry foundation; it was too porous, but by amalgamation with other material the end in view could be attained. Pumping, no

doubt, drained the subsoil, but its cost was utterly prohibitive. Having pointed out the disadvantages of square and circular-shaped tiles, he said that the egg-shaped tiles were the most effective in so far as discharging velocity was concerned. Fire-clay pipes properly constructed were practically indestructible, and answered their purposes much better than iron-made pipes, as the latter did not last so long and were liable to become ineffective through the corroding influence of sewage acids. However, as regards the use of iron for soil-pipe purposes, he thought its use was justified. Medina cement was better than Portland cement, as it set much quicker; and as regarded intercepting traps, he confessed that those of the Buchan pattern were hard to beat. He condemned the construction of cesspools as an effective way of getting rid of sewage matter, and said that a drain once properly made should give no further trouble; but the point was to see that the materials were correctly used, and that the proper tests were applied before filling in.

On the motion of Mr. Tighe, seconded by Mr. Ross, a cordial vote of thanks was passed to the lecturer, and the proceedings terminated.

#### EDINBURGH ARCHITECTURAL SOCIETY.

At a meeting of the Edinburgh Architectural Society held on the 3rd inst., Mr. J. A. Williamson in the chair, Mr. R. S. Lorimer delivered a lecture entitled "Some Notes on the Artistic Work and Influence of William Morris." Mr. Lorimer traced the history of the firm of William Morris & Co. from its foundation; dealt with Mr. Morris as a craftsman, as a teacher and lecturer, as the founder of the Society for the Protection of Ancient Buildings, and as a publisher and printer, and showed some of the books produced at his Kelmscott Printing Press.

#### GENERAL.

**M. Henri Gervex**, the French painter, has received the cross of St. Anne (second class) from the Emperor of Russia. The artist is preparing a great diorama of the coronation of the Czar for the exhibition of 1900.

**The Rector of Lambeth** proposes to erect some lasting memorial of Archbishop Benson in Lambeth parish church. It will take the form of a font for adult baptisms, the late Archbishop having been very much interested in the erection of such a font.

**The Restoration** of the lady chapel of the church of St. Bartholomew the Great, West Smithfield, is in progress. The houses which have blocked a portion of the north side for over 250 years have been removed, and a considerable portion of the original flint and stone-work is thereby exposed. The dividing wall between the church and lady chapel, which is of brick, and has acted as a safeguard from fire while the chapel was in secular occupation, will not be removed until the work is nearer completion.

**A Museum** and art gallery will be erected in Plymouth as a memorial of the Queen's reign.

**A Special Exhibition** of meteorological instruments in use in 1837 and in 1897 has been arranged in commemoration of the Diamond Jubilee of H.M. the Queen at the Institution of Civil Engineers, Great George Street, Westminster.

**A Portrait** of Mr. Francis C. Penrose, F.R.S., ex-president of the Royal Institute of British Architects and surveyor to the Dean and Chapter of St. Paul's, is to be hung on the walls of the Institute, in recognition of that gentleman's distinguished services in the cause of architecture.

**The Committee** of the Society for the Protection of Ancient Buildings recently wrote to the Dean of Exeter to ask what was being done with respect to the repair of the west front of the cathedral. In the absence of the Dean, Canon Edmonds has written that the Chapter "do not wish to be brought into relations with your Society in the matter of what we are doing at the west front of the cathedral."

**The Next Ordinary Meeting** of the Institution of Civil Engineers will be held on Tuesday, March 16, at 8 P.M., when the discussion upon "The Main Drainage of London" and "The Purification of the Thames" will be continued and concluded; and a paper will be read with a view to discussion on "The Mond Gas-Producer Plant and its Application," by Mr. H. A. Humphrey, Assoc. M.Inst.C.E.

**The Prizes** for the Handicrafts Competition at the Building Exhibition will be given by Sir Arthur Arnold, late chairman of the London County Council.

**The Third Ordinary Meeting** of the Dundee Institute of Architecture, Science and Art for the session will be held in the Hall of the Young Men's Christian Association on Thursday evening, the 18th instant, at 8 o'clock, when a lecture will be delivered on "Architecture in the Reign of Queen Victoria," by James A. Williamson, A.R.I.B.A., Edinburgh, president of the Edinburgh Architectural Society.



# The Architect.

## THE WEEK.

WHEN will owners learn that it is not equitable, after selling a building site, to utilise another as a means for reducing the value of the purchaser's house? In more senses than one the adage is true that property has its duties as well as its rights, and surely among the duties must be consideration for those who have expended money in purchasing a part of the property. It is common enough to make stipulations which will prevent the buyers of building sites doing any act which will interfere with their neighbours' enjoyment, but it is no less necessary occasionally to put restrictions on the vendor. The case *BROOMFIELD v. WILLIAMS*, which came before the Court of Appeal on Friday last, is an example. The plaintiff bought a plot of freehold land with a house on it at Llandudno from the defendant. It was understood that the adjoining land was to be used by the defendant for building on, but it was not agreed that the plaintiff was to endure any inconvenience on that account. When the defendant's building was erected it was found that the kitchen and windows on the west side of plaintiff's house were darkened. This was owing to building closely to the plaintiff's boundary. An action was commenced, but Mr. Justice KEKEWICH, before whom it came, decided there was no right of action, although the access of light was materially interfered with. The plaintiff appealed. Lord Justice LINDLEY held there was nothing in the conveyance to exclude the operation of the Conveyancing Act, for it was possible to build on the adjoining land without darkening the windows of the house conveyed. His lordship relied on *MYERS v. CATTERSON*, in which it was held that a purchaser was entitled to all the light which his vendors could give him, and a grantor cannot throw on a grantee the onus of showing the limits to be set on rights incidental to the enjoyment of the property granted. Lord Justice A. L. SMITH also considered that the defendant was under an obligation not to build any house substantially higher than those already erected in the row, and that he was not to build over the part which was to constitute the passage. Lord Justice RIGBY concurred. Inquiry is therefore to be made as to what damages the plaintiff has sustained by reason of the obstruction of the light by the defendant's house not being set back, and the defendant is to pay such damages when ascertained. Defendant is also to pay the costs of the action and of the appeal.

WE can make allowances for the bewilderment of the Edinburgh town councillors, who, having an offer of 100,000*l.* to erect a public hall, cannot discover a site for the building within the boundaries of the city. But in order to get rid of the incubus, it is not becoming to mar the character of an interesting spot. It is proposed to remove seven houses on the north side of Charlotte Square, and to use the sites for the Usher Hall. Now the square, as all visitors to Edinburgh will remember, exemplifies an effort, and a very successful one, to treat lines of houses as a whole. Like other parts of the new town, it is evidence of a time when it was supposed there was much affinity between the Scottish spirit and the antique. The square is therefore an example of northern classic, and as such it merits to be preserved. To set up a big building which is to accommodate in one of its halls at least 4,000 people, will be (if scale has any influence) the dwarfing of the parts of the square which will be allowed to survive. As if to emphasise the contrast, it is intended to leave two of the existing houses on either side of the new block, but separated by a carriage way. The committee claim that the position has the advantages of being quiet, central and readily approached, which we grant. But why should property be deteriorated because it possesses those advantages, and an architectural work—for the square can be considered as one—be deprived of its character? Moreover, the purchase of the seven houses is likely to need the greater part of the money which Mr. USHER has offered, and the owners of the remaining houses will have grounds for action for damages on account of the depreciation of the value of their property. Edinburgh is supposed to have a society

of men of taste, who can be referred to in cases which are likely to affect the amenity of the city, but of late years the Town Council have assumed to be infallible, and the consequence is seen in such proposals as the destruction of a square which strangers cannot see without admiration.

BRONZE doors are costly, but if ever the expenditure required for their erection was justified it is in the case of the Palais de Justice at Brussels, which is one of the noblest of modern buildings. The great portal has a height of about 34 feet and a width of 14 feet. Mr. FERGUSSON considered the span was so large it should have been corbelled out after the Indian practice. The design for the new door was prepared by M. VAN MANSFELD, and the models were by M. HOUTSTONT. About 15 tons of bronze have been used, and in size and weight the door stands second to the Pantheon alone. In spite of its mass the door is easily moved, for steel ball-rollers are employed to avoid friction. The cost has been about 60,000 francs, which is not one-half of the sum paid for TRIQUET'S door in the Madeleine, Paris.

THE annual meeting of the Royal Irish Academy was held in Dublin on Tuesday. The report stated that during the year a large number of antiquities have been acquired by the museum. These include many bronze weapons and implements, swords, dagger blades, celts, &c., and two exceptionally fine specimens of rapiers. The Academy has also acquired a collection of upwards of 700 flint objects, including some very perfect specimens of a rare form of tanged knife blades and a representative collection of flint arrow-heads from the north of Ireland. This is the most important acquisition in this department, which the Academy has made for years. In addition to the foregoing some fine specimens of querns and over 200 other stone objects, two excellent collections of beads, and nine wooden objects known as otter traps, have been obtained. Two additional rooms in the Museum Building will shortly be made available for the display of the Academy's collections. The western gallery of the large central court has been for some months occupied by ogham inscribed stones and other large stone objects, which had been at first placed in the crypt. The Council regretted to say that they had not any communication from the Government as to the filling up of the post of curator of the Academy's Museum, which has remained vacant since November last. The Earl of ROSSE, K.P., was elected president of the Academy for the coming year.

THE sanitary committee of the Brighton Town Council have prepared a scheme for artisans' dwellings. The committee are unanimously of opinion that, in order to provide for men with families, it is absolutely necessary that three bedrooms should be provided, and further that none of these should be on the ground floor. A suggestion has, however, been made that some houses might be erected providing only two rooms upstairs, so as to provide homes for those workmen who have either only very small children or grown-up children of the same sex. The feeling of the committee is that while the home should be as comfortable as possible, still at the same time there should not be any undue expenditure in ornamental work. For this reason they suggest that the houses should be flush to the road, and without forecourts. A saving would thereby be effected of all forecourt walls. With regard to the smaller dwellings, the committee suggest that on the ground floor there should be a sitting-room, kitchen and lean-to scullery with two bedrooms above. With regard to the dwellings where three bedrooms are required, they are of opinion that the best way to build the house would be to construct it in three storeys, containing, on the ground floor, a sitting-room, living-room and lean-to scullery, on the first floor two bedrooms, with a third bedroom in the roof of the house. The committee estimate that the cost of building a four-roomed house with lean-to scullery would be 160*l.*, and adding to this the cost per plot of land, 27*l.* 10*s.*, it would make the cost of the small houses come to 187*l.* 10*s.* each. If, in addition to the four rooms, a room is built in the roof, the committee estimate that this would cost 25*l.* extra, which would make the total cost of a five-roomed house, with lean-to washhouse, come to 212*l.* 10*s.*



## WATTEAU.\*

THE French have reason to envy England for the gift bequeathed by Lady WALLACE. The Louvre possesses only one work by ANTOINE WATTEAU, *L'Embarquement pour l'île de Cythère*, of which we give an engraving this week, while there are several by the master in the Wallace collection. The deprivation is a satire on French taste. The picture in the Louvre was never purchased by French money. It was painted by WATTEAU as a diploma work, and if it were not for that circumstance the country of his birth could not show an example of one of her most illustrious painters. It is in foreign galleries in Berlin, Potsdam, St. Petersburg, Florence and Madrid, or in English private galleries, that the masterpieces of WATTEAU are to be discovered.

There is a reason for the neglect. WATTEAU, who was born in 1684, appeared at a time when French art was under the sway of Academicians and LE BRUN was supposed to have attained a level to which WATTEAU dared not aspire. He was, too, a product in which officialism could have no share. WATTEAU exemplifies one of those freaks which nature sometimes enjoys. He was essentially a painter of subjects that suggested a more refined court than was ever found outside a fairy tale. Princes and princesses might envy the grace of his figures, and his robes are enough to drive royal costumiers to distraction. And yet WATTEAU's father was no more than a *couvreur* in the semi-Flemish town of Valenciennes, and the boy could not have seen any ceremony that was worth a record during his most impressionable years. From the position of the family he was probably acquainted with poverty from his infancy. Throughout his life he was in delicate health, and he seemed to be one of those beings that melancholy had marked for her own. It is likely that with so frail a constitution he did not show much aptitude for assisting his father on roofs, while he may have made better drawings on his slate than the majority of schoolboys. GÉRIN, a painter, took him into his atelier, and from him he was passed over to a decorator, who at one time was able to obtain some work in the Paris Opera House, and brought young WATTEAU to assist him. When the task was completed the young artist was left to shift for himself in the capital. He was then about twenty years of age.

WATTEAU was friendless, and to secure food he was compelled to undertake the humblest work that offered. The bridges of Paris in those days were mainly assigned to the poorer representatives of the arts. On the Pont Notre Dame pictures were to be purchased which had as little individuality about them as if they had been produced by machines. They anticipated the landscapes and figure-pieces in oils with massive gilt frames which are now obtainable in the cheap furniture shops of London for a few shillings. The principle of the division of labour was not then discussed by political economists, but it was adopted in the establishment where WATTEAU was employed. Figures, trees, skies had their creators, and each colour had its specialist. WATTEAU had to take a turn of all when occasion offered. In return for his versatility he was rewarded with a plate of soup every day, and 3 francs at the end of the week. He must have suffered as much hunger as any of the inmates of Dotheboys Hall at a later time. His constitution was undermined by the deprivation of nourishment, and he reached a stage of misery when death was looked on as a redeemer. A good, well-fed and luxurious amateur, the Count CAYLUS, made him the subject of a moral discourse. WATTEAU was indifferent to the precepts. "Let the worst come," he said to the Count; "the hospital still remains for me; nobody is rejected there." It was the "De Profundis" of the artist whose works are now the gems of royal galleries.

Somehow he escaped from the Pont Notre Dame. He was picked up by GILLOT, a painter who was meeting the taste of the moment by producing pictures which were supposed to be representations of scenes enacted on the Italian stage. They served the same purposes as representations of negro minstrels in our days. WATTEAU refined the pictures and thus attracted a wider class of patrons, but at length GILLOT's susceptibilities as an artist

were touched, and he got rid of a man that, as an employer, he should have cherished.

WATTEAU could not yet stand alone; he was therefore very glad to become an ornamentist under CLAUDE AUDRAN, who was engaged at the Luxembourg. He was a shrewder and more honest man than GILLOT. He did not endeavour to exhaust WATTEAU's productiveness. He allowed the artist time to make drawings from the pictures by RUBENS and to sketch in the gardens. There may have been some selfishness in the guidance of his assistant. He wished to keep the young artist as an auxiliary, and for that purpose the development of his skill was advantageous. When therefore WATTEAU tried his hand on an easel picture, AUDRAN advised him to abandon such experiments. WATTEAU, however, was able to find a purchaser who gave him sixty francs for the picture. Such good fortune was not anticipated, and the money he utilised to visit Valenciennes. There he produced a companion picture, for which he received 100 francs. But as patronage was not visible in his native place, he was forced to return to Paris.

In those days, there was an amateur named CROZAT who was very anxious to obtain possession of WATTEAU. His gallery contained a fine collection of Italian paintings which revealed, as it were, a new world to the imaginative artist. It is believed that CROZAT employed him in decorating his house, but WATTEAU was already wearied with work of that class. He left his patron. Whether he made any resolution of trying to be independent is not known. He was more likely to have allowed himself to be treated as a puppet by destiny and to accept whatever turned up. The Academy offered a studentship in Rome, and WATTEAU tried the experiment of competing for the prize. The subject was scriptural, and his experience as an assistant in producing such works on the Pont Notre Dame was not likely to bring him success. However, he sent in two small pictures. They were so unlike the other competitive works, the Academicians were surprised by them. WATTEAU was informed that he was qualified to be an Academician without going to Rome, and if he cared to comply with the formalities he was assured there was no doubt of his election. He submitted, and it was in compliance with the conditions imposed that the beautiful *Embarquement* was executed.

The picture is, we consider, the most characteristic of the artist's works. It is remarkable for the same reason as some of TURNER's landscapes. The English painter, amidst the darkness and meanness of Maiden Lane and the garbage of Covent Garden, saw visions of beauty which are not surpassed by anything found on the earth's surface. WATTEAU, after a course of oppression, hunger, illness, poverty and general misery, created a scene which no idyllic, poetic or arcadian romance has approached. What is more, he compels the spectator to believe that, compared with the Cythera which awaits the travellers, the place from whence they are embarking is no more than a bleak and desolate shore. His privations caused WATTEAU, as a sort of reaction, to imagine youths and maidens of his own age who were the reverse of himself in health and strength and enjoyment of life. His sordid surroundings led to the creation of earthly paradises, surpassing all that fancy had attempted to describe. The lonely artist suggested on the canvas his own longings for love and companionship in a region where no middlemen could exist, and labour, if exercised, was only a pastime.

It was a most unacademical act to have brought WATTEAU into the Academy, but so much generosity is enough to condone many faults. The *Embarquement pour Cythère* is accordingly a memorial that even among Academicians exclusiveness can be sometimes broken down. The exceptional circumstances of his election drew attention to WATTEAU's merit and a demand arose for his pictures. He painted as many as he was able, and of a joyous class. If he could have settled down quietly he must have been happy, but the influence of his trials was not to be shaken off. Restlessness dominated him. He changed his abode from Paris to the country, and from the country to Paris; in desperation he came to England, but he could not abide for long in any place. At that time there was no cure for consumption, and WATTEAU's instinct made him feel that he was doomed. He died in July 1721, in his thirty-seventh year.

\* See Illustration.



Of late years a host of writers have descanted upon the works of WATTEAU. They all agree that he was original in his treatment of life. In no part of France could he behold such incidents as he depicted. It was then difficult to discover a landscape of any extent which did not exhibit some signs of human suffering. WATTEAU's swains are unconscious of what is taking place outside their parks. Life is to them all pleasure, and the seasons are always summer. He was therefore an idealist, although in his time the word related only to figures which bore more or less resemblance to ancient sculpture. The pictures might all have been painted by a man who was every day in the happiest mood, and they excite emotions of happiness in those who look on them. Their unaffectedness may be affectation, but there are few paintings which seem better adapted for enjoyment in a pessimistic age.

## ELECTRICAL INSTALLATIONS.\*

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### SPECIAL PRECAUTIONS.

**Factories.**—Where inflammable goods are being manufactured or stored, and especially where inflammable material is floating in the air, such as in cotton mills, and also gunpowder magazines, &c., it is necessary that the following precautions be taken:—

Arc lamps as a rule must not be used, and certainly arc lamps without globes. For this kind of work the enclosed arc lamps now being introduced, in which the arc is maintained in an air-tight globe, are very suitable, and there is not much objection to them in cotton and such-like mills, but for explosive factories and even accumulator-rooms it is better not to permit any arc lamps of whatever construction. In workshops, and especially in carpenters' shops and any places where inflammable material is on the floors and benches, it is of the greatest importance that properly enclosed globes be used, and provided with a dish to catch any pieces of hot carbon which may be detached; this precaution must be insisted upon.

With reference to the use of incandescent lamps in mills and workshops, there are practically no special precautions to be taken. However, in accumulator-rooms, chemical works, and explosive factories and magazines, there are many points which need attention.

All fuses should be placed in positions where there are no explosive gases or materials near, and these should preferably be outside the dangerous rooms. If, however, the fuses have to be inside these rooms, they must be placed in an air-tight case, so that even if the room were full of an explosive gas and a fuse blows, no explosion would result. Switches must be air-tight or nearly so, and in chemical works it will be found advisable to discard brass lampholders and use the special oil-cup lamps which the best makers supply for such positions. In these lamps the connections are of the bottom loop type, and the holder is enclosed in a glass cup, which may be filled with some insulating compound or oil; by this means the bare copper connections and the brass-work are protected from the acids, &c.

Returning to gunpowder magazines, the lamps and connections must all be enclosed in perfectly air-tight fittings, no fuses may be allowed in the vicinity and the greatest care must be exercised that there shall be no possibility of arcing, or sparks of any description. The advice and assistance of an expert should always be obtained where work of this description is being carried out, as there are very many points which must be attended to in such installations, and they cannot all be enumerated in a small work.

**Breweries.**—In damp buildings, such as distilleries, breweries, laundries and paper mills, the difficulties are very great, and can only be properly grasped by experience. The chief difficulty is electrolytic action, and it is almost impossible to prevent it if ordinary wood casing is used.

There is much discussion as to the advisability of using continuous currents in such buildings, and there are many advantages in favour of alternating currents, not necessarily high tension. It is obvious that in an installation the positive cable will be attacked and corroded if there is the slightest leakage, the same chemical and electrical laws applying to this as to accumulators. The negative cable will, however, not be affected to any dangerous extent. Fires are caused by the corrosion of the positive wire in the following way:—The wire is corroded until the circuit becomes very bad, and the current is kept flowing through the copper hydroxide which is formed. This will be noticed by the lamps becoming dull and flickering, while neighbouring ones are bright. Finally, the heat evolved at this place of resistance dries the hydroxide and the casing, the result being that an arc is formed between the two ends of the wires. If the damp has disappeared in the interval the result is a fire.

These latter dangers can be avoided by frequent testing, and by the use of earth lamps, which are a continual indication of faults. It may be perhaps of interest to describe the earth lamp arrangement. Two lamps are connected in series across the mains, an earth wire being connected between the two. If the two wires are equally insulated from earth, the potential between the positive and the middle or earth connection will be the same as that between the negative and the earth connection, consequently the lamps, if of the same candle-power and voltage, will burn equally at half voltage. If one of the mains becomes earthed the lamp connected to it goes out and the other burns at full voltage.

This earth-lamp system only applies in cases where both mains are insulated. Care must be taken to disconnect the earth wire when testing the insulation, as it really earths both mains continuously and reduces the insulation resistance to that of the lamp resistance, *i.e.* a few hundred ohms; but this, of course, is no disadvantage, as the "fault" is a lamp and there is no danger.

There is no doubt that rubber is not good enough to resist wet and dry action in distilleries, and consequently it is important to discover a kind of wiring which will stand these conditions. If a separate plant is being laid down and there is no chance of public supply mains being laid near, an earthed outer concentric lead-covered system is perhaps the most suitable, but the fittings must be water-tight and perfectly enclosed. The fittings should not be taken on trust from any contractor, but samples should be submitted before the work is commenced, and an expert's opinion obtained before any tender is accepted.

The special fittings designed by inventors of numerous systems, and which are claimed to be water-tight and damp-proof, are unfortunately rarely if ever so, and usually collect the moisture.

There is an absolute necessity for lamps and holders to be enclosed in air-tight fittings, and ship fittings are as good as any where there are no acid fumes, &c., in the atmosphere. The outer lead covering should be soldered to the base of the fitting, so that no moisture can possibly enter, except from the front. The fittings inside must be damp-proof, so that moisture cannot get into the hygroscopic insulation, if used, and the outer glass cover may be clamped to an inside rubber ring in the usual way. A fitting put up as described does not cost much, if any, more than one carelessly designed, such as one which depended upon the glass front to keep moisture from the cable, or upon a red-lead joint at the back.

Fuses in damp positions give a great deal of trouble; the fuse wires are electrolysed by the current passing through the film of moisture on the porcelain base. Switches do not, as a rule, give much trouble, the only serious point being that metal handles become connected to the circuit through the moisture, and shocks result. It takes a long while for the switch contact blocks to become corroded very seriously, and when it does happen there is no danger of fire as with fittings, as the switch is, or should be, mounted on an incombustible base.

It is, however, advisable to arrange switches and fuses in air-tight metal boxes, and there will be no trouble with either.

If there is any probability of supply mains being laid, the system to be recommended should be the lead covered

\* In last week's article, page 169, last line but three, read:—"They usually have mercury commutators, &c.," instead of "They usually have mercury accumulators, &c."



either concentric or twin, with both conductors insulated, or an iron pipe drawing-in system may be adopted. Exactly the same precautions should be taken in either case. The lead covering or iron pipe should be connected to a metal box which is air-tight and surrounds the switches and fuses, and also connected to the base of fittings.

It is often found practicable to have the switches, fuses, &c., in a separate room which is dry. This is often possible in breweries and distilleries, and in this case the special precautions for fuses and switches may be omitted.

These special precautions do not necessarily mean an extra high cost, as they are most of them questions of design rather than of expense. Of course the greatest skilled supervision must be exercised over the workmen while work of this class is being carried on.

*Theatres.*—Precautions to insure that total failure of light shall not occur are most important where many people are congregated, such as in theatres, churches, public halls, railway stations, and also in places where articles of value are exhibited, and where temporary darkness might be made an opportunity for theft. A consulting engineer should always be employed to design, to supervise during construction, and to make periodical tests. This is insisted upon in the case of theatres and like buildings by the County Council regulations. If the current is obtained from public supply mains, the matter is a difficult one, as the failure of the mains or supply station has to be provided against.

If the supply is on the continuous current system a battery of accumulators always connected across the mains, with an automatic accumulator switch to prevent any return current from the battery to the mains, will effectually prevent failure of the light, and can be put up at a not very excessive cost. The accumulators will last almost an indefinite time, as they will very seldom be discharged, and they will not take any appreciable current to keep them charged. If alternating currents are used for incandescent lighting it is not hopeless to provide against failure of supply, as a battery of accumulators can be installed as before, and instead of an automatic accumulator switch, an automatic rock-over switch can be provided which will change the circuit from the alternating to the continuous current circuit. A small motor-transformer may be used to charge up the battery occasionally, say once in every two or three months. In either case the extra cost of working will not be more than a small fraction of the ordinary cost; in fact, the above method might be likened to the use of a cistern in a water supply, which is on the "constant" supply system, but which, as experience has shown, may fail temporarily.

Having shown how to prevent a total failure of the service, the next point is to prevent failure owing to fuses blowing, defective wiring, &c. If no accumulators are used there should be *more than one* main fuse, and this point must be insisted on; if the supply company's officials will fix only one main fuse, an application to the chief engineer explaining the circumstances, or, if he is obdurate, to the Board of Trade inspector, will remove this difficulty. There must be at least two principal fuses, whether accumulators are used or not.

The whole of the important parts of the building must be wired alternately on at least two entirely separate circuits on the two separate main fuses. In this case, if one main fuse blows half the lights will be on, and this will prevent anything like a panic, and with the present standard of illumination, hardly any serious inconvenience in consequence, the illumination being even then what would have been considered good ten years ago.

There should be as few branch fuses as will be allowed by the insurance companies, and if accumulators are used there should either be no fuse for them, or the one used should be very large.

The above principles may be summarised as follows:—

1. No single main fuse between the source and the whole of the lamps.

2. As many totally independent circuits (interlaced as much as possible) as can be arranged.

3. The use of accumulators to temporarily take the place of the source of supply if it fails.

If the above precautions are carried out there will be, if not absolute immunity from failure, such a very small

chance of failure that it may be neglected for any case which has up to the present arisen.

#### *Regulations.*

It may be advisable to enumerate the most important regulations made by the County Council for the protection of theatres and other licensed buildings from fire:—

Where the electric light is permitted in such premises, it shall be on condition that a competent electrical engineer do certify in writing to the satisfaction of the Council once in six months that the system is in perfect working order.

All such premises when lighted by the electric light shall have at least three distinct and separate circuits (*a*) for the stage, (*b*) and (*c*) for the auditorium, corridors and exits.

The circuits referred to in (*b*) and (*c*) shall be so arranged that half the lights in each division of the auditorium, and half those in each corridor and exit shall be on (*b*) and the other half on (*c*).

When the current is supplied by a public lighting company these circuits shall be taken separately from the street mains.

Under all circumstances complete metallic circuits must be employed.

Gas and water-pipes shall never form part of any circuit.

The number of lamps shall be so subdivided that no sub-circuit shall carry more than sixty-five amperes, and each sub-circuit shall start from a distributing-board.

All conductors shall be efficiently protected from mechanical injury.

Where conductors pass through walls, fireproof floors, or ceilings, they shall be protected by iron pipes or by glazed stoneware or porcelain tubes, and precautions shall be taken to prevent the possibility of fire or water passing along the course of the conductors.

All external conductors shall be specially insulated and laid in iron pipes properly jointed and of ample size.

Such iron pipes shall be protected where necessary, and securely fixed and supported when not underground.

Resistances for regulating the power of the lights shall be mounted on incombustible bases, and shall be so protected and placed at such a distance from any combustible material that no part of the resistance, if broken, can fall on such material.

Principal resistances shall be placed in a fireproof room reserved for the purpose.

Arc lamps shall not be used within buildings without special permission of the Council.

When they are used special precautions shall be taken to guard against danger from falling glass or incandescent particles of carbon.

All parts of the lamps, lanterns and fittings which are liable to be handled (except by the persons employed to trim them) shall be insulated.

When there is a stage special care shall be taken that all works in connection with the lighting of the stage are carried out in as substantial manner as possible.

No metal-work in connection with the circuits shall be exposed or so fixed or constructed as to be liable to cause a short circuit.

Lamps on battens, footlights, &c., shall be protected by stiff wire guards so arranged that no scenery or other inflammable material can come in contact with the lamps.

No readily combustible material shall be used in connection with any lamps on the stage in such a manner that it might come in contact with the lamps.

No soft or readily inflammable wood shall be used in connection with the lamps on the stage, and all wood shall be protected by unflammable material from the possibility of ignition by an arc between any two parts of the two conductors, or by heated particles from any conductor or part of a conductor which may connect together the two main conductors.

Where a number of lights, as in the footlights, battens, &c., are supplied under the control of one switch, and protected by one single or double-pole cut-out, as the case may be, the conductors shall be maintained throughout of such a section that they will be effectually protected by the cut-outs against heating.

The leads to the battens shall be specially guarded, particularly at the points where they join on to the battens;



and a sufficient length shall be allowed to prevent the leads receiving any injury through any movement of the battens.

The battens shall be suspended by at least three wire ropes attached to insulators on the battens.

On no account shall the same batten be adapted for both gas and electric light.

A switchboard containing all the necessary switches, cut-outs and other fittings for the control and regulation of the stage lighting shall be fixed in some convenient position overlooking the stage.

The board shall be inaccessible to all but the persons employed at such premises to work it.

Boilers, steam-engines, gas-engines and dynamos, when used for the supply of electricity to such premises, shall be placed in such positions as shall be sanctioned by the Council.

Gas-engines shall be placed in rooms so adequately and continuously ventilated that no explosive mixture of gas can accumulate by any leakage through the engine in the event of any of the gas-cocks being left turned on.

A hood, connected with a pipe carried into the external air, shall be fixed over the ignition tube when this is used.

Primary or secondary batteries shall be placed in rooms so adequately ventilated that no fan shall be necessary.

The batteries shall be well insulated.

Transformers used to transform either direct or alternating currents, together with the switches and cut-outs connected therewith, shall be placed in a fire and moisture-proof structure.

Where the primary current is of high potential, such structure should be preferably outside the building.

No part of such apparatus shall be accessible except to the persons in charge of its maintenance.

No transformer which under normal conditions of load heats above 130 deg. Fahr. shall be used.

Transformer circuits shall be so arranged that under no circumstances shall a contact between the primary and secondary coils lead an electromotive force of high pressure into the building. The term "high pressure" means in all cases pressure above 200 volts.

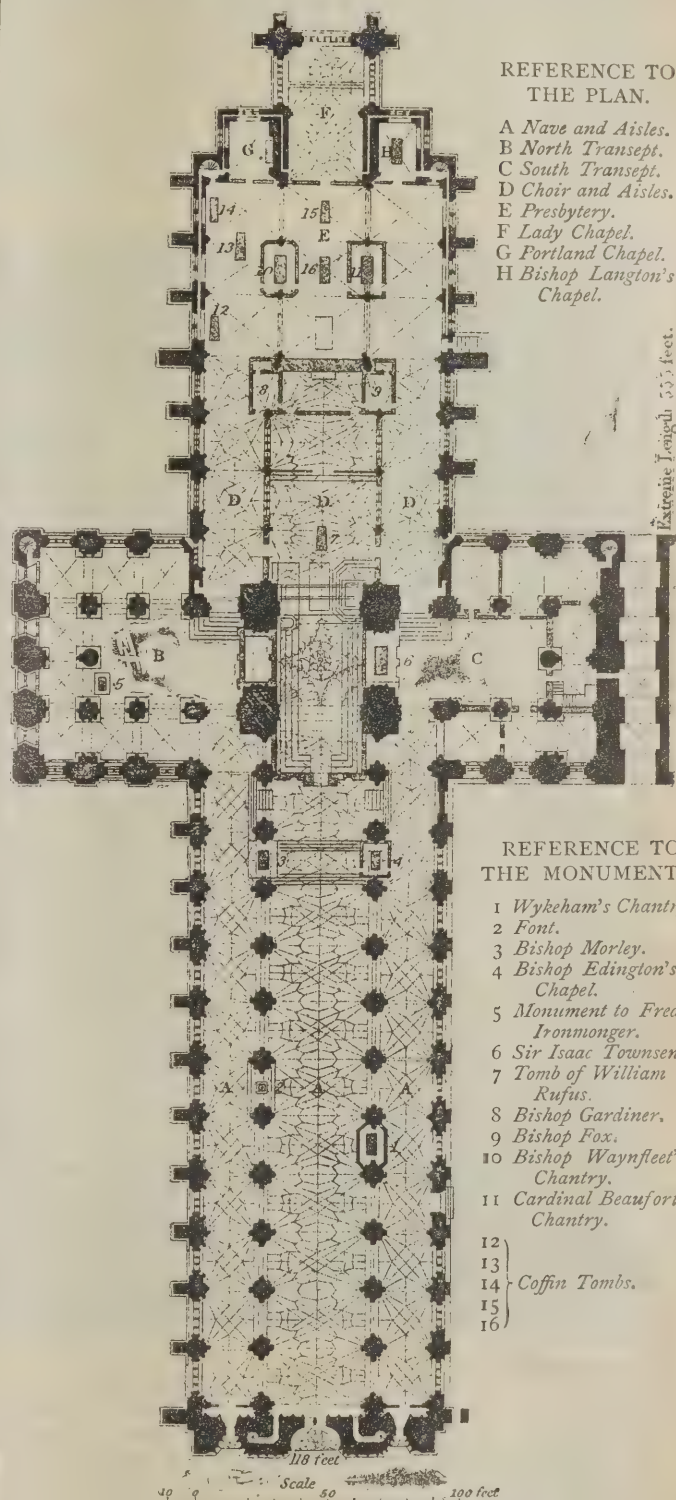
The generating plant and switching gear shall be in the hands of thoroughly competent manipulators, and the engine-room (if any) shall be inaccessible to the general public, and shall, where possible, have an independent entrance.

A plan of the wiring shall always be kept in a prominent position in the office of the manager of such premises.

#### WINCHESTER CATHEDRAL.—IV.

IN the preceding articles we have referred to several men and women of various ranks who were connected with the history of Winchester Cathedral. That course was inevitable. With the exception of Westminster Abbey there is no building in England which has so many personal associations around it. The peculiarity is further exemplified by the number and beauty of the chantries and chapels. Three of them are of exceptional interest, viz. WYKEHAM'S, WAYNEFLETE'S and BEAUFORT'S. They form a class of work which is of great interest. The designers were more exempt from restrictions than when erecting a church. They were able, therefore, to give a more free expression to their ideas of Gothic architecture. It will be seen from the views of the chantries that in every case there was a desire to express the soaring aspirations of the style. A pyramidal construction could not be employed, for a chantry was a miniature chapel, but all the lines may be described as upspringing and pinnacles abound. There is not the severity of the pyramid or the obelisk, but a chantry may be described as a collection of miniature examples of them. There was no suggestion of a prison-house, and although sanitarians may object to sepulchres in buildings, it could not be denied that in the chantries there was no lack of ventilation. In the style of workmanship the stone-cutter was emulous of the goldsmith. In such cases the character of the structure depended on financial considerations. It was allowable to suggest the greatness of the individual who was buried and the number of friends he believed he possessed in heaven. If funds were available a large number of statuettes of patron saints could be introduced. The history of a

family could be suggested by the aid of heraldry, and the virtues of the deceased could be indicated by means of paintings. It is remarkable that Gothic art was exhibited in chantries after it had almost ceased to appear in church buildings. The chapel of Bishop Fox, who died in 1528, is an example. It is introduced in the view of the south aisle of the choir, which we published on the 5th instant. The structure is shorn of the sculpture and other ornaments which imparted animation to it, but as it stands it



is a noteworthy example of English art. The following technical description of it is worth reprinting:—

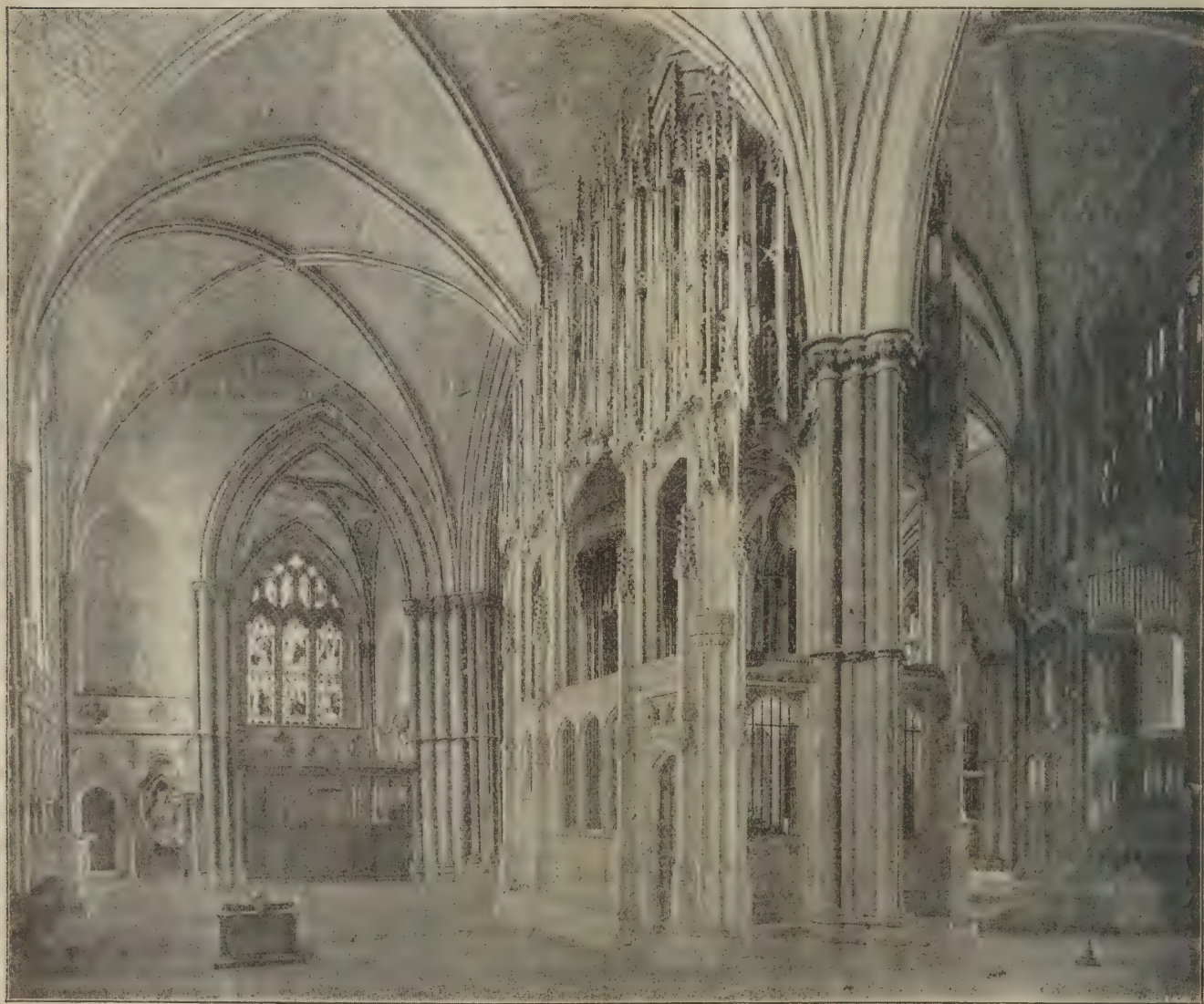
In this magnificent sepulchral chapel every effort of ingenuity and skilful workmanship have been exerted to their utmost, and it unquestionably affords one of the most extraordinary examples of design and sculpture in existence. Four equal divisions compose the architectural design of the front, the elegance of which corresponds with the ornaments that enrich it. These divisions are formed by octagonal turrets rising from the pavement, and exceeding the height of the surmounting parapet, where they are larger and more decorated. Between these turrets and rising from the ornamental course below the parapet are smaller finials, each supporting a pelican in its



piety, an emblem of the Christian Church, and a favourite device of Bishop Fox. The height of the chapel is divided into storeys; the lower of solid masonry, enriched by a series of canopied niches and panelled compartments of elegant design and exquisite workmanship. In the westernmost division is the door of entrance to the chapel; and in the third division eastward, which projects a little on the basement, is an arched recess containing a sculptured effigy of the bishop, who is represented emaciated and clothed in a winding sheet. The divisions of the upper storey are composed of large arches, the spandrels are charged with pelicans, and the arches are subdivided into two open compartments by ornamental mullions, forming inner arches, terminated by crocketed finials. These are also divided into two openings, and in their height by embattled transoms. The surmounting cornice and its parapet are very elegant; the projecting course is enriched by a very beautifully designed and sculptured band of entwined vine leaves, with tendrils and fruit delicately undercut, and marked with the initial letters

Nor is the interior of this chapel less beautiful or deserving of notice than the exterior, although less enriched. The chapel is ascended by several steps through a doorway in the first division from the western angle; the roof is in an almost infinite variety of compartments, divided and subdivided, and connected by knots of leaves, and having various enrichments. The niches at the eastern end of the chapel are as delicate and beautiful as ingenuity could make them, and the internal parts of the canopies rival anything of their kind."

Cardinal BEAUFORT's Chantry, which is shown on the same plate, No. 15, is of simpler character. Bishop Fox was a lover of sculptured figures, and we suppose he had arranged that several of them were to be introduced in his chapel. The Cardinal may have cared as little about "stone dolls" as Sir ISAAC NEWTON, and consequently they were mainly introduced in the upper part of the structure. One of the consequences is that the BEAUFORT



Photographed by S. B. Bolas & Co.]

WINCHESTER CATHEDRAL, NORTH AISLE.

"H. W." in one part. The parapet is composed of lozenge-shaped compartments, enclosing quatrefoils in open work, and terminated by large and small leaves alternately disposed on the summit. Between the octagonal turrets and the outer mouldings of the arches or windows of the upper storey are canopied niches, which, together with those on the lower storey, make the whole number of niches which originally contained statues thirty-eight; their canopies are nearly alike, the difference being only in the detail of the ornaments. The pedestals intended to sustain the figures are remarkably elegant, particularly those rising from the base of the chapel. Mr. Buckler, an architect of established reputation, whose judgment may be relied on, in a description of this chantry says:—"On the most scrupulous examination of the smallest part or ornament, whether a canopy, a crocket, or the smallest moulding, the character and precision are equally the same. The roof of every canopy differs in design, as also the animals in their positions, which are attached to the arches.

Chantry to-day appears more complete than its neighbour. It has also, we consider, more claim to be considered as a perfect example of architecture, for it is a monument rather than an enclosure. The name of BEAUFORT was identified in the popular imagination with "a monstrous life," and when opportunity offered the chantry suffered, for we are told that "the extent of the violence upon the more delicate enrichments of this superb monument has been such as to leave not a single niche and scarcely one pinnacle entire." Bishop WAYNEFLETE's Chantry is opposite BEAUFORT's, and the two so nearly correspond they suggest they were executed about the same time and by the same artists.

WYKEHAM's Chapel is rightly placed in the nave, in one of the bays on the southern side. There are three arches facing the nave which are treated with much delicacy. Over the monument, within the enclosure, are niches which



once were filled with figures. But a costly monument was hardly needed for so famous a man, whose name will be always associated with the cathedral.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Mr. Aston Webb presiding. The minutes of the last meeting having been circulated, were taken as read. The following is an abstract of Mr. W. H. St. John Hope's paper on

### Heraldry in English Mediæval Architecture.

He said he should confine himself to the historical period beginning with the accession of Henry III. in 1216, and ending with the death of Henry VIII. in 1547. The applications of heraldry to architecture in this period were so numerous that it was not easy to deal with them in any degree of connection. Arms, badges, crests and supporters were freely used in every conceivable way and on every reasonable place. Whether the building were ecclesiastical, domestic or secular was immaterial; there was no difference in the treatment of the heraldry nor limitation of its use. The earliest applications of armorial insignia were purely of a personal character, to distinguish a man from his fellows when all were alike disguised in their war harness. These insignia usually took the form of a device painted upon the wearer's shield or attached to his headpiece. Heraldry, consequently, is met with first in buildings, in the form of painted or sculptured shields on the monumental effigies of departed warriors.

The value of armorial shields as a mode of picture-writing soon suggested itself when heraldry became a science, and the association of them with architecture formed at once a beautiful form of decoration and a speaking historical record. The wall arcades of the nave aisles and the tombs of Queen Eleanor and William de Valence in the abbey church of Westminster furnish the earliest and most charming examples of this combination.

Another admirable thirteenth-century example is the gatehouse of Kirkham Priory, Yorkshire. In the new nave of York Minster, of about the same period, various benefactors to the church are commemorated, after the Westminster fashion, by their shields of arms, thirty-two in all, sculptured, two to a bay, in the spandrels of the pier arches. A somewhat similar arrangement occurs at St. Albans in the beautiful decorated bays of the nave, built after the partial fall of the south side in 1323. In the North of England there were numerous fourteenth-century buildings showing heraldic decoration with the architecture—for instance, Bothal Castle, Alnwick Castle, Hilton Castle, co. Durham, Lumley Castle, the Lion Tower at Warkworth, and Micklegate Bar, York. The presbytery and choir of York Minster contain in the spandrels of the pier arches a series of sculptured shields similar to those in the nave, and the great arches of the central lantern tower are also adorned with large and fine examples of the sculptured shields of arms of the builders and others. Taken as a whole, the fourteenth century, except perhaps in Yorkshire, was not very prolific in buildings decorated with heraldry; but it produced a magnificent series of monuments, many of so elaborate a character as to form distinct features of the churches wherein they stand. The more notable examples were enumerated and illustrated by the author of the paper.

The so-called Perpendicular style was very prolific in heraldic ornament and decoration, which was especially seen in East Anglia, where almost every large church of the period is lavishly decorated with heraldry. Several examples were described. Fine displays of heraldry existed in many of the ornate fireplaces of the fifteenth century, notably at Tattershall, in Lincolnshire, and the bishop's palace at Exeter.

The fifteenth century, like the fourteenth, was rich in heraldic monuments, and brought into fashion those beautiful stone structures that combine the monument with the chantry chapel, of which examples exist at Tewkesbury, St. Albans, Salisbury, Winchester, and elsewhere, one of the finest in design, as it is most remarkable in construction, being the bridge-like structure in Westminster Abbey church, in memory of Henry V., whose tomb stands beneath it.

Much of the architectural heraldry of the first part of the sixteenth century is simply a continuation of that which preceded it. In large and costly buildings, however, the increased richness of the architecture was accompanied by a corresponding outburst of heraldic display, as in Henry VII.'s Chapel at Westminster (in particular the bronze doors), King's College Chapel, Cambridge, St. George's Chapel, Windsor, and Hampton Court.

Selecting a few typical architectural features, such as spandrels, bosses of vaults, &c., Mr. Hope proceeded to show the influence the introduction of heraldry had had upon their ultimate development, citing numerous existing examples. In

conclusion, the author discussed, by the light of Mediæval examples, the artistic treatment of heraldry in its application to architecture, shields, crests, supporters and various other features being dealt with in detail. The lecture was illustrated by a large number of lantern slides and coloured photographs of stall-plates of Knights of the Garter in St. George's Chapel at Windsor.

Mr. J. A. Gotch said he had been asked to propose a vote of thanks, but in order to do that properly he should be well versed in heraldry, and this he could not boast to be. He was struck by the interesting series of views, but the later examples pleased him more than the earlier ones. The earlier were more heraldic and simpler, but from a decorative point of view the later ones were better and the art of the designer was more clearly shown. If he criticised he would venture to say that the badges in the Tudor period appeared coarse; perhaps this was because the finest designers never stuck to the highest form of decoration. There was one thing which could be gathered from the examples, and that was the great advantage of studying heraldry in the round as well as in the flat. By having to model a shield, and not merely to draw it, one became better acquainted with its construction and how the various things which the shield bore were logically placed. Freedom in heraldry was a thing which modern designers ought to consider—freedom both in drawing and the shape of the shield. Considering the origin of heraldry, it was curious that ladies should have indulged in heraldic bearings; but perhaps when it took a line not only useful but decorative, the ladies saw their advantage and stepped in. It was the custom in Spain for unmarried girls to display a shield, one half of which bore the maternal arms, the other half being blank, so that the husband inserted his arms and a new insignia was formed. This shield carried by the girls was called the shield of expectancy. Architects must have found heraldry very useful, as it told the history of a building, and was very often the only way of finding out dates.

Mr. J. J. Stevenson, who seconded the vote of thanks, said the paper was a treat, because of the knowledge and precision of statement that it showed. Heraldry made them feel how poverty-stricken they were, not being able to do the like. Heraldry, he thought, was as old as the race; it must have been before letters, and it was one way of writing names. He could not understand why it should be considered assuming or bumptious to set up the arms of one's family. If a man had a right to a crest why should he not employ it? The crest expressed the totem notion of relation or resemblance to a particular animal, and hence the bear or the leopard was once largely used in England. But if heraldic signs served instead of signatures in days when few could write, it seemed anomalous that now there should be a tax on similar signs.

Mr. Hugh Stannus said he also found hesitation in adopting heraldic signs. Heraldry served two purposes. It was an indication to identity and was a decoration. It was also connected with storiography and was a clue to dates, but it should be properly treated, and early examples on that account deserve to be respected, although some later examples might be no less efficient and artistic. Heraldry should be subordinate to architecture, but that would not diminish its true value.

Mr. J. D. Crace warned the members against the danger of freedom, for there was more precision about the principles of the science than was commonly supposed. As an example of what could be done by its aid, he referred to the beautiful gates between the House of Lords and the lobby. The work suggested that, if the conditions were favourable, the modern treatment could compare with Mediæval examples.

Mr. Aston Webb, in putting the vote, expressed satisfaction that so many specialists were present, and if any improvement was feasible they might expect it from those gentlemen. Referring to modern examples, they should not forget what had been done by Pugin.

Mr. St. John Hope, in returning thanks, said he had assumed that all who had listened to him would have mastered the elements of heraldry. He then dealt with some of the objections raised during the discussion. He agreed with the Chairman about the merits of Pugin, who was most dexterous in the representation of heraldic beasts in the traditional style.

It was announced that Mr. J. Alfred Gotch would read a paper at the next meeting, March 29, on "Heraldry of the Renaissance in England."

**The Decree** providing for the repair of the battlements of St. Mary's Church, Oxford, in accordance with Mr. Jackson's designs at a cost not exceeding 1,750*l.*, which was approved by Congregation, was opposed on Wednesday in Convocation by Mr. Park Harrison, who objected to any departure from the designs of Sir Gilbert Scott. Professor Case deprecated further opposition, Mr. Jackson's treatment of the repairs having been on the whole most careful and judicious. The decree passed without division.



## NOTES AND COMMENTS.

ONCE upon a time there was no building in Ireland which attracted more attention than the Conciliation Hall on Burgh Quay, in Dublin. It was not a remarkable example of Irish architectural skill, but in it O'CONNELL ruled for several years, and fulminated weekly against all whom he considered to be his enemies. There, too, the Young Ireland party arose against the great agitator, because he despised the sword and declared that repeal itself was not worth a little bloodshed. In the hall his last speeches were delivered without attracting much notice from the people. After the death of O'CONNELL, and the downfall of the movement which, by means of subscriptions of a shilling a year from members, was to overcome England, the hall ceased to be a forum, and was easily converted into a corn store. Now it is about to be subjected to another transformation. Plans have been prepared by Mr. W. H. BYRNE, of Dublin, which will be carried out by August next at a cost of over 20,000*l.*, and then the Conciliation Hall will appear as the Grand Lyric Hall. There was not much harmony inside it in its political days, and we hope compensation for all the old discords will be found hereafter. What a blessing it would be if other political institutions in Ireland could be as readily adapted for promoting the "concord of sweet sounds."

THE Royal Society of Antiquaries of Ireland is the successor and development of a society which was founded in Kilkenny about half a century ago. As such it rendered more service to archæology than was possible for the parent society. We apply the past tense, for the Royal Society of Antiquaries now seems to be in a condition of decline, although we do not suppose its condition is hopeless. Before the amalgamation took place a valuable collection of antiquities was gathered in Kilkenny, and there it still remains. The capital of the BUTLERS is the most fitting place for it, as it represents largely local archæology, and would never have existed without the zeal of local members. The majority of the members of the Royal Society will talk and display themselves freely, but apparently collecting is too humble a task for orators. Yet an antiquarian society without some sort of a collection is an absurdity. Accordingly, longing eyes have been cast on the objects in Kilkenny. We can understand there is another motive for the desire to dispossess Kilkenny of the property. So long as there is a museum of antiquities in that city, it would form a sort of nucleus for a new society in case of a split among the members of the Royal Society of Antiquaries of Ireland. It is well to remark that if the collection were handed over next week the society could not undertake charge of it, having no premises to shelter so many objects. The scheme at present is therefore to operate on the acquisitiveness of the Science and Art Department by representing that the Dublin Museum is incomplete so long as a fragment of an Irish capital remains in Kilkenny. The Department is not, however, adverse to the creation of local museums in England, and similar toleration should be exercised in Ireland, where much havoc is caused because there is not enough interest taken in archæology by country folks. It cannot be said the collection suffers in Kilkenny, and as it has been preserved during so many years there is no ground for doubting about its safety hereafter. If the Department will not allow itself to be duped into becoming a catspaw for a clique, there is no likelihood of a removal to Dublin of what was gathered mainly by Kilkenny men, and which they are eager to treasure.

THE peculiarity of the Scottish law in dealing with parish churches received a curious illustration in a case which was tried before the Court of Session on Friday last. In October 1892 it was decreed by the Presbytery that the parish church of Kinghorn was in such a condition as to be beyond repair, and that a new building should be erected. By an arrangement which was made in 1761 the burgh of Kinghorn is to pay one-half of the expense of all repairs of the church on condition of having one-half of the area assigned for use of the burghers. If a new building were to be erected that arrangement would not be valid. Accordingly the heritors, who feared they might have to

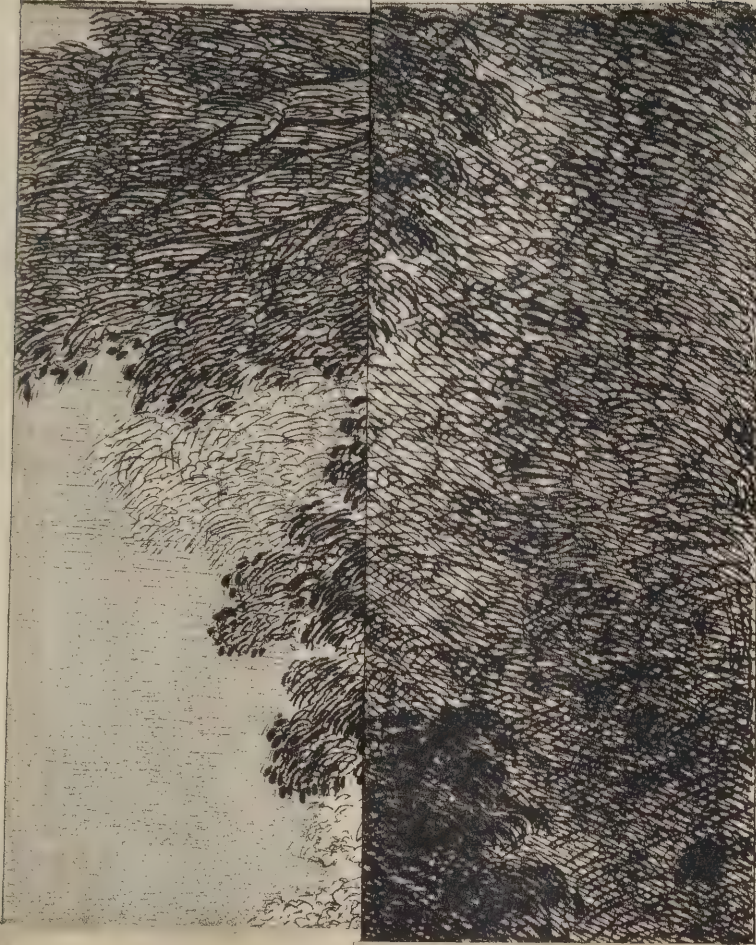
bear the greater part, if not the whole, of the burden of a new church, lodged an appeal. An architect was called in, who declared the building to be repairable. The work was carried out accordingly, and cost 2,889*l.*, or within 600*l.* of the cost of a new building. The question then arose, who was to pay so large an amount, especially as the order of the Presbytery was not obeyed? The burgh would have escaped liability if a new church was erected, and it was contended that the altered building was equivalent to one. But their lordships held that, however much of the building had been taken down and replaced, it must still be considered to be the very same church which was the subject of the arrangement in 1761. The burgh will therefore have to pay one-half and the heritors one-half the cost. It is worth remarking that if the work comprised any enlargement the heritors would have escaped payment, and it is difficult to say who would then be liable.

AN investigation of the effect of the tornado in St. Louis was undertaken by Mr. JULIUS BAIER, and he has presented the results to the American Society of Civil Engineers. Among his conclusions are the following:—  
1. That for any twisting, wrenching or bending strain a  $\frac{3}{4}$ -inch rivet is far superior to the ordinary  $\frac{3}{4}$ -inch bolt. 2. That the tension value of three  $\frac{3}{4}$ -inch steel rivets is sufficient to distort the web of a 15-inch 41-lb. I-beam  $\frac{1}{8}$  inch out of line without failure of the rivets, and is also far in excess of the bending resistance of the metal in a  $\frac{7}{16}$ -inch connecting angle. 3. That a tension strain transmitted across the root of an angle from one leg to the other will cause a bending and a distortion of the angle, and bring an eccentric tension strain on the nearest line of bolts or rivets, and that under such action, in an angle as light as  $\frac{7}{16}$ -inch, the second row of rivets will not act till the first row has failed. 4. That an eccentric tension strain will readily cause a bolt to fail by bending or breaking in the thread while the steel rivet will stand considerable distortion without failure. 5. That well-riveted joints in steelwork will stand, even under jar and shock, an excessive amount of abuse and distortion before actually separating into individual pieces. Mr. BAIER considers that the safety and interests of the community and of the owner of the building require a recognition of a wind-pressure of at least 30 lb. per square foot against the exposed surface of the building, with an additional local provision of 50 lb. for several storeys near the top; and that this amount should be safely taken care of by some positive and definite provision in the construction of the frame.

RAILWAY companies have a knack of evading liabilities, especially when dealing with property which does not belong to a person of influence, and in too many cases, owing to the fear of the consequences of contending with them, the companies contrive to be successful. An attempt of the kind on the part of the Caledonian Railway Company has met with failure and may be a lesson to other companies. An Act was obtained for an extension of the Caledonian system in Leith. On the Parliamentary plans and in the reference book a warehouse, courtyard and approach to street belonging to a Mr. TURCAN were shown which formed one property. But when the notices for purchase under the Lands Clauses Act were sent to him, only the approach was described as being required. The owner would therefore be left in possession of a warehouse which he could not enter or, if he somehow gained admission, could not depart from it. The arbitrator would not regard the case through the Company's spectacles and decided that as the approach could not be severed from the rest of the property the sum to be paid must be 10,000*l.* The Company then offered to make an approach to the warehouse beneath their line, and if that proposition was made at first there can be little doubt that Parliament would have approved of it. But the owner would not agree and the case was taken to the Appeal Court. Their lordships, however, upheld the award, one of the reasons being that it was doubtful whether the directors of a railway company could bind their successors in so simple a matter as the keeping open of an accommodation bridge.



Mar. 19<sup>th</sup> 1897







EMBARKMENT FOR THE ISLE OF CYTHERA.

FROM THE PAINTING IN THE LOUVRE

BY ANTOINE WATTEAU



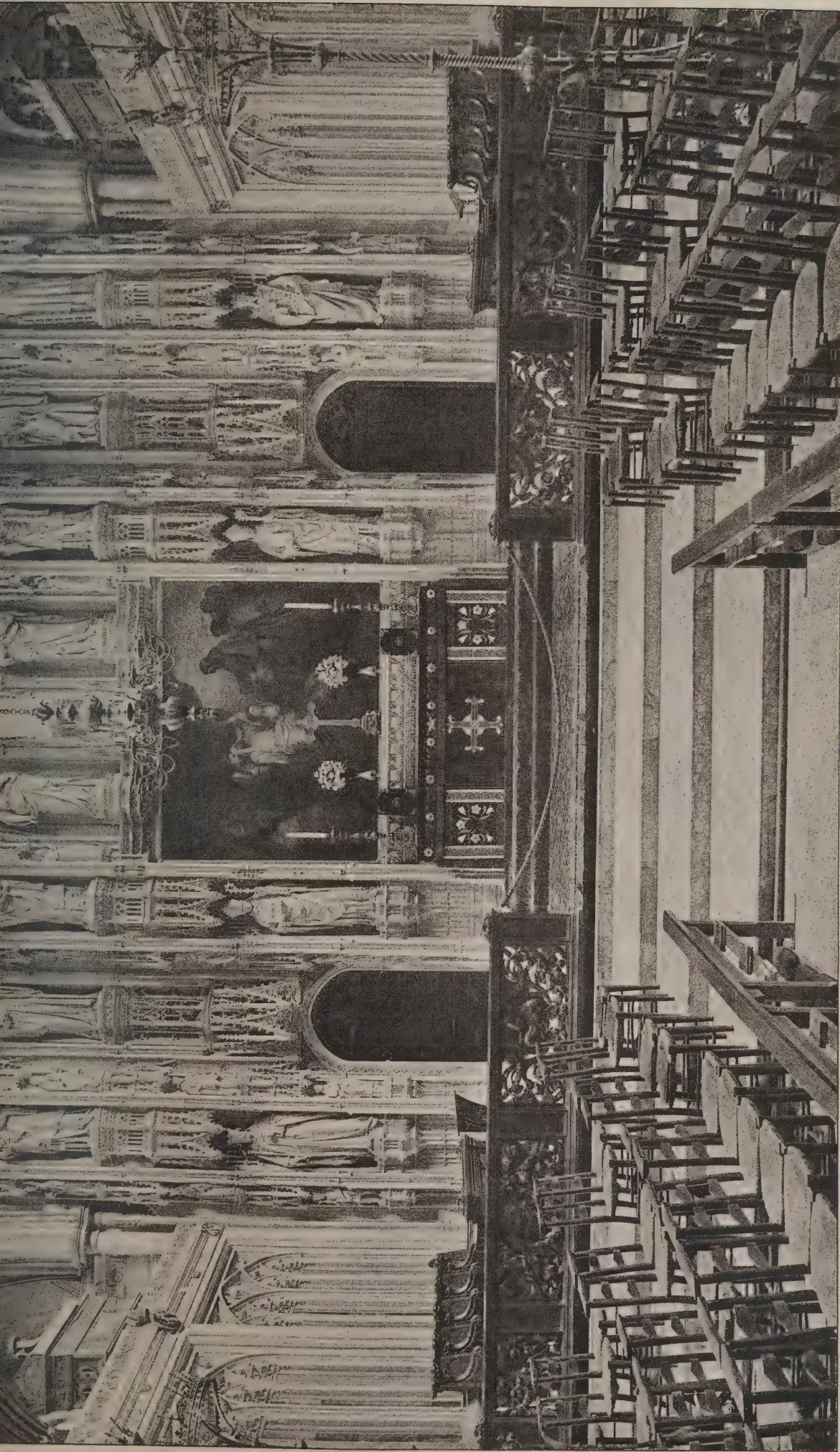




The Architect, Mar. 19<sup>th</sup> 1897





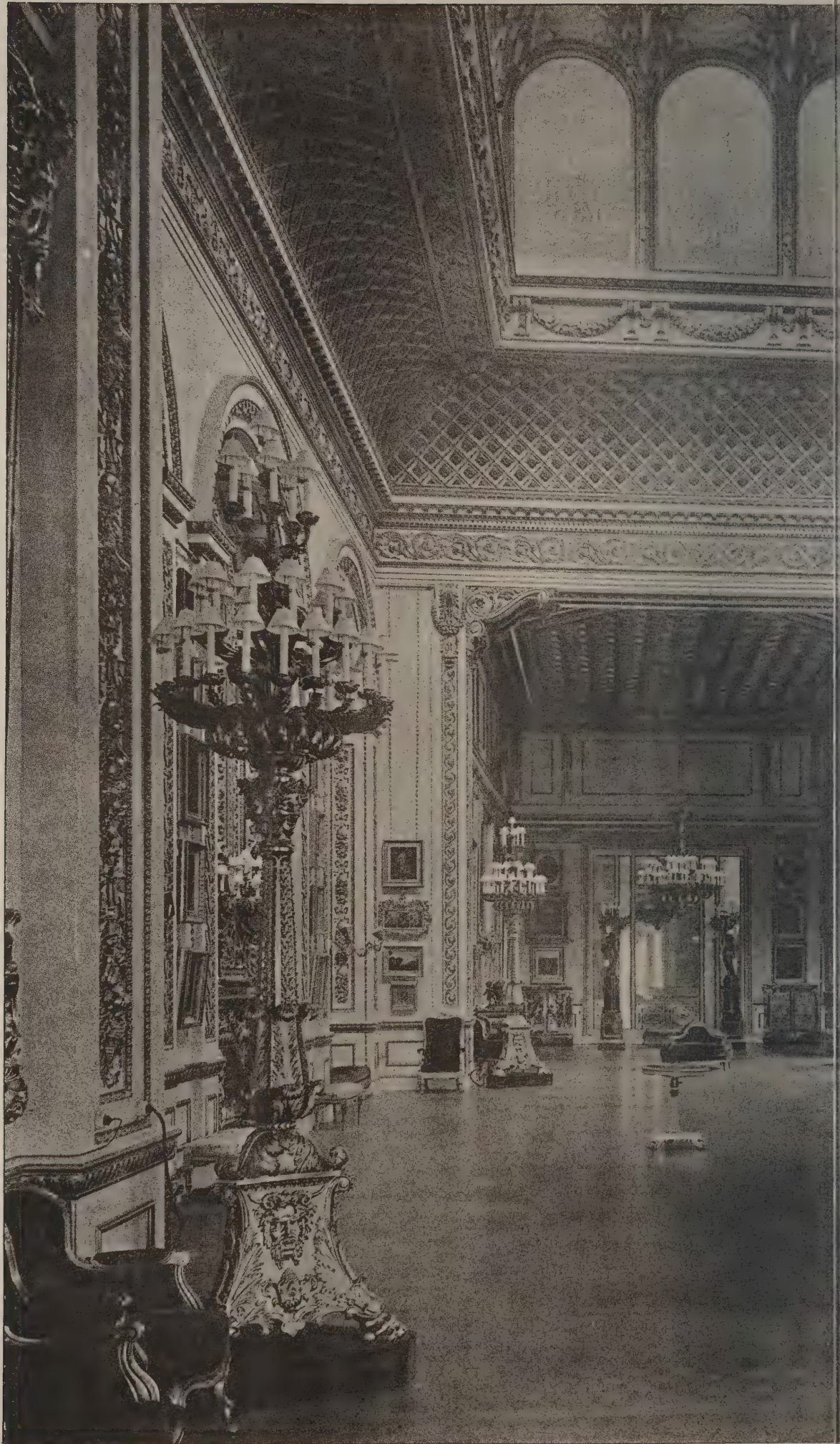


PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

INK PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 18.—WINCHESTER: THE GREAT SCREEN.





PHOTOGRAPHED BY BERTRE LEMERE & CO

PICTURE GALLERY: ST  
MANSION OF THE D  
OLD CHURCH



Mar. 19<sup>th</sup> 1897



INK-PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

ORD HOUSE, ST. JAMES'S.  
OF SUTHERLAND, K.G.  
BERRY, Architect







## ILLUSTRATIONS.

## GREAT SCREEN, WINCHESTER CATHEDRAL.

IN the illustration of the chancel already published the screen has appeared, but the work of Bishop Fox is too important to be treated incidentally. The central figure of CHRIST has yet to be introduced, but the statues which fill the niches are a credit not only to the munificence of lovers of ecclesiastical art, but to the liberalism of the cathedral authorities. The sculpture has not exercised, so far as is known, any baneful influence on congregations. BENJAMIN WEST'S altar-piece is out of place amidst so much sculpture, and some day, it is to be hoped, a more suitable example of decoration will be introduced.

## PICTURE GALLERY, STAFFORD HOUSE.

THE exterior of Stafford House, as seen from the court hardly suggests the grandeur of its principal rooms. In that way it is characteristic of an English peculiarity. The interior was completely altered according to the plans of Sir CHARLES BARRY, and suggests his skill in dealing with Italian forms. There is no mansion in London which is better adapted for a patrician residence. The pictures are also little known to those who visit winter exhibitions. But among them are works by RAPHAEL, TITIAN, TINTORET, GUIDO, PARMEGIANO, MURILLO, RUBENS, VANDYKE, TENIERS, TERBURG. There are no less than five of WATTEAU'S paintings. Modern art is represented by examples of WILKIE, LAWRENCE, LANDSEER, ETTY, PAUL DELAROCHE, &c. The building was originally erected for the Duke of YORK, the second son of GEORGE III., who never inhabited it. In 1841 the lease was purchased by the then Duke of SUTHERLAND for 72,000*l.*, and the whole of the money was applied to the formation of Victoria Park. BARRY was commissioned to adapt the building to modern requirements. An upper storey was added, and among the new works was the fine gallery now illustrated.

## THE EMBARKMENT FOR THE ISLE OF CYTHERA.

See article, page 184.

## ROYAL INSTITUTE OF PAINTERS IN WATER COLOURS.

THE galleries of the Royal Institute of Painters in Water Colours are the most hospitable in London, for the members' works are always in a minority. In no other place in England is there a better opportunity of judging the progress of art in one direction. Everything that is to be seen is not the work of a practised artist, but on that account we can gauge the possibilities of the future. This year there are some novelties which we may ascribe to French influence, but on the whole we see a respect for English traditions. One great advantage of the Piccadilly exhibition is that we have finer colour drawings of the figure than elsewhere, although in landscape the Pall Mall galleries are superior.

In this exhibition the whole of a gallery has been assigned to drawings which have been presented as prizes for the Institute Art Union. The object in view is to relieve the members of some of the debt which was incurred when the galleries were erected. If we remember the generous way in which wall space has been appropriated to outsiders, the claims of the Institute Art Union on public support can hardly be ignored. The works which are available for distribution are excellent. No words are required to recommend a collection to which Turner, Muller, Holland, Varley, Prout, Cotman, Bonington, Copley, Fielding and other masters of water colour art have contributed, besides many modern artists. The object in view is not altogether personal, for the Institute has earned the support of the public.

The President this year has another Shakespearean character on a large scale. *Rosalind* is probably a portrait. In character it differs from the types adopted by other painters, and if it is not the ideal *Rosalind*, it is suggestive of the poet's description. Near it is Mr. Kilburn's *The Lady June*, which may be considered too pretty to suit some tastes, but is such a piece of work as few artists could rival in water-colours. Mr. Sheridan Knowles's *Silvia* is another vigorous single figure. If we may judge from what is said by young lady critics, the *St. Genevieve* of Mr. T. Austin Brown will not be popular, but those who condemn it are forced to linger in front of it. It shows the shepherd girl with a flock of sheep, and under the subjection of some influence that is, not visible. *The Picture*

*Book*, by Mr. C. A. Smith, two girls reading a book in an old-fashioned cottage, is simple, but displays a fine sense of beauty in contrast. Mr. H. R. Steer has become a rival of Mr. C. Green as an illustrator of Dickens. *Nicholas Nickleby interposes on Smike's behalf* is successful as a representation of the incident, but the schoolmaster's wife does not correspond with the ordinary ideal. *Come unto Me, ye weary*, the only work of Mr. W. W. Collins, showing a woman at the foot of a crucifix, with a visionary Christ approaching her, is novel, and difficulties have been skilfully overcome. In *Sword and Pen*, by Mr. F. W. Davis, Cromwell and Milton are in co-operation. The figures are characteristic, and drawn with power. The small drawing, *Girl in Hat and Feathers*, by Miss Kate Greenaway, has all the artist's old dexterity. Military subjects are now in fashion. Mr. W. B. Wollen's *Drummers*, from its colour and drawing, is about the most effective work in the exhibition. *The Highland Cattle Fair*, by Mr. C. J. Adams, which is above it, deserves a better position. Mr. J. C. Dolman's *Dogma*, three clergymen engaged in an after-dinner controversy, has one face which will bear comparison with Mr. Wilmot's in Mulready's *Whistonian Controversy*. Mr. Henry Ryland's *La Penserosa* is another capital drawing. Mr. Ernest Breun's *Brown Study* is skilfully treated.

There is great variety among the landscapes. Mr. Nisbet's *A Dark Moorland* is impressive. We hope Mr. Orrock is not becoming pessimistic. His *Old Mill in Essex* would recall Constable if it were not for the blackness that is mixed with his greens. On the other hand, Mr. Yeend King's *In Dovedale* shows greens in the trees, which are greener than ever, but it is a pleasant drawing to consider when the day is dull. Mr. John F. Fulleylove's *Acropolis and Temple of Olympian Zeus* recalls not only the ruins but the sky and olive trees of Athens. If Mr. C. E. Johnson's *Valley of Gloom* presented a few examples of architecture, it might also suggest heroic times. Mr. Cotman's *Away!* gives a glimpse of the sea, and the figure of the girl justifies the title. Mr. Arthur Severn is always ambitious, and his *Storm clearing off*, in which a rainbow is introduced, seems a true record of atmospheric effects. Mr. Bernard Evans has been impressed with the architectural beauty of *Fountains Abbey*, and delineates it with a fidelity which we are afraid will not satisfy the crowd. Mr. Wimperis has seven drawings, all records of open-air painting. He is one of the few artists who can suggest the appearance of English downs.

Among the street scenes may be noted Mr. Macquoid's *Market Place at Goslar*, Mr. Haité's *In the Street*, and Mr. Tyndale's *Market at Dar el Beida*.

## THE FIRST ROYAL EXCHANGE.

By ALFRED J. GLASSPOOL.

MR. J. G. WHITE, deputy alderman of the Ward of Walbrook, has recently written a most interesting little volume, entitled the "History of the Three Royal Exchanges."\* It deals not only with the first Royal Exchange, the gift of Sir Thomas Gresham, but also with Gresham's other gifts to the citizens—the founding of the Gresham Lectures and the building and endowment of the homes for decayed citizens, known as the Gresham Almshouses, at Brixton.

Mr. Deputy White's position as chairman of the City Side of the Gresham committee has enabled him to present to the reader many important facts in connection with Sir Thomas Gresham's good deeds, which are both valuable and instructive to the architect, the antiquary, and the ordinary citizen.

Seldom has any building had a more unique history than the Royal Exchange. Thrice opened by the reigning sovereign, twice burned to the ground, it has risen each time out of its ashes a more glorious building than its predecessor. At the present day it presents an imposing appearance on one of the finest sites of the Metropolis, and we may believe that the decorations now proceeding in its interior will in time make it bear on its walls some of the grandest specimens of the painter's art which the nineteenth century has produced.

We have to go back over three hundred and thirty-three years to January 4, 1564, when in the Aldermen's Chamber at Guildhall Sir Thomas Gresham offered to build at his own cost "a comely burse for merchants to assemble upon," on condition that the City authorities provided a suitable site. The offer at once met with approbation, for many of the aldermen—merchants of the City themselves—had experienced the want of such a building. Three aldermen and four liverymen were deputed to consider the offer, to view sites, and to report to the Lord Mayor and the aldermen on the very next Sunday at eight o'clock in the morning, "at the chapel in St. Paul's Church" wherein they do usually assemble before the sermon time."

\* *History of the Three Royal Exchanges.* By Mr. Deputy J. G. White. Effingham Wilson.



These quotations which Mr. Deputy White presents to us show us far better than any amount of words the simplicity of the days that are past. Then the aldermen lived in the City, they rose early, they attended forenoon service at church, and they did not scruple to discuss their municipal duties on a day devoted principally to religious exercises. The Corporation of London has from time immemorial had a part of London's cathedral devoted to its use. At the present day the Lord Mayor has his vestry, and the Corporation contribute its share to the cathedral expenses by paying the fees of the morning preachers.

The western end of Cornhill was selected as the site for the Exchange, and the aldermen at once set themselves seriously to the task. Eighty houses were removed, and in less than two and a half years, on June 11, 1566, the land was formally handed over to Sir Thomas Gresham, who laid the first stone of the building. The ground was not obtained without a considerable amount of opposition, and, as usual, many attempts were made to obtain unfair compensation for forced removals. Contributions towards the expenses were obtained from the livery companies, the chief citizens, the Worshipful Company of Merchant Adventurers in parts beyond the sea, and in the end it was found that the cost of the land was 2,208*l.* 6*s.* 8*d.*, for the leases 1,222*l.* 14*s.*, and for legal expenses 101*l.* 16*s.* 6*d.*, making a total of 3,532*l.* 17*s.* 2*d.*

When the Lord Mayor, the aldermen, and the Sheriffs with all the pomp of civic state, went in procession to the laying of the first stone a very different sight then met their view to that presented in modern days. No spectators from the Mansion House or Bank of England gazed upon the scene. The Mansion House was not erected till 1753, George Dance the elder being the architect. The site upon which it stands was in 1566 a market for the sale of meat and fish known as the Stocks Market. The site of the Bank of England was then occupied by the church and nearly all the parish of St. Christopher-le-Stock, its churchyard now being known as "the garden." The Bank did not commence operations till January 1, 1695, and then it occupied part of Grocers' Hall. The foundation-stone of the present building was not laid till August 1, 1732, and the business removed to its new home on June 5, 1734.

A glance at William Nelkton's Map of London in the reign of Edward VI. shows us that many of the chief streets still retain their ancient names. Cheapside, or Cheapling, as it was named, still joined on to the Poultry and ran westward; running out of it on the north we find Lawrence Lane and Ironmonger Lane, leading to the Guildhall. Threadneedle Street and Lombard Street occupy the site of modern days, Bucklersbury is there also, and Birchover Lane tells us of the future Birchin Lane, and that running stream the Wallbrook is an actuality, taking its rise from a spring on the Moor, or Moorfields, not far from our modern Old Street. Here in winter time was splendid skating; here the spring sent forth its sparkling waters, and meandered on its way across the Poultry, till at last it emptied itself into the then silvery Thames, from which anglers were able to draw the finest fish.

Cornhill was a popular spot. In it stood the Tun, so named from it being like a tunnel standing on one end, and being originally used for a cage or prison, in which bakers who gave short weight and others were exhibited to the popular gaze. This was afterwards converted into a conduit for sweet water, boarded over, and a stocks and pillory erected; it was here that the infamous Titus Oates received part of his punishment.

London was then a quiet city compared to the bustle and noise of modern days. Barbican, Aldersgate Street and the Minories were then as far removed from the actual business part of the City as Grosvenor Square, Park Lane and Piccadilly are at the present day. The trade of London was looking up; the Hanseatic League suffered by the rise of commerce in the Low Countries; Edward III. had encouraged commercial relations with our neighbours; we exported wool and imported Flemish manufactures and French wines, for beer was then unknown; the Wars of the Roses, though they devastated many of the flower of England's nobility, did not stop trade entirely. Under Henry VII. trade began to revive; Henry VIII. spent lavishly the money his father had saved; religious quarrels under Edward VI. and Mary had put a damper on commercial enterprise; but under the Virgin Queen a new vigour took hold of the nation, distrust passed away, and our merchants went abroad, foreign merchants came to our shores, and there was a general revival of prosperity.

It was no doubt these visits to the commercial cities of Italy, Germany and the Netherlands that gave to several public men the idea of erecting a building where merchants could meet; for happily in England the people are anxious to do for themselves what in foreign countries the governments undertake to carry out. The necessity for such a building was apparent to all. Stow tells us that the merchants met in Lombard Street. He says, "The merchants and tradesmen, as well English as strangers, for the general making of bargains, contracts and commerce, did usually meet twice a day," at noon

and in the evening, "but their meetings were unpleasant and troublesome by reason of walking and talking in an open narrow street, being there constrained to endure all the extremities of the weather, viz. heat and cold, snow and rain, or else to shelter them in shops." No doubt the disturbed merchants had often taken shelter in Sir Thomas Gresham's shop, which was situated in Lombard Street, facing the present post office; we may reasonably suppose also that the want of an Exchange was partly the cause of those disorderly scenes in old St. Paul's, where trade was carried on in sight of the very altar.

It was at this juncture, when Elizabeth was firmly established, having been queen for nearly six years, that Sir Thomas Gresham came forward to build a home for his brother merchants. Who was this generous trader? It is recorded that the Greshams derived their name from the village of Gresham, in Norfolk. Here a certain James Gresham was the father of four sons; the two youngest, Richard and John, were knighted by Henry VIII. Sir Richard was the father of Thomas; he was apprenticed to his uncle John, who was the king's agent in Flanders, and very soon proved himself an apt pupil. His abilities were so much appreciated, that in 1551 he followed his uncle's footsteps and became king's factor and king's merchant in Flanders, and went to live in Antwerp. He traded in wood, salt, silk, precious metals and diamonds; he served his country by deception, at one time exporting from the Netherlands 2,000 lbs. of gunpowder as "one piece of velvet."

He served King Edward VI. so well that, by skilful arrangement of the currency of his adopted home, he was able to pay off 108,000*l.* of the king's debts. Queen Elizabeth so appreciated him that she visited him at Mayfield, Sussex, 1573, and at the manor of Heston in 1576. It was on the latter occasion that the Queen expressed her opinion that the courtyard was too large; the next morning she was astonished to find the court divided by a wall: Gresham had employed a number of workmen during the night to erect the wall, but so quietly was the work carried out that the Queen knew nothing of what was going on.

Gresham employed Henrich, a Fleming, to design and construct the Exchange. It was a close imitation of the bourse at Antwerp; it was from Flanders that the stone, slates, iron and glass came. Flemish workmen were also employed, for the Court of Aldermen had given permission that "strangers" might be employed.

The Exchange had a frontage to Cornhill of 210 feet. There were piazzas round the interior, supported by marble pillars, opening into an inner court or quadrangle, which was not covered in. Above the inner panelling, within the arcade, were sculptures of river gods. In niches within the quadrangle, and immediately above the cloister in the covered walk, stood the statues of the kings and queens from Edward the Confessor to Queen Elizabeth.

The principal feature of the exterior view was a lofty square bell tower with two balconied galleries; on the top was a ball, with Gresham's sign, the grasshopper, surmounting the whole; from this tower the merchants were called to 'Change at 12 at noon and at 6 in the evening.

It was on January 23, 1571, that Queen Elizabeth visited the building, naming it the Royal Exchange and knighting the donor at the same time.

Sir Thomas was only destined to carry his honours for a short time, for on November 20, 1579, as Hollinshed says, "Coming from the Exchange to his house, a very short distance (Broad Street), between 6 and 7 o'clock in the evening, he fell down in his kitchen, and being taken up was found speechless, and presently dead."

The interior of the Exchange must have presented a very animated and picturesque appearance. In it could be found merchants from every trading nation: the English merchants wearing large puffed breeches, long vests, short cloaks and ruffs; the Fleming with his fur-trimmed coat and tight-fitting pantaloons; among these mixed the lowly Venetians wearing their long robes and elegant caps; and besides these at times were seen not a few courtiers from the palace dressed in all the glory of the period.

If we may take the words of the Rev. Samuel Rolle, who wrote 110 discourses, "Meditations and Contemplations on the Great Fire," in a literal sense, the Royal Exchange in after years was one of the wonders of the age. His words were:—"How full of riches was the Royal Exchange! rich men in the midst of it, rich goods above and beneath! There men walked on the top of a wealthy mine; consider what Eastern treasures, costly spices and suchlike things were laid up in the bowels (I mean the cellars) of that place. As for the upper part of it, was it not a great store-house where the nobility and gentry of England were furnished with most of those costly things wherewith they might adorn either their closets or themselves. Here if anywhere might a man have seen the glory of the world in a moment."

Notwithstanding all this flowery language, the Exchange became a place of unenviable notoriety. "Boys and young rogues" made such noises that elder people could not "hear themselves speak"; men sold rats and dogs; the cursing and



swearing of both men and women were terrible to hear; bulls and bears were paraded to advertise the amusements provided at Bankside, perhaps, indeed, to make known the play at the Globe Theatre, in which Shakespeare was taking a part.

Just as the loungers in St. Paul's were said to dine with Duke Humphrey, so the idlers at the Exchange were said to sup with Sir Thomas Gresham. This idea was expressed by Hayman in 1628 in his address to Sir Pierce Penniless:—

Though little coin thy purseless pockets line,  
Yet with great company thou'st taken up,  
For oft with Duke Humphrey thou dost dine,  
And often, with Sir Thomas Gresham sup.

The Flemish workmen had, however, not done their work in a very substantial manner; in ten years very serious defects were found in the building. The "Inquest Book" of Cornhill Ward of 1581 informs us that the keystone of some of the arches was "dangerouslie decayed." In consequence of these faults there was a "great danger, hurt and losse of lief and lym"; the clock was the "worst kept of any clocke in the same cittie."

Lady Gresham, who had a life interest in the building, did not exhibit her husband's generosity. The archives of the Corporation show the correspondence between her and the Lord Mayor; she was informed that some parts of the building had fallen down, and she was requested "for the honour of Her Majesty and Sir Thomas Gresham the worthy monument might not be suffered to fall into ruin and decay, but that the restoration might be carefully performed."

With all its imperfections, the first Royal Exchange stood for ninety-eight years; in 1665 the plague raged, and the grass grew within the area. The purification of the City came afterwards by fire.

On Sunday, September 2, 1666, at 1 o'clock in the morning, a fire broke out in Pudding Lane. It raged all Monday and Tuesday; to stay its ravages some houses in Cornhill were pulled down, the timbers, however, of which they were composed caught alight and spread to the Royal Exchange.

"When the fire was entered how quickly it did run round the galleries, filling them with flames, then descending spreads, compasseth the walks, giving forth flame, vollies, and filling the court with sheets of fire; by-and-by the kings fall down upon their faces, and the greater part of the stone building after them, the founder's statue alone remaining."

So it was: as the building Sir Thomas Gresham gave to the citizens passed away in smoke and flame, his image gazed calmly upon the destruction, and stood the ordeal without any harm.

## A TWENTIETH-CENTURY STYLE.

A LECTURE entitled "Is a National Twentieth-Century Style of Architecture Probable?" was given by Professor Banister Fletcher at the hall of the Carpenters' Company. Sir John Lubbock presided.

The lecturer commenced by saying he could not justly be accused of being too premature in speaking of the architectural style of a century not yet born, because time out of mind men have been proposing or prophesying new styles. One such might be remembered in which stone and brick were to be absolutely dispensed with and iron was to be universally used. One iron style was to be curvilinear, even the juncture of the floor and wall lines was to be curved, and much was made of the light and shade of perforated balconies. In another proposal the opposite extreme was to be adopted, and angularity was to be the characteristic of the new style. Day by day in this eventful year we read, or hear, again and again, of the great advance made in science. One does not see or hear any record of a similar advance in architecture. Architecture, which was formerly the record of a people's progress, is to-day only a paraphrase of bygone styles. The people are lethargic about architecture, and it may be, as some assert, that architects are themselves to blame for this condition. One thing is certain, no new style will be created until people take a deeper interest in the matter. One can have little faith in any new style except such as shall grow out of our needs, our climate and our intellectual development. All the great styles of the past have been developed from what had gone before. The Greeks did not attempt to create a new style, they only adapted preceding styles to their own wants. Place a view of the tomb of Beni Hassan side by side with a view of the Parthenon, and the prototype of the Greek work is evident. A popular fallacy is that great size is necessary to grand results, but in reality size has no relation to beauty. The Parthenon is only 100 feet wide and 228 feet deep. A still smaller temple, that of Nike Apteros, has a frontage of only 18 feet and a depth of 27 feet; yet it charms every beholder. The great hall of Xerxes at Persepolis has none of the extreme beauty of the Parthenon, although the columns of the former are double the size of the latter. The site of the Parthenon on the edge of the Acropolis rock enhances its grandeur. The

prototype of the Ionic column is found in an Assyrian tomb at Nineveh. The Greeks adopted and refined what they found suited to their needs. They were distinguished for harmony and simplicity; the Romans for conquest and grandeur. The Romans had no time for refinement; their mouldings are all struck by compasses, but it is impossible to do this with the finer lines of the Greeks. Roman work has a redundancy of ornament and a greater number of divisions in the entablature. The adoption of the arch gave the Romans a freedom which they used by placing one or more orders over another, as in the Theatre of Marcellus. The arch was known to the Greeks, but they preferred to retain the beam style. They used concealed arches structurally, and arches were in common use in countries which the Greeks conquered.

In our own country the development of architecture may be traced. The early window, without glass and very small, as every opening was a point of danger to the inmates, at first was square-headed, then circular, and then pointed. In this last is the origin of tracery. Two pointed windows are first placed together, a circle is placed over and between these, and then occurs the idea, Why not put a drip-stone, or label, to combine all under one arch? The wall spaces between are reduced to mullions and the number of openings are increased, and the lines of the pointed heads are carried on intersecting each other. Later, cusping, which at first appears as something added, becomes an integral part of the design. The curved lines gave way to the direct vertical and horizontal lines of the Perpendicular style. The window was now to become a frame, and depend for its beauty on the glories of painted and stained-glass. The light of day, shining through the parti-coloured work which was so excellent at this period, became transformed in a brilliancy of colour. All this tracery, it may be noted, is under one main arch. This is characteristic of English, German and French Gothic. The Italian, developed from the same parent, differs in being essentially a part of the structure. The mullions, transoms and tracery can be removed without injuring the English building, but in such a building as the Doge's Palace no part can be so removed. The whole length of the upper building is supported on constructive tracery.

Development can be traced in other features of the buildings. The Norman buttress is of small projection and used to strengthen the walls at the coigns or angles. A new form of roof produced the necessity for stronger construction. In the first roof every rafter is of the same value. By introducing principals (which are aptly named), the points of stress can be 10 or 12 feet apart, and if these points are supported it matters little what the wall is between. How well the builders of these buttresses understood what was wanted can be seen by placing such a series of shores as would be deemed necessary now if the wall were considered unsafe. It will be found the lines of the buttress just cover the line of the shores. With vaulted and groined roofs, which became general in England, still further support was necessary. The buttress which began at the aisle wall had to be carried over to the nave wall to take the line of thrust of the roof. This is done by means of the flying buttress, of which we have examples at Westminster, and where further stability is given by weighting the buttress with a pinnacle. The French built so high as to verge on the border line of safety, but at Beauvais there are fine examples of flying buttresses.

Time will not permit to point out the gradual development of Renaissance from the Roman; a masterpiece of the former is always with us in St. Paul's Cathedral.

Lord Rosebery has said, "How vastly unlike two portraits of the same person may be, the one taken at the age of three, the other at the age of three score and ten, yet the change has been so gradual in all the intervening time, that it could not be said on any one day, it was not the same person as on the day before." So it is with architecture. The change is gradual. The original cannot be recognised. Although sprung from the same common stock the divergence becomes so great. Compare the Parthenon with the Coliseum; the heavy plain Norman with the ornate chapel of Henry VII.; and how great the contrast and how gradual the various changes which gave such results. Mr. Jackson has recently said, "If art is to live it can only do so by colouring our whole lives;" and Professor Aitchison says, "We are neither Greeks, Romans, nor Byzantines; and our architecture must be one that will discover the needs of the age."

In conclusion, the idea of inventing a grand style is only likely to result in the well-known fruitless labour of "ploughing the sands." Buildings may want novelty, but design and planning must be, as in the past, a work of gradual development. If people will throw aside apathy and take an interest in architecture, then, and not till then, is a national twentieth-century style possible.

Sir John Lubbock said he had not quite made up his mind about the style of the future. A recent visit to the country was spent at a house which was very ugly outside but very comfortable within. There was a house having a charming exterior on the opposite hill, and the host was asked why he had not rather



selected the prettier house. The reply was, "That house is very uncomfortable inside. Here there is a pretty house to look at, and an extremely comfortable one to live in; there it would be uncomfortable to live, and in addition this ugly house to look at." Greek architecture is always dealt with in temples. We want palaces, libraries, municipal buildings (except in London) and houses. Our recently built Law Courts are not at all suitable for their purpose; the Natural History Museum has a very pretty outside, but the inside is not well adapted for a museum. We shall probably develop not one style but several. There should be confidence in the destiny and genius of Englishmen. Two thousand years is but a very small space of time, but if we remember what miserable dwellings our ancestors then lived in, we are naturally interested in looking forward to the possible changes of the future.

### ROYAL SOCIETY OF BRITISH ARTISTS.

A MEMBERS' dinner of the Royal Society of British Artists, in commemoration of the fiftieth anniversary of the granting of the Royal Charter, was held on Monday. Mr. Wyke Bayliss presided.

The President, in proposing the toast of "The Queen," said that, in obedience to the Royal command, the presidential address which he was about to deliver had been laid before Her Majesty. He had received the following message:—

Windsor Castle: March 1, 1897.

Dear Sir,—The proof copy of your presidential address to the Royal Society of British Artists, which you forwarded to me under cover of your letter of February 24, has been laid before the Queen.

Her Majesty commands me to convey to you, the president, and to the members of your Society, her sincere congratulations on the fiftieth anniversary of the granting of its Royal Charter, and also on the valuable work accomplished by the Society on behalf of art and artists during a period exactly coincident with that of Her Majesty's own life.

The Queen trusts that continued prosperity may be assured to the Society in the future.—I am, dear Sir, yours very faithfully,

ARTHUR BIGGE.

The President then delivered his address. He said that it was in 1819 that the first gathering took place which resulted in the formation of the Society. It originated not as a private enterprise, but in response to a national requirement. In 1823 the galleries in Suffolk Street were completed, and in 1824 the Society held its first exhibition. No sooner had the Society fairly begun its work than the Academicians formally declared war upon it. There were faults on both sides. The Academy passed a law debarring any member of the British Artists from becoming a candidate for academic honours. The British Artists passed a law inflicting a penalty of 100*l.* on any member withdrawing from the Society. Both laws had long since been repealed, but they created much mischief at the time. The President went on to review the history of the Society from its origin, and mentioned, among other names of its members, those of David Roberts, Clarkson Stanfield, Müller of Bristol, David Cox, James Holland, Hurlstone, Daniel Pasmore (who lived to see one of his pictures exhibited at Burlington House among the Old Masters, and engraved in the *Graphic* as a fine example of the work of J. M. W. Turner), George Cole, Vicat Cole, Henry Dawson, Henry Moore, R. I. Gordon, J. S. Noble, W. L. Wyllie and James McNeil Whistler. The record of the last ten years began with the distribution of the awards in the Fine Art section of the greatest of the international exhibitions—that of Paris in 1889. Of the 100 English artists who received medals no fewer than fifty-five—and of the twenty gold medallists no fewer than fifteen—proved to be members or exhibitors of the Royal Society of British Artists. At this period also commenced that splendid series of studies by Lord Leighton, seen nowhere else, and revealing him in a new light. They began with his first sketch for the *Daphnephoria*, and ended only with the last, made but a few weeks before his death. They were arranged in groups—120 in all. They would live as long as the name of Leighton was remembered. During these last few years the galleries had been enriched by the works of Mr. G. F. Watts, Sir Edward Burne-Jones and Sir John Gilbert, honorary members of the Society, as well as by a collection of the works of the late Cecil Lawson. Mr. Watts had been represented by many of his finest portraits, including those of Lord Tennyson, Lord Salisbury and William Morris. The works by which Sir Edward Burne-Jones would be remembered in connection with these exhibitions were the magnificent series of studies for his paintings of *The Briar Rose*. The pictures by which Sir John Gilbert was permanently represented at the Guildhall were first seen together in these galleries, where hung also the first paintings he ever exhibited. The Society, beginning with thirty-two members, to-day numbered 150. It had held 107 exhibitions, including in the aggregate about

70,000 pictures. It had effected sales for artists to the amount of more than a quarter of a million sterling. The service it had thus rendered to art and to artists had been honorary service. Such a Society was worthy of their affection and loyalty. To such a Society the past, with all its traditions, its difficulties, its achievements, was but the prelude to a still more useful and honourable future.

### ANCIENT ATHENS.

THE second of his course of lectures on "Greek History and Extant Monuments" has been delivered by Professor Percy Gardner, at the Royal Institution. He dealt mainly with the Athenian Acropolis as a background of history, starting from the devastation of the Acropolis by the Persians in 480 B.C., and working backwards. The lecturer dwelt on the account given by Herodotus of the Persian occupation, which resulted in the Athenians abandoning their city to the ruthless vengeance of the invaders, to whom nothing was sacred. The evidence of the historians could now be supplemented by the yet more truthful records on rock, marble and bronze, for recent excavations brought the monuments of old to light and completed the tale of the wreck of all works of interest and beauty by the Persians and the consequent restoration of Athens. When the Athenians returned they had lofty ideas and plans, and intended to replace the old buildings with grander ones of marble. Modern excavations enabled us to recompose temples, to set up votive images, sometimes even on their own pedestals, and to trace the development of Athens from century to century. When the Persians razed the Acropolis they were probably unaware of the existence of any earlier monuments than those which they were destroying. We now know that the history of Athens began at a period that was as remote to Herodotus as his time was to ours. Recent excavations revealed to us successive phases of the history of the capital of Greece. The earliest stratum showed house-walls, graves and terra-cottas; the second, Mycenaean pottery and palace walls, and the house of Erechtheus known to Homer; the third took us to the period when the kings gave way to Athens and the Acropolis was made sacred to the gods. The Greeks gave the name of the Pelasgic age to all the early monuments that they could not assign to any definite period. Professor Gardner then attempted to reconstruct ancient Athens at different periods. The first fixed historical landmark was the age of Pisistratus. Before his time the Acropolis was still a fortress. Pisistratus erected a temple, or the Acropolis, in honour of Athena, and some walling built by him on the road up to the temple still remained. The ground plan and style of the Pisistratid Temple were now quite apparent. In the Age of the Tyrants the early temples were of limestone, and it was not till about 600 B.C. that the age of stone gave way to the age of marble. Pictures of various pediments, the low gables which crowned the fronts of the buildings were thrown on the screen, and the restorations suggested by archaeologists shown. These showed the fondness of the sculptors for monstrous forms, to which they were more inclined owing to the form of the pediment, which suggested to the artist the display of serpents and monsters. The lecturer then went on to speak of the discovery by Studniczka of the design and part of the substance of the pedimental group erected by Pisistratus over the doors of the Temple of Athena. An account was given of the marvellous way in which the German archaeologist obtained a clue to his discovery by a head of Athena which stood in the museum. The clue was followed up, the drapery of the goddess found and other fragments pieced in, until at last the whole of the central group which represented a battle between the gods and the giants was put together out of various fragments. Professor Gardner said that within the last few days a young German student had followed up these discoveries and had reproduced the design of the whole of the figures in the pediment. The series of female figures on pedestals lately unearthed was referred to and slides shown of them. Professor Gardner thought they represented not priestesses or the goddess Athena, but were idealised portraits of Athenian ladies, in attitudes of doing homage to Athena.

### MISUNDERSTANDING TENDERS.

AN extraordinary case, *Tasker v. Chew*, was tried before the Lord Chief Justice at Leeds on Monday, of which the following report is taken from the *Leeds Mercury*:—

Mr. Atkinson, Q.C., said the action was brought in point of form to recover 258*l.* 10*s.*, but owing to the way in which the action was defended the only question would be as to a sum of 120*l.* The defendant wished to build some houses at Halton, and employed Mr. Brearley as his architect, and got him to advertise for tenders. Those obtained were in the plaintiff's opinion too much, and Mr. Brearley, the architect, asked the



plaintiff if he would send in a tender. The plaintiff inspected the site, and stated that he could not build the houses under 160*l.* for each house. Mr. Brearley suggested that he should reconsider the matter, and he afterwards wrote to Mr. Brearley stating that he had carefully gone over the particulars again, and found he could not possibly do them for less than 160*l.* per house. The plaintiff's tender was accepted, but the defendant said the contract was for 140*l.* per house, and not 160*l.* The work was continued, and certificates were given. Mr. Brearley had written to the defendant with reference to the payment of the balance due to the plaintiff, and on December 1, 1896, the defendant wrote to Mr. Brearley:—

"Dear Sir,—I am surprised at receiving such a note from you. You know perfectly well what the contract price was, and I am neither going to be fooled or robbed either by you or Tasker. If Tasker gets any more it will be through the court, then you will have to turn up the contract signed by me. The price was—and you know it—840*l.*, equal to 140*l.* per house. This is what I mean to pay, and nothing more." Mr. Brearley wrote in reply that he had told the defendant repeatedly that the price was for 160*l.* per house. He added:—"You say you are neither going to be fooled or robbed either by me or Mr. Tasker. Let me inform you that neither Mr. Tasker nor myself has ever attempted to fool or rob you. I have not the least doubt that both of us are as straight and strictly honourable as yourself."

His Lordship said the charge was a very gross one.

The first witness called was John Henry Brearley. He stated that the contract was for 160*l.* per house. At no time had the plaintiff agreed to build the houses for 140*l.* per house.

Mr. Kershaw cross-examined the witness, with the view of showing that the price was 140*l.*

His Lordship said this was a charge of the very foulest kind of conspiracy. The correspondence from the first showed conclusively that the price per house was 160*l.* Such a conspiracy might exist, but it would require a very strong case to establish it.

Mr. Kershaw said he had testimony to show that what he had called the tender signed by Tasker was taken away.

His Lordship: I cannot stop you, but I think you are working an enormously difficult case.

Mr. Kershaw proceeded with his cross-examination, and in answer to a further observation by his lordship, he said: Your lordship has evidently formed some opinion.

His Lordship: A very strong opinion. I think counsel must exercise some judicial faculty over their own cases. I really do.

Mr. Kershaw said he refused to get up and cross-examine after his lordship's strong opinion. He sat down because he could not carry the case any further.

His Lordship: That is for yourself. I am not surprised, but do not come to that conclusion because you think I am wanting to stop you. The more I see of the case the more improbable seems the case that you are asked to advocate.

Mr. Kershaw said he was not putting it that his lordship was hard upon him; but it was hard to cross-examine the witness after his lordship's expression of opinion.

His Lordship: That is no reason why you should not go on and test this man as much as you like. You have to ask the jury to believe that this man, not in a moment, but as a matter of contrivance and conspiracy, months before the event, concocted this factitious correspondence for the purpose of cheating the defendant. That is what the facts come to.

A consultation took place between counsel and the defendant, and his lordship, after waiting for a short time, said he thought it would be better for Mr. Kershaw to continue his cross-examination of the witness, and let his client go into the box. He did not think the responsibility rested with him.

Mr. Kershaw said he had put pressure upon his client in this matter, and he had suggested to him that this document which he relied upon was a lost document, and that he and the witnesses on his behalf might be mistaken with regard to the figures that might be upon it. He thought he was justified in advising his client not to proceed further with his defence.

His Lordship said the correspondence showed that the price was to be 160*l.* per house. That that was contrived in order to misrepresent was the only theory upon which that matter could be explained. He had taken the trouble to go through the letter book. The letters were all copied in the ordinary way. The counterfoil always gave the amount of the contract—960*l.*, and the amount of the instalments paid. Was it to be supposed that these gentlemen were deliberately inventing all this in order to misrepresent the true state of things, and cheat this gentleman of 150*l.*? Was it not a thousand times more likely that this gentleman might have misunderstood the figures? He was perfectly certain Mr. Kershaw had taken a proper course in the matter.

To the Jury: I do not know how the transaction strikes you as business men.

A Juryman: We entirely agree with your lordship.

A verdict was then given for the amount claimed.

## EDINBURGH ARCHITECTURAL ASSOCIATION.

THE Edinburgh Architectural Association visited on Saturday afternoon the parish church and Calder House, Mid-Calder, by the kind permission of the Rev. J. D. Moir Porteous and Lord Torphichen, under the leadership of Mr. A. Hunter Crawford. The church at Mid-Calder is of early foundation, probably twelfth century, and the present building, which is of the sixteenth century, with modern additions, is curiously interesting from the fact that it was partly built under a bond between the Rev. Peter Sandilands, who, as an old man in 1541, wanted to ensure the completion of his work, and Sir James Sandilands, his nephew, who was to be paid 1,600 merks in consideration of his executing the works all minutely detailed in the bond. Attention having been drawn to the architectural features and the armorial device, the party, after a thorough examination of the building, proceeded to Calder House. After Mr. Crawford had given an historical description of the house, which partly dates from the thirteenth century, and contains many very valuable paintings, the party was shown through the house by Lord Torphichen, who kindly drew attention to various features of interest, and especially to the paintings in the drawing-room, formerly the large hall. Among these are the celebrated portrait of John Knox so frequently engraved, also a portrait of Queen Mary, two fine Raeburns, &c. The visit was brought to a close by a vote of thanks, proposed by Dr. Rowand Anderson, to Lord Torphichen and the Rev. J. D. Moir Porteous. St. Cuthbert's, East Calder, was also visited. This ruin is of twelfth-century date, and the south wall and two gables are still partly standing. Among those present were Messrs. John Watson, J. A. Carfrae, G. Wardlaw Burnet, James L. Caw and Rev. P. M. Herford.

## DISCOVERIES IN LINCOLN.

EVERY year evidence accumulates of the truth of the saying of Mr. Freeman that Roman Lincoln exhibits "larger traces of itself than most of the Roman towns in Britain," and the testimony forthcoming this week greatly strengthens the assertion. It will be in the recollection of many of our readers, says the *Lincolnshire Chronicle*, that from time to time parts of a very important building of the Roman period have been unearthed at Bailgate. The first discovery was due to the watchful care of Mr. Geo. Allis, of the Bail, who in 1878, while alterations were being made at his residence, discovered three columns, including the curious double one at the north angle, under his house. These have been carefully preserved and can be seen by those interested, a separate entrance to the basement of the house in which they are maintained in their original positions having been provided by Mr. Allis. Nine years later the bases of three more columns were found in the foundations of Mr. Blaze's property, which adjoins; and from time to time the discovery of other columns forming part of the same building has been duly recorded in the *Chronicle*. In the words of the late Precentor Venables, in his lecture on "A Walk through Lincoln," this building was probably the Basilica, or Hall of Justice. "It was a grander building than Lincoln had seen erected from the completion of the cathedral to the present epoch." The building, from the latest discoveries, is shown to have been 280 feet along the front, and about the same in depth from east to west—15 feet longer than the nave of Lincoln Cathedral. Up to last week seventeen of the columns forming the front colonnade had been brought to light, only, alas! with the exception of the three in the basement of Mr. Allis's house, to be covered up again, as they take a diagonal line across the roadway in the Bail, but the fourteen which have been reinterred corresponded exactly to the three mentioned, so that we can see what they are. Mr. Allis prepared a plan showing the positions of the seventeen columns thus far discovered, and there were two vacancies in the line. It has many times been mentioned that it was a pity those spots were not explored so as to ascertain whether the columns were really existent or not, and on this reaching the ears of a local lady she asked why it was not done. When she heard that it was simply a question of expense she at once generously undertook to defray the whole of the cost of the excavation. The work was entrusted to Mr. Allis, who readily obtained the sanction of the Mayor and the chairman of the highways committee to take up the street. Operations were commenced near the shop door of Mr. Blaze, and, sure enough, the base of a column was found just where expected. However, there was a surprise in store, because following out the order of the other discovered columns, this should have been a double column, but no trace of the twin could be found. In searching for it an equally interesting discovery was made. Mr. Allis's observant eye detected that the workmen were throwing up some cubes of tesserae. He at once stopped the work, and descended into the hole. It did not take him long to ascertain that there was a most elaborate piece of tessellated pavement 2 feet higher than the bottom of the bases of the columns, and at about the place where the



second column should have been if it ever existed. This pavement, from the fact that it was 2 feet higher than the bottom of the bases, must have belonged to a building of a much later period than the basilica, if such it be. At present it is not known what the structure may have been which had so elaborate a pavement, but one may hazard the suggestion, without committing oneself to the fact, that the base of the inner column, if there were two, was removed when this later structure was erected. The pavement is of a very interesting nature, and a careful drawing of the portion laid bare has been prepared by Mr. H. H. Dunn, architect. The border, which apparently forms a large square, to judge by the pattern of the corner discovered, consists of four alternate broad bands of red and white cubes, with an inner and narrower band of white. Then comes a small strip of blue cubes. A circle of blue touches each inner side of the square, and in the corner angle thus made there is a "bud" in red, blue and white. The outer circle encloses a smaller one, and between them there is what is known, we believe, as a guilloche pattern. The centre design is that of a head, plainly discernible, and around this is an elaborate design, probably intended to represent drapery; the colours used in the centre are the same as in the border, with the addition of a little purple. Could the excavations be carried further, there would probably be laid bare one of the largest and finest tessellated pavements ever found in the city, for if one may draw an inference from the wide border, what has so far been seen is only the corner piece of an elaborate design. Mr. Dunn is preparing a scale drawing, coloured, of the portion discovered, and we hope he will allow it to be exhibited both above and below hill, so that all interested may see it. The site was visited by scores of citizens, who showed a deep interest in the find. Amongst these may be mentioned the city sheriff (Mr. W. Mortimer), who expressed a strong desire that the pavement should be taken up and preserved in some public place. However, this could not be done without the consent of the Corporation to extend the excavations, and the provision of the necessary funds. Having found what he was looking for, namely, the base of the column, Mr. Allis had perforce to fill in the hole, but he did so in a manner calculated not to injure the pavement, and it is to be hoped that sufficient public spirit will be shown to insure that the explorations shall be continued, and, if possible, the pavement brought to the surface. One other column to complete the frontage of the building still remains to be unearthed, and excavations in search of this will be commenced. We shall look forward with interest to the laying bare of the last of the series which adorned the front of a building of so imposing a character. We may add that Mr. Allis communicated the find to Mr. F. C. Penrose, the eminent archaeologist, who, in reply, writes regretting the demise of the Rev. Precentor Venables and of Archdeacon Perry, who kept such careful and accurate records of like discoveries, and adds, "I hope there are others in Lincoln who feel interested in such matters—one there must be. I mean the lady whose liberality started this last investigation. She may feel sure that many archaeologists will feel indebted to her." An expression of opinion which we fully endorse. Speaking of the building in question, the late Precentor Venables said that "where the north side wall began there is a very singular twin column—two columns in one—an architectural feature previously unknown. It has been examined by many distinguished architects, who all agree that Lincoln possesses that which cannot be found anywhere else. It is thought probable that the stone entablature which ran between the columns at this point showed symptoms of failure, and the architects very wisely built another column at the side, scooping it out so as to make a double support where one was not sufficient."

#### COUNTY OFFICES, WAKEFIELD.

AT the meeting of the County Council of the West Riding it was reported that Messrs. Gibson & Russell, the architects for the new offices of the Council at Wakefield, having made a request for further remuneration by reason of additional and extra work in and about the buildings, superintending the painting and decorating and other work, the committee recommended that the architects' remuneration be increased from 3,200*l.* to 3,800*l.* (the architects having agreed to accept such sum), such increased remuneration to include all charges for completing the buildings, including boiler-house and alterations in connection therewith, preparation of plans on vellum for filing, painting and decoration, and other work other than the provision of the fittings and furniture. It was explained that the recommendation was a compromise arrived at with the architects, who originally claimed a commission on all extra work. The granting of an additional 600*l.* would make the commission paid to the architects about  $4\frac{1}{4}$  per cent., the usual commission charged being 5 per cent. The resolution was carried. The committee further recommended that Messrs. Gibson & Russell be employed to superintend the work con-

nected with the fitting-up and furnishing of the new county offices, the fees to be paid to them to be 5 per cent. on the outlay, provided that the total fee should not exceed 600*l.*, such fee to include all designs, specifications and estimates, visits to inspect furniture and fittings in course of construction from time to time, the testing of the electroliers and all other services necessary to the complete and satisfactory carrying out of the work. This recommendation was adopted. It was resolved to make application to the Local Government Board for their sanction to the borrowing of the further sum of 43,500*l.*, making, with the sum of 65,000*l.* already sanctioned, a total of 108,500*l.*, for the completion of the erection of the new county offices at Wakefield, and for the furniture and fittings in connection therewith, and that the period of repayment be thirty years.

#### MODERN PAINTING.

ON Saturday evening Professor Baldwin Brown, Edinburgh, lectured in Moffat to a large company on "Modern Painting." Impressionism, he said, was really nothing new. It was practised by Velasquez in the seventeenth century, and it could be followed by two processes. By the analytic process the artist treated the different objects in a scene one by one, reproducing them as exactly as possible, or he could take the other process, and regard the scene as made up of so many patches of tone, colour, and light and shade, which he had correspondingly to reproduce. The analytic process led the artist to make the picture more complete than it actually was, and it became an explanation, distinguishing lines which were in nature obscure and colours which were blended. The second process enhanced the mystery of nature, and gave the appearance of things, while the analytic gave the representation of things. Impressionism did not dominate modern painting, but remained the ideal towards which modern painting tended more and more to conform. Portrait-painting had undergone a great change. Modern portraits, while excellent as portraits, were not pictorial. In modern painting there was an absence of the religious and classic subjects once so strong, and there was a break from the traditions in that, owing to the introduction of the factory system of production, things of utility were not now adorned as they had been from earliest times. Then the old masters stood out from the general body of artistic craftsmen. They had still the domestic style of sculpture, the monumental style had died out, and sculpture had passed under the influence of painting, which was the dominant art of the day. Painters were on the increase, and Scotland produced a large number, whose works shown in the Edinburgh and Glasgow exhibitions he thought had done more for the lovers of pictures than the Academy exhibition in London.

#### THE ARCHITECTURAL OUTLOOK.

ON Monday, at the meeting of the architectural section of the Glasgow Philosophical Society, Mr. David Barclay, architect, delivered a lecture on "The Architectural Outlook." He said that former ages had left a legacy of great works in architecture which were possible under the conditions of civilisation then existing. But present conditions of civilisation, while spreading general culture and comfort and art surroundings amongst the people, were not likely to demand, and therefore would not give opportunities for creating buildings which would rival those of the past. Facilities for studying the past and for art and science education were greater at the present than at any former period, and a high level of artistic ability was very general, and must tend to a higher average of good work. The highest level, however, would depend on genius, to which education alone did not prove an open sesame. The conditions of the abused system of architectural competition had reached as low a level as possible and showed some hope of amending, and in the meantime and immediate future there was an abundance of work in which he hoped all might have some share and do something for art that would leave a good impression of the times of the good Queen Victoria. At the annual business meeting of the section Mr. McGregor Chalmers was re-elected president; Messrs. McBean and Carlton, vice-presidents; Mr. William Howitt, treasurer; and Mr. Lindsay Miller, secretary.

**The Jury for Painting** in connection with this year's Salon will consist of the following members:—M.M. Cormon, president; F. Barrias, J. Breton, Benjamin-Constant, Busson, Raphael Collin, Dantan, Dawant, Gabriel Ferrier, Glaise, Guillemet, Harpignies, Henner, Humbert, J.-P. Laurens, H. Lévy, Renard, de Richemont, Roybet, Thirion and Vibert.



## TESSERÆ.

## Designing Buildings.

IN designing a building the various requirements of the structure should first of all be attended to exclusively with reference to its practical application. These should be strictly carried out without any deviations arising from a prejudice for a particular rule of proportion or for the sake of a supposed beauty of effect. The building having thus been conceived of as to its mechanical construction, it will then remain to display this construction decoratively with mathematical correctness, and the result will be more or less perfect, according as the architect has correctly or not solved the mechanical problem; the beauty of the structure being greater the deeper his perception has been of the mechanical construction, even to its minutest details. Thus the problem of building is not unlike that which the sculptor solves, for he has to carve his statue in accordance with the science of anatomy, and he does this most perfectly when he has succeeded in displaying even in the smallest particulars the internal structure of the body. Let, therefore, the architects of the present day look less behind them. Let them simply learn from the past those principles which are to be followed in the future. Let them also have a strictly liberal education, and above all a sound knowledge of statics in order that they may be able to carry out correctly and fully in their decorations the mechanical construction of their designs. As it is at present, architects, and too frequently general writers on architecture, form their notions of excellence on views of their own which are often a little more than prejudices. They venture on criticisms, while they have no other modulus than that which they themselves have created, and which has been determined to a great extent by their education and the accident of place. Thus Mr. Fergusson in his Handbook says of St. Antonio at Padua:—"A signal failure was the result, for an uglier church can hardly be found anywhere;" and of St. Petronio, Bologna:—"It is fortunate that it stopped there, as no uglier building was ever designed or executed." Such remarks can only be of value as showing to how great an extent the standard of beauty, set up by particular individuals, is subject to sympathies which are the result of a particular mental training.

## Generation of Surfaces.

Any surface may be traced out in space by a line, curved or straight, provided the motion of the line be properly directed. The moving line is called the "generator," and one method of directing its course is to compel it always to intersect a fixed line, together with certain other conditions, as, for example, that in every position it shall make a given angle with the fixed line; the fixed line is called the "directrix." As an example, suppose we place a pencil with its point on a piece of flat paper, and let the point trace a circle on the paper, to which the pencil always remains perpendicular; then we shall find that the pencil itself will trace out a cylinder. In this case the pencil is the generator and the circle is the directrix; also the condition has been given that, as the pencil moves, it shall always remain perpendicular to the paper. Again, if a circular ring be made to slide along a pencil upon which it is suspended, the pencil being kept horizontal, the ring will trace out a cylinder. In this case the ring is the generator and the pencil the directrix, and the conditions are that the pencil be kept horizontal, the ring being made to slide so as always to lie in a plane parallel to the one in which it was always at first placed. The line joining the extremities of the arc, or the free extremities of the arcs forming the directrix, will be called the "base," and a line dropped from the vertex perpendicular to the base the "altitude."

## Raphael and Vitruvius.

Celio Calcagnini had the highest admiration for Raphael; Ludovico Dolce was the eulogist of Titian; Portius, whose amicable relations with the Florentine painters may be inferred from various circumstances, lectured at Florence on the Aristotelian doctrine relating to colours early in the sixteenth century. In a letter to Ziegler, the mathematician Calcagnini speaks of Raphael as "the first of painters in the theory as well as in the practice of his art." This expression may, however, have had reference to a remarkable circumstance mentioned in the same letter, namely, that Raphael entertained the learned Fabius of Ravenna as a constant guest, and employed him to translate Vitruvius into Italian. This MS. translation, with marginal notes written by Raphael, is now in the library at Munich. The Italian translations were later, but still prove that these studies were undertaken with reference to the arts, for one of them is dedicated to the painter Cigoli.

## Cleavage of Slates.

A slate may be defined as a rock having the property of cleavage or fissility, or both combined, the rock parting into layers with relatively smooth surfaces. In slates the mineral particles are usually of small size. A schist is a rock having the property of cleavage or fissility, or both combined, the rock

parting into layers with rough or wavy surfaces. In schists the mineral particles are larger than in slate. As is well known, there are all gradations between slates and schists. In origin and essential characters the two have many properties in common. Schistosity, however, indicates more severe metamorphism than slatiness. It follows, from the above definitions, that a slate or a schist may have the property of cleavage or of fissility, or of both combined. When both are present they may be parallel or intersecting. Both may occur in the same slate or schist in more than one direction. Sorby explains rock cleavage as mainly caused by the rotation of mineral particles, and especially mica, so that their longer diameters and the cleavage of the mica particles are normal to the greatest pressure. The rock readily parts along the greater dimensions and cleavage of the mineral particles. The minute mica plates were supposed to be fragmental particles deposited in the plane of bedding, and to have been rotated by the movement of the rock to a position normal to the pressure. Sorby also showed that the laminar hydrous silicates, such as chlorite, develop *in situ* parallel to the cleavage. He did not think that this was true of mica in slates, but believed that the parallel mica flakes of mica-schist formed *in situ* during the recrystallisation of the rock. Sharpe and Tyndall explain cleavage as due to the flattening of the mineral particles by pressure, so that they have a parallel arrangement with their shortest axes in the direction of greatest pressure. This cause and the causes given by Sorby have ordinarily been regarded exclusive of each other, but it is believed that they may be mutually supporting. Van Hise is convinced that in the interstices, and by the decomposition of the larger particles, new minerals, and especially mica, abundantly develop with similar orientation and with their longer diameters or cleavage, or both, parallel to the flattened or rotated original particles. The innumerable parallel minute flakes of cleavable minerals in slate, especially mica and chlorite, which are almost universally present, are in no case detrital, but have developed *in situ*. Usually it is easy to discriminate the large, comparatively sparse fragmental mica plates, if any are present, from those which are autogenic. As soon as a new mineral particle has developed it is subjected to flattening and rotation precisely as an original mineral particle. This parallel arrangement of minerals developed *in situ* is probably the most important single cause of cleavage.

## Nero as a Builder.

The architects employed by Nero after the great conflagration of Rome in the construction of his Golden House, which surpassed all that was stupendous and beautiful in Italy, and proclaims the extravagance of the emperor as much as anything else he undertook, were Celer and Severus. Nero's statue, 120 feet high, stood in a court ornamented with porticoes of three files of lofty columns, each file a mile long; the gardens were of vast extent, with vineyards, meadows and woods, filled with every sort of domestic and wild animals; a pond was converted into a sea surrounded by a sufficient number of edifices to form a city; pearls, gems and the most precious materials were used everywhere, and especially gold, the great profusion of which within and without, and even on the roofs, caused it to be called the Golden House; the essences and perfumes continually shed around showed the extreme extravagance of this inhuman monster, who for the purpose of gratifying his pleasures seized on the wealth of others. Among other curiosities was an eating-room, in which was represented the firmament constantly revolving, imitative of the motion of the heavenly bodies; from it was showered down every sort of odoriferous water. Nero did not complete this palace, as the first order of Otho was the sum of ninety millions of sesterces for the finishing it. The ground not occupied by it was left to the inhabitants of Rome to build their houses on, which were not rebuilt in the same manner as after the conflagration by the Gauls; the streets were made more spacious, the squares widened and surrounded by porticoes. The emperor published many wise regulations to prevent the repetition of a misfortune which some imputed to him. At a certain height wood was not permitted to be used, but stone from Alba or Galba as the most likely to resist fire; reservoirs were provided, and persons constantly ready to render the most prompt assistance in case of accident; the houses were to be at a certain distance from each other, and they were to have no wall in common. These regulations rendered the city more beautiful, more commodious and more secure; nevertheless, the wide streets were objected to as not affording sufficient shelter from the sun. But it is usual to condemn all that is new, particularly if the projector is disliked, as if the vicious could not do anything that was good. Suetonius assures us that Nero intended to extend the walls of Rome to Ostia, and afterwards by means of a canal conduct the sea to the Seven Hills, an idea very likely suggested by these two architects, who were great projectors, and who undertook to make a canal from Lake Avernus to the Tiber. This canal was to be 160 miles long and sufficiently wide to admit of two vessels abreast; all the prisoners were collected,



immense treasures were exhausted in cutting through mountains, but the obstacles they met with dispirited them, and the work was relinquished; the motive was ridiculous, being only to prevent vessels from doubling Cape Misenus. His great palace was but of short duration. The emperor Vespasian restored to the people the lands which Nero had taken from them, and thus the Golden House disappeared like one of the enchanted palaces of Tasso and Ariosto, and in its place arose the mighty Colosseum and the magnificent Temple of Peace.

#### Historical Painting.

Among the Greeks art and life went hand in hand. All the external circumstances of life, especially the costume, were of such a nature that they fulfilled, as they were, the laws of beauty and taste which the highest aims of the art require. The artist therefore was involuntarily impressed with his studies in the living world around him, which is an immense advantage. He enjoyed the same opportunity for the study of the human figure by the public exercises in the Palæstra. If the outward forms of life had not in the Middle Ages this purely plastic character, yet the feeling for the picturesque found nourishment in very many respects—in the architecture, in the various costumes, in the richness and variety of the materials used for clothing. But such ugliness, deformity and tastelessness has gradually arisen in the whole external world, that the historical painter is compelled to begin his work by total abstraction from the reality with which he is surrounded, in which he can find nothing corresponding with his object. He must create out of his fancy alone and complete the details with the dead, wretched aid of models and draperies artificially thrown over lay figures. If we consider what is required, under such circumstances, to create a work of art which shall produce in every part the impression of the intellectual, animated and transitory, we ought in reason to be filled with the greatest admiration for an artist who produces such a performance and look with indulgence on single imperfections. Besides this, the position of an historical painter with respect to the public is unhappily still essentially the same as in the last centuries; for whatever boast may be made of the increasing interest in the fine arts among the most civilised nations of Europe, it has partly extended principally to the other branches of painting, conversation pieces, landscapes, &c., and partly—it is with few exceptions—only just lively enough to allow art, like a game at whist or l'ombre, a place among the various amusements of mankind. Even this kind of interest is confined to a proportionably small circle, for not to speak of the lower classes of the people, the peasant and the mechanic, there are in what are called the educated one hundred to one for whom the fine arts have no existence. How infinitely remote, then, are we still from being able to call them a general intellectual want.

#### Vanbrugh as a Creator.

As we have neither an acclimated foreign style, the high and the low Classic being essentially southern, nor a native one suitable to every purpose, palatial and domestic, religious and secular, some new style may perchance sooner or later spring from those two most prolific seeds of invention, necessity and abundant knowledge. This hope, to be sure, this faint perspective of a new style, will appear chimerical to those who presume the human species near its end, judging mayhap from its present corrupt nature and numerous anilities; but as our unprophetic eyes have not yet perceived in the sidereal distances any glimmer of the last conflagration, we think time enough possibly remains for realising the hope if they will follow any clue to novel discoveries besides cotton-twist or steam. We, moreover, hold the mind of man to be a perpetual pendulum, moving backward and forward by turns, a sort of so-called gridiron pendulum, some of whose bars lengthen while others contract, and it may, peradventure, take a swing in the direction we speak of. As proof we are not dandling a mere child of imagination, let us cite a compatriot who, with a spice more of independent spirit, had probably laid the corner-stone of a new and noble architectural style—Vanbrugh—whose name, preserved in the vinegar of an epigram, has by this means its best hold on endurance. His genius, like a Rosicrucian lamp, burns with a feeble and ineffectual fire beneath the mountains cut into stone of Blenheim and Castle Howard; lay it open to the sunlight of reason and it disappears. Yet suppose this man possessing vivid powers of creation and composition, a picturesque enthusiasm, a decorative taste intrinsically Gothic, to have shaken himself altogether free from the shackles of Classic superstruction, instead of distorting and convolving its rectangular forms into curves of double curvature, and heaping up an architectural chaos of its elements, for the poor and illicit purpose of effect, like a landscape gardener—suppose him to have endeavoured at filling in the beautiful contours of his edifices by homogeneous features, features which the climate, the customs and the materials of the land suggested—it is no Utopian theory that he might have blocked out a new type, or at least sown the acorn of a future magnificent growth in the public mind. That man's tenure of earth is a lease of lives renewable for ever may be doubtful to all

but philosophers; let it merely equal the tenure by which the pyramids hold their ground, and we can scarce think nature will lie fallow so long a time of original architectonic productions. If she do it is only because he continues to plough her with the reversed share and delve her with the mattock wrong end downwards.

#### GENERAL.

**Mr. Thornycroft, R.A.**, has been commissioned by the Corporation of Durban, Natal, to execute a statue of Her Majesty the Queen, similar to that in the London Royal Exchange, and which is to be placed in the local Town Hall to commemorate the Diamond Jubilee.

**The Building Committee** of Truro Cathedral have decided to arrange for the laying of the foundation-stone of the nave immediately. The sum already collected amounts to 23,000*l.*

**The Dean and Chapter of Peterborough** have purchased an ancient farmhouse built of the same stone as the cathedral, in order to afford a supply to be used in the restoration.

**The New Cathedral Library**, Hereford, is to be opened by the Archbishop of Canterbury on April 30.

**Messrs. R. Horsfall & Son** have prepared plans for the new Queen's Hall which is to be erected in Halifax at a cost of about 16,000*l.*

**Lord Loch**, formerly High Commissioner of South Africa, has purchased Stoke-by-Clare College Estate in Suffolk, containing 3,050 acres, with mansion and homesteads. The price given was 34,600*l.* Stoke College stands on the site of a religious establishment which was removed from Clare by Edmund Mortimer, Earl of March.

**Mr. J. A. Settle**, who is engaged in the surveyor's department, Bolton, has been appointed surveyor of Heywood. There were forty-three candidates.

**The New Lecture Theatre** of the Royal Dublin Society has been inaugurated. It will accommodate 800 people. Sir Thomas N. Deane & Son are the architects.

**Mr. Orchardson, R.A.**, is to be entrusted with the commission for the portrait of Lord Peel which is to be placed in the Speaker's house.

**Sir E. J. Poynter, P.R.A.**, was on Saturday last elected president of the Royal Birmingham Society of Artists, in succession to Mr. Alma-Tadema, R.A.

**The Glasgow Memorial** of the Queen's reign is to be a reconstruction of the older part of the Royal Infirmary.

**Lady Wallace**, it is understood, has bequeathed 5,000*l.* to the Artists' General Benevolent Institution.

**The National Gallery** will be opened again on Sundays from April 4 to September 26, between the hours of 2 and 5 or 6 P.M., according to the season.

**A Memorial** of the brothers William and John Hunter, the anatomists, is to be erected in Glasgow, but the form of it has to be determined.

**Mr. T. W. Cubbon** was, at the last meeting of the Birkenhead School Board, appointed architect for new schools to be erected in Well Lane, at the south of the borough.

**The Commissioners** of Kingstown, co. Dublin, invite architects to send plans, &c., for public baths, which will cost 6,000*l.*

**Mr. W. R. Lethaby** will read a paper on "Lead Work" before the Applied Art Section of the Society of Arts on the 30th inst.

**Mr. A. Ramsell**, of Derby, has prepared plans for a new opera house which is to be erected in Dudley at a cost of about 10,000*l.* The extent of the site will allow of the erection of an arcade with shops on two sides of the building.

**Ingres's Portrait** of M. Bertin, who was formerly editor of the *Journal des Débats*, has been purchased for the Louvre, the price given being 80,000 francs.

**Mr. Frank Matcham** has completed the designs for the new Empire Palace, Leeds, the work comprising also two arcades and three or four blocks of shops. The principal front will be in Briggate.

**Mr. W. J. Dibdin**, the chemist to the London County Council, has resigned his office in order to engage in private practice.

**Additional Wall-Paintings** have been commissioned for the Royal Exchange. In the ambulatory Mr. Seymour Lucas, A.R.A., has depicted "William the Conqueror giving the Charter to the Citizens," at the expense of the Corporation. The Mercers' Company have commissioned Mr. E. Crofts, A.R.A., to paint a panel of "The Opening of the First Royal Exchange by Queen Elizabeth." Sir Samuel Montagu, M.P., has commissioned Mr. Solomon J. Solomon, A.R.A., to paint a panel of "Charles I. Demanding the Surrender of the Five Members at the Guildhall," and Mr. Carl Meyer has asked Mr. Sigismund Goetz to paint "The Offer of the Crown to King Richard at Baynard's Castle."



# The Architect.

## THE WEEK.

COMMON juries who have the privilege of serving in the High Court do not appear to set a great value on an architect's reputation. A man, especially of the licensed victualler species, can apparently say an architect is a thief and a robber, with a variety of adjectives thrown in for emphasis, and threaten to do his best to ruin his victim, and the entertainment will only cost five guineas. That was the experience of Mr. E. J. STREVEVS, architect and surveyor, on Tuesday. The defendant pleaded that all he said was only abuse and did not amount to defamatory matter. The jury adopted that ingenious theory of the slander. If the case were reversed and the architect had charged the victualler with thievery and robbery and had sworn to have his public-house deserted, would a London jury be as merciful in awarding damages?

THE members of the City Lands committee have testified to the merits of their chairman, Mr. MATTHEW WALLACE, J.P., of the Albion Iron Company, by presenting him with a silver épergne and service of plate. The work of the committee has been most successful, and this is owing in a large measure to the business capacity, tact, public spirit and impartiality of Mr. WALLACE, who devotes much of his time on which there are so many claims to municipal interests. The gift is valuable, but it will be more prized by Mr. WALLACE on account of the friendly feelings which inspired the presentation, and will be regarded as an incentive to further exertions for the benefit of the citizens of London.

THE works committee of the London School Board have recommended the Board to purchase from H.M. Commissioners of Works, for the sum of 6,000*l.*, about 56,628 square feet of property at Millbank, having two frontages of 118 feet each to a new road to be constructed by the London County Council. It has also been arranged that the Board shall pay to the Council the proportionate cost of constructing the roads and sewers on their estate (of which the property now proposed for purchase forms a part), together with the proportionate cost of the properties to be acquired by the Council in Winchester Terrace, Causton Street and Vincent Street, for approaches, at a total estimated cost of about 2,800*l.* In the event of any difference arising between the County Council and the Board with regard to the payment to be made for the roads, &c., it is stipulated that the question shall be settled by H.M. First Commissioner of Works.

WE must always expect something abnormal in whatever relates to administration in Dublin, and there will be no surprise to find that the valuation of the city for taxation is based on a system that is unique. According to a paper which was read before the Statistical Society of Ireland on Tuesday, it appears that since 1878 the sums spent on the betterment of the city amounted to over 1,000,000*l.*, but the increased valuation of the city since 1878 bore no proportion to this enormous expenditure, only 107,867*l.* having been added to the valuation. When the Municipal Council secured the management of the city the valuation was reduced by 159,000*l.* At the same time, a debt of nearly 300,000*l.* was handed over, which the present Corporation were annually reducing. Apart from the reduction mentioned, the subsequent annual revision and present state of the valuation of the city were made quite unfair to the ratepayers in general, and not in accordance with the law. The law in both countries was identical, but the difference between England and Scotland and Dublin was that in the former countries the law was carried out, and in Dublin it was not, and there was no provision for the gross rental as the basis of value. In the principal streets of the city the valuation was about one-third of the rental. In Dublin the only idea of increased value with a poor-rate collector had appeared to be one of a struc-

tural change or an original construction, the fallacy of which standard was obvious. One of the speakers pointed out that London was revalued every three years. They might take it for certain that Dublin was not revalued every year. There was no practice in Dublin of going back in valuation and raising it as the houses increased in value. The changes in the rent were not taken into account, and no effort was made by the Commissioners of Valuation to do so. Another speaker explained the anomaly, when he said that very many members of the Dublin Corporation were opposed to revaluation for personal reasons, because they were interested in house property, which was at present undervalued, and on that account they would not sanction any change.

THE return of the Science and Art Department relating to the application of funds by local authorities to technical education shows that the expenditure is increasing. The amount in 1894-95 was 737,809*l.*, while the estimated expenditure for 1895-96 was 793,507*l.* Among the loans on the security of local rates for 1895-96 for erection, extension, or furnishing technical school buildings are 2,024*l.* at Stockport, 850*l.* at Runcorn, 700*l.* at Bideford, 3,708*l.* at West Hartlepool, 11,000*l.* at Dover, 2,100*l.* at Margate, 3,591*l.* at Tunbridge Wells, 10,000*l.* at Bolton, 40,000*l.* at Manchester, 5,059*l.* at Accrington, 2,000*l.* at Darwen, 10,333*l.* at Widnes, 1,400*l.* at Radcliffe, 5,000*l.* at Leicester, 14,500*l.* at Bath, 1,800*l.* at Tunstall, 850*l.* at Godalming, 20,000*l.* at Birmingham. Out of the 49 county councils in England 38 are applying the whole of the residue received under the Local Taxation (Customs and Excise) Act to technical education, and 11 county councils a part of it to the same purpose. Of the councils of the 61 county boroughs, 54 are devoting the whole of the residue to technical education, and 7 a part of it. Further, the councils of 13 county boroughs, 67 boroughs and 109 urban districts in England are making grants out of the rates under the Technical Instruction Acts; and 7 local authorities are devoting funds to technical education out of the rate levied under the Public Libraries Acts. There were 25 local authorities that raised sums by loan on the security of the local rate under the Technical Instruction Acts during each of the years 1894-95 and 1895-96.

IN Warwickshire there is a remarkable ridge of quartzite at Hartshill which is assigned to different formations, as well as several carboniferous beds, while at Caldecote volcanic tuff, quartz, porphyry and diabase are found. It is now evident that the Romans were able to use the stone for pottery or other purposes. Four years ago a Roman kiln was discovered near the village of Mancetter, but its value was not realised until too late, and as the important parts were destroyed a systematic examination was impossible. Last week, on the other side of the roadway, at what was known at the Caldecote Quarries, a second kiln was found, and care was taken to avoid damage in the uncovering. A careful search was made, and a third kiln, in a wonderful state of preservation, was unearthed. Remains of pottery have been found, chiefly of dark-blue slate colour, including a perfect specimen of a cinerary urn, about 5 inches high. The kilns, which were about 16 inches below the turf, are oval in form and measured 48 inches by 60 inches.

THERE is likely to be much competition among cities for the privilege of holding an exhibition in 1901, for many of the objects which appeared in the Paris Exhibition of 1900 will then be available for other places. The Glasgow Corporation are the first claimants in this country. It is proposed to hold the exhibition in Kelvingrove Park, and the Corporation will guarantee a sum of 5,000*l.*, besides allowing the use of the new art galleries buildings and of the ground. It is to be understood that if any surplus accrues from the exhibition it is to be handed over to the Corporation to be applied to art and science purposes. As soon as 50,000*l.* can be guaranteed a meeting is to be called for the purpose of forming an exhibition association. In 1888 the guarantee fund amounted to 320,000*l.*, and it is probable a far larger sum will now be subscribed. The project merits encouragement, and the precedent of 1888 is a guarantee of success.



## EUSTACHE LE SUEUR.

TWO hundred and sixty years have elapsed since EUSTACHE LE SUEUR, who afterwards painted the picture we illustrate this week, entered the atelier of SIMON VOUET as a pupil. About the same time another pupil, named CHARLES LE BRUN, made his appearance. There was a great difference between the social circumstances of the pair. CHARLES LE BRUN, who was the younger, was under the protection of Chancelier SÉGUIER, the most powerful subject in all France after RICHELIEU. LE SUEUR was the son of a poor turner in wood who was unable to pay a livre as a fee, and EUSTACHE was therefore received as an object of charity. In the old ateliers a pupil of that kind was compelled to pay dearly for his privilege by constant drudgery, and he had to submit to the tyranny of more fortunate fellow-pupils as well as of the master. EUSTACHE LE SUEUR was in one sense ill-adapted for the position. He was timid and industrious; he was therefore likely to have heavy labour cast upon him, and he was unable to resent injustice. LE BRUN evidently looked down upon him, and as long as LE SUEUR lived plumed himself as the superior. SIMON VOUET was too great a man to bother himself about the squabbles of his pupils or assistants. He was the master of LOUIS XIII., of princes and princesses, and it was a high honour if he condescended to look upon a plebeian's drawing and to point out its weakness.

In those days it was indispensable for everyone who aspired to be a painter to study in Rome. VOUET's atelier was only a sort of elementary school where young fellows were prepared for the Vatican. LE BRUN was not only destined to follow the usual course, but he was to appear in Rome as a representative of France. There was no hope of that kind for EUSTACHE LE SUEUR; he was to content himself with being an artist's journeyman. We know it is sometimes an advantage when dealing with currents of air and water of which we wish to increase the force to interpose obstacles to their courses. In the same way the limitations amidst which LE SUEUR lived only strengthened his genius. Maréchal DE CREQUY, French ambassador in Rome, opportunely brought some examples of Italian art to Paris, and those by early masters were studied by the young apprentice with an eagerness that could hardly fail to be productive. An opportunity arrived for him to employ the knowledge he derived from them. A commission was given to VOUET to prepare a series of eight designs from the "Hypnerotomachia di Polifilo," or "Dream of Polifilo," by the Dominican monk FRANCESCO COLONNA. No two people can ever agree about the signification of that wonderful and interminable dream, or "Battle of Love in a Dream." We can imagine the consternation of so busy a man as VOUET, who had a monopoly of the most lucrative commissions, at the thought that he was to select subjects out of what seemed to be an inextricable jumble. So he tossed over the book to his drudge EUSTACHE. He expected to have designs produced which would bear some resemblance to his own, and which he might send in with his name attached to them. LE SUEUR was too well inspired to treat them in a style that was false and not personal. His designs satisfied all who saw them except SIMON VOUET. Tapestry was made from them, but, in common with several other productions of the Gobelins, they have disappeared. VOUET was dissatisfied, for his pupil had shown that he possessed individuality, which was not a becoming quality in one who had not paid the proper fee, and he could not, therefore, any longer look upon him as a most useful "ghost."

EUSTACHE LE SUEUR then began on his own account to paint pictures for churches. Happily he also met with one of the most generous of secular patrons. This was LAMBERT DE THORIGNY, the president of the Chambre des Comptes. He had erected a noble mansion in the Isle St. Louis, eastward of Notre Dame, still known as the Hôtel Lambert. The commission for decorating it was offered to LE SUEUR, without any restriction as to the time in which it was to be completed. The artist was occupied with the paintings during the rest of his life. Apparently the whole arrangement and choice of subjects were left to him. In the Louvre there are several of the paintings which have been removed from the hotel, where they adorned the Cabinet de l'Amour, which was so-called because the artist illustrated the history

of CUPID. Among the subjects are *The Birth of Cupid*, *Venus presenting Cupid to Jupiter*, *Venus Scolding Cupid*, *who takes refuge in the arms of Ceres*; *Cupid receiving the Homage of Gods and Goddesses*, *Cupid instructing Mercury to announce the universal power of Love*, *Cupid Stealing the Thunderbolt of Jupiter*. Many other mythological subjects were painted on the walls and ceilings of the house. Let no one imagine the pictures have any of the characteristics of the debased works of the Renaissance. LE SUEUR was one of those men who could see only guileless subjects in ancient legends, and he could not be either sensuous or sensual in his forms or colours. In many ways he seems to have corresponded with JOHN JAMES RIDLEY or "J. J." in "The Newcomes," but instead of visions of such heroes and heroines as were sure to arise in an age when Sir WALTER SCOTT was performing his wizard tricks, the French artist could only perceive ascetic men and women who had renounced the world, or beings like CUPID and his mother, who were as unsubstantial as the air. So close a correspondence was seen between the characteristics of LE SUEUR's own life and those of many of his non-Olympian subjects, that his contemporaries supposed his favourite dwelling-place was among the Carthusians in the Rue d'Enfer.

There was, however, a sincerity in LE SUEUR's work which attracted attention from those who had the bestowal of commissions. LE CAMUS, the superintendent of the royal palaces, ordered from him for the king's chamber a large picture representing Monarchy leaning on a globe and accompanied by figures of Justice, Courage and Renown. For the same chamber LE SUEUR executed "camaïeux" on a gold ground of the four quarters of the world. In the adjoining room was another allegorical picture showing Authority seated on a throne, with Time studying a record which History is writing, while below were figures of children playing with a lion. ANNE of Austria also engaged the painter to adorn her bedroom, bath-room and an adjoining room. It was alleged that some of the paintings were removed by ROMANELLI, one of Cardinal MAZARIN's painters, who was worried to see work which he could not surpass; but there is a record which is evidence that up to 1710 eight of the paintings in the bath-room of the queen-dowager had survived. It must be regretted that the paintings can no longer be identified. A drawing of one, *Parnassus*, which is in the collection of the Louvre, suggests there was some reason for comparing them with RAPHAEL's works.

The world is more fortunate in possessing some of LE SUEUR's pictures which were devoted to the life of St. BRUNO, although as they were subjected to rehandling by later artists and were not properly conserved, we can only imagine their original appearance. The convent of the Carthusians was not very large, and the cloister which the artist was called to decorate was not very important. Nor is it likely the payment was liberal. These facts should be borne in mind by everyone who criticises the twenty-two pictures in the Louvre. There are deficiencies in the figures arising from negligence, but it is evident that LE SUEUR was able to persuade the monks to serve as models, and in those days few painters cared to keep so near to reality. It was illegal to employ a nude model, and the admiration of the antique compelled artists to prefer statues to living beings. From their position in the cloister the paintings could be injured without much likelihood of the detection of a culprit. LE BRUN and other painters were accused of sharing in such vandalism, but there is not a tittle of evidence against the former beyond a sort of tradition. The pictures were completed in 1648, when LE SUEUR had reached his thirty-first year. The Académie Royale de Peinture et de Sculpture was also founded in 1648, and as he was selected as one of the twelve artists who were to rank as *anciens*, or founders of the institution, his value as a painter was evidently appreciated by his contemporaries. LE SUEUR painted a picture of *St. Paul Expelling Demons at Ephesus* for the Academy—a work which has disappeared—but he was too genuine an artist to take part in prescribing regulations which could only fetter art and accordingly he resigned his office. His resolution to take no part in the proceedings was likely to be strengthened when he found that LE BRUN was on the opposite side, and eager to exercise authority. For the *protégé* of SÉGUIER



was more of a favourite with fortune than when he entered VOUET's studio. LE BRUN had distinguished himself while in Rome, and on his return Cardinal MAZARIN was proud to aid him and to present him to the king. FOUQUET the munificent confided to LE BRUN the decoration of his château, a building which afterwards excited the envy of LOUIS XIV., and settled a pension of 12,000 livres on him. It would be strange if LE SUEUR could rejoice at the presence of a rival who possessed so many of the qualities which the world always admires, while he was forced to depend for success on his art alone. The two men were representatives of two species of artists, and if they had lived as long as the patriarchs there would be at the end as little approximation between them as there was in the days of their apprenticeship.

Without their rivalry we should not, however, have possessed the painting of *St. Paul Preaching at Ephesus*. It was the custom in the seventeenth century for the goldsmiths of Paris to present at the beginning of May a painting to the cathedral of Notre Dame. The brilliant CHARLES LE BRUN was selected to receive the commission for the gift of 1648. His subject was the *Crucifixion of St. Andrew*. The commission for the following year was given to LE SUEUR, and he painted *St. Paul Preaching at Ephesus*. It was manifestly his aim to demonstrate that, although he was not fortunate enough to study in the Roman galleries, he was competent to follow the principles of the Roman school. LE SUEUR must have thought over RAPHAEL's cartoon, and had the courage to measure himself with that master. The laws of composition in modern times are so different from those which were formerly followed, the picture may now be considered as too academical. But it is accepted by French artists as one of the glories of their school, although as painters they would hesitate before imitating the arrangement. In most of the other works of LE SUEUR the excessive modesty of the man is apparent, but in this case he seems to have displayed a power and majesty which are only rivalled by the great masters. VICTOR COUSIN, who had always to speak with caution as the representative of the French school of philosophy, was not afraid to suggest that EUSTACHE LE SUEUR in this work is at least equal to RAPHAEL. He relates how he visited Hampton Court in order to study the cartoons and to compare the Roman *Preaching of St. Paul* with his countryman's work. The older picture, he says, carries us at once towards the ideal. The other is less striking at first, but little by little its emotional power prevails, and goes on increasing. The figure of St. PAUL by RAPHAEL is shown enveloped in a grand robe which falls in splendid folds, and displays the tall figure of the orator. But as the figure is in shadow, what is seen has nothing of the marvellous. LE SUEUR, on the contrary, shows the figure fully, for it faces us, and it expresses inspiration, terror and majesty. COUSIN considers that the picture also recalls the *School of Athens* by the extent of the scene, the architecture and the able distribution of the groups. There are a greater number of personages and of episodes in the Roman work, while in the French picture, whatever action is seen among the subordinate figures, is the effect of the words of St. PAUL, who is like the JUPITER of Olympus, but animated by a different spirit.

LE BRUN could not fail to recognise that his own work was surpassed. He sought another commission for a May gift, which was produced two years afterwards, and is now in the Louvre. The subject is the *Stoning of St. Stephen*. But his rival was not to be tempted to a second struggle. There were, however, other people who were not disposed to allow the competition to cease. LAMBERT DE THORIGNY, who was, as we have related, LE SUEUR's best patron, became desirous to have LE BRUN also employed in the decoration of his house. He assigned to him a large gallery which was to be devoted to sculpture. The subject selected by the painter was the *History of Hercules*. It was one well adapted to his powers, and formed a violent contrast to the reposeful works of LE SUEUR. According to the story, when the work was finished the Pope's Nuncio inspected the mansion. He was charmed with LE SUEUR's work, but all he condescended to say about LE BRUN's was to designate it as *una coglioneria*. The phrase was not merited, for the painting of the *Marriage of Hercules and*

*Hebe* is an effective piece of decoration according to LE BRUN's principles. The artist was wounded by the criticism, and declined to paint any more in the Hôtel Lambert.

If LE SUEUR had lived LE BRUN would have been able to demonstrate that he was the more favoured painter. We cannot imagine that LE SUEUR would have ever charmed LOUIS XIV., for he could not stoop to the representation of His Most Christian Majesty as a sun-god. But competition between the artists shortly afterwards came to an end. LE SUEUR died in 1655 in his thirty-eighth year, while LE BRUN, who was two years younger, lived on to 1690. The elder artist is likely to have shortened his life by his devotion to work, and yet it is doubtful whether he did not die in a state that approached poverty. He has been called the French RAPHAEL, and, although there may be some exaggeration in the title, he comes nearer than any of his countrymen to the Roman master. But the distance between them is wide.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### DYNAMOS.

*Theory*.—The dynamo is a very efficient machine for converting mechanical into electrical energy, this efficiency often being 95 per cent. in large machines. The conversion is effected by the action of a magnet on a coil or coils (discovered by FARADAY).

If one pole of a magnet is plunged into the centre of a coil of wire, although there may be no actual contact between the magnet and the coil, an electromotive force is generated, and if the circuit is complete a current will flow in one direction. When the pole is withdrawn a current is generated in the opposite direction. It can be demonstrated that the amount of work done by the electric current so generated is the same as that required to insert or to draw out the magnet. Thus this machine is a most elementary form of dynamo. The same effect can be obtained if a coil wound on part of a magnetic circuit is rotated in such a manner that the magnetic induction through it is continually being varied, and this is the form of a dynamo.

The two-pole machine consists of a heavy iron forging or casting made of a U shape, or inverted. On the limbs are wound coils of copper wire, which will convert the soft iron into an extremely powerful magnet if a suitable current is passed through them. The ends of the limbs of the magnet are made solid, and are accurately bored out so that a circular mass of iron can be rotated between the poles, thus almost completing the magnetic circuit. This mass of iron called the armature is of various forms—ring, disc, or drum—and is wound with coils of wire in such a manner that each coil is, as it were, pierced by the magnetism twice in every revolution; thus the induction passes through it in each direction once in every revolution, and this is equivalent to continually plunging the magnet into and drawing it out of the coil.

The important point is that the wire must be wound longitudinally along the axis or parallel to the axis of the coil, as this complies with the condition that the magnetic induction shall be cut by the coil. The voltage or electromotive force which the dynamo will generate is proportional to the number of magnetic lines (a measure of the strength) of force, the number of times in each second that each individual line is cut by any one conductor on the surface of the armature, and to the number of conductors on its periphery.

Now it is evident that, as above explained, if the two ends of the coil were connected to two insulated rings attached to the armature shaft, the current collected from them would reverse twice in each revolution. To convert this current, which is alternating, into a continuous one, a mechanical device called a commutator is employed. The commutator, which is fixed to the shaft, consists essentially of a tube, split axially into two semicircular pieces which are insulated from each other and the shaft, each end of



the coil being connected to a segment. Two metal strips or brushes, which collect the current, rub on this commutator on opposite sides, and are placed in such a position relatively to the magnetic induction or field that when the one half of the commutator is disconnected from one of the brushes and connected to the other, the pressure in the coil is just reversing.

The current from such a machine will always flow in one direction, but it will rise and fall from nothing to a maximum twice in every revolution. Suppose the dynamo to make 1,000 revolutions per minute, there would be 2,000 pulsations per minute; this would be almost noticeable for lighting.

To obtain a practically steady current, the commutator consists of a large number of segments, each connected to a closed coil of the armature; the effect of this is that the pulsations are rendered more frequent, and are of less amount proportionally.

Dynamos have usually from 50 to 100 segments on the commutators, and the higher the voltage the more segments are required to insure sparkless collection of the current.

*The Magnetic Circuit.*—A magnet may be made by passing a current through a coil of wire which surrounds the iron to be magnetised. This method is used in a dynamo, as already mentioned. If a few turns of thick wire are used, a heavier current must be employed than if many turns of thin wire are used. The important point is that the current in amperes, multiplied by the number of turns of wire must be a given amount to produce a given induction in the magnetic system. It follows that for this number of ampere turns, given the same voltage on the terminals, you may decrease the current indefinitely by increasing the turns of the same gauge, remembering that the current multiplied by the turns must be constant. The effect of this is to increase the weight of copper, and consequently the expense.

*Magnet Windings.*—A series dynamo is one in which the magnetism is supplied by a coil of wire carrying the main current. The result of this is, that the stronger the current the higher the voltage (within limits), the speed being constant, because the magnetism increases as the ampere-turns increase until the magnets become saturated or fully magnetised.

A series dynamo uses the whole of the current generated by the armature and only takes up a part of the pressure. In any case, taking a series machine and converting it into a shunt by altering the magnet windings, the power used in exciting the magnets would be the same for a given maximum output, *i.e.* the ampere-turns would be constant.

The characteristic of a series-wound machine is that the voltage will increase as the current in the circuit increases, given constant speed. This rise in voltage is very rapid until the current has attained a fair amount, and afterwards it increases less rapidly. This less increase is due to the magnets becoming saturated, and so requiring a much larger increase of current to increase the magnetic induction by an equal amount.

This is only true when there is very little armature reaction, *i.e.* when the field magnets are strong compared with magnetism caused by the armature, so that the armature currents have little power to oppose and reduce the field and so lower the voltage.

A shunt dynamo is one which is excited by a coil of fine wire having many turns, which is connected to the brushes. Thus a small amount of current generated by the armature is used at the full voltage to excite the magnets.

The characteristic of a shunt-wound machine is that the slightest drop of voltage due to resistance of the armature causes less current to go through the magnet coil; the effect of the armature reaction also reduces the magnetism, consequently the voltage of the dynamo falls still more. There is a certain current at which this state of things becomes unstable, and the current and voltage fall rapidly to nothing; thus a shunt dynamo protects itself against short circuits.

A combination of the two windings, the compound, is very frequently used, and it can be arranged that the voltage can be kept constant, assuming constant speed as the current increases; the latter is accomplished by winding rather more series turns than are required to overcome the drop in current of the shunt turns or circuit, and

is called "over-compounding." These over-compounded machines are used to a large extent for private installations and in places where one dynamo only is used, as they automatically regulate for the drop in the mains, &c., as the load increases.

*Sparking on Commutators.*—This subject is a difficult one to explain in a small space, but the cause of sparking may be briefly said to be due to the attempt of the commutator to force a coil (whose commutator segment is just leaving the brush) round which current has been flowing in one direction to receive current in the opposite direction. This coil has electrical inertia or self-induction, and will not respond to the action of the commutator, consequently the circuit virtually becomes broken, and the main current sparks from the commutator segment to the brush, being unable to make the polarity of the coil reverse immediately. The current in this coil is rather heavy, and usually much heavier than the main current, as the coil has been short-circuited under the brush, and so this effect is worse if the brushes are at right angles to the field magnetism.

The forced reversal of the current the moment the segment leaves the brush is the difficulty, and it is overcome in the following way:—The brushes are given a lead, *i.e.* they are set forward a little in the direction of rotation of the armature. When this is done, the current in the short circuited coil has been reversed by the action of the magnet, and, consequently, assists the other coils to deliver their current to the commutator. The result is that there is no tendency to spark, as the current can go through the coil much easier than through the air gap.

If the above were the only cause of sparking the matter would be unimportant, as the brushes need only be set forward a very little as the current from the armature increases, in order to allow the coil to be commuted to have a larger reverse current to assist the larger main current. The angle through which the brush must be moved is greater than the one necessary to accomplish this owing to the armature reaction. The magnetism of the armature core tends to be oblique to that in the field magnet, consequently it opposes and contorts the field, and the effect is to strengthen the points of the poles the conductors are leaving, and to weaken the ones the conductors are approaching. For this reason the brush must be shifted round further than would be necessary if there were no armature reaction, in order that the coils be commuted in the reverse field of requisite strength.

If the position of the brush is not altered into the sparkless condition the commutator will be damaged by the sparks, and each segment will have its edge burnt off, and continuous sparking, or arcing, will be the result, owing to the uneven nature of the surface and the vibration of the brush. The result of moving forward the point of commutation in front of the plane at right angles to the lead is to reduce the voltage of the dynamo. This is caused by the fact that some of the coils must oppose the main current, as already explained, before they come under the brush, in order that sparkless collection may result. This is, as it were, the price that is paid for sparkless collection, as a larger dynamo is required to give the same output as that which could be obtained if sparks could be otherwise prevented, and the maximum power of a dynamo, given a reasonable drop of pressure, is usually limited by the angle of rocking, rather than the heating of the coils. Modern machines are made so that the sparking is negligible, and the brush-holder requires very little rocking.

The usual method adopted to keep this arc of rocking within reasonable limits is to make the field magnet coils very powerful in comparison to the armature reaction, so that the distribution and amount of magnetism is little affected. This can be done by (1) making the field very strong; (2) by slotting the magnet pole-pieces axially, and so making a number of air gaps in the armature field, thus opposing the cross-magnetising effect; (3) by making a large air gap; (4) by winding series coils on the pole-pieces so that they neutralise the armature reaction.

The first method makes the machine heavy, because the magnet is so large; the second is costly, because of the labour necessitated; the third method is very satisfactory as regards prevention of sparking, but it sacrifices efficiency or lightness to effect this. The fourth method has not been used very much as yet, and, in fact, has not long been



suggested, but the labour entailed to carry it out would certainly be considerable. In fact, each and every method suggested means either decreased efficiency or an increased expense.

*Carbon Brushes.*—Carbon brushes have been found to stop sparking to a large extent, and the reason for this is that the contact between a metal and carbon is of high resistance compared with that of the coil; consequently when the segment is leaving the brush the surface of contact becomes small, and therefore the resistance is high and increasing. Thus the current flowing through the segment leaving the brush is reduced greatly, and is practically nothing at the moment of leaving; hence practically sparkless collection. Also, as the resistance of the brush contact is high, the short circuit current is kept low and affects the problem very little, and for this reason the lead of the brush does not affect the importance of these currents; consequently the brushes are usually fixed in one position, especially in motors.

There are several points to consider in the use of these brushes, and one is that carbon is a bad conductor, especially at contacts, and the very reason which makes them sparkless for brushes may cause serious heating at the point of contact between the commutator and the brush, and brush and holder. Ample surface must be allowed at the latter contact, and the brushes are usually copper-plated at their ends for this purpose. The reasons that these brushes are not used more are that they require a considerable amount of fitting to run well, as they must be filed to the curve of the armature; also they are never completely sparkless; the resistance of the contact which reduces the short circuit current naturally makes a greater angle of lead necessary to get a reverse current of requisite amount to prevent sparking entirely. The great excellence attained with ordinary brushes makes it preferable to use them, except when one has a very bad machine. It is in the latter case that they are most suitable and often absolutely necessary.

*Mechanical Sources of Sparking.*—Much trouble is experienced from sparking which cannot be cured by altering the lead of the brushes. It may be taken that if when new the machine does not spark when the load is varied, any sparking which may afterwards occur is not due to original bad design, but to something which has developed later. That being so, it will be of interest to enumerate the causes and give the remedies of such sparking.

1. If there is a periodic spark on both brushes, the spark being once every revolution of the armature on each brush, there is one of two defects. (a) One coil has short-circuited. (b) A wire is broken. If (a) is the fault there will be rather a brighter spark at one position of the commutator, but nothing very serious. The speed will also need to be higher to obtain the usual voltage; a connection to the framework will also be probably found on testing. If (b) is the fault, and the fault is in the armature, the voltage will also be very low, and there will be a violent oscillation of the current and fairly heavy sparking all round. If a commutator segment is disconnected from the armature there will be a spark when the segment comes round, but no fall in voltage. This is assuming that the brush is wider than one segment and the insulation, and is therefore always on two, and sometimes on three, segments.

If one brush sparks and the other does not, it is certain that they are not opposite or that one is dirty. This latter can be easily tested. Calling one brush A and the other B, if A is sparkless and B sparks, then if on moving the brush-holder a position is found such that B is sparkless and A sparks, then it is absolutely certain that it is because they are not opposite. If a position cannot be found where B will not spark, then (1) B may be dirty, (2) the spring adjustment may be slack, (3) the brush may not bed fairly on the commutator. (1) may be found out by changing the brushes, and if the same brush still sparks, it is dirty; (2) can also be discovered by the change, as the other brush will spark if the adjustment is wrong; (3) can be seen by inspection.

If both brushes spark violently and continuously and no neutral point can be found, it is probably due to vibration; the machine should then be examined to ascertain that it is firmly bolted down. The tension of the springs should be altered and the sparking may cease, as

the vibration of the dynamo may be in sympathy with the natural time of vibration of the spring.

A clumsy belt joint may also be the cause of sparking, or it may be caused by a flat on the commutator due to uneven hardness of the commutator segments, or to the edges of the segments being burnt away by careless use. If this is so, the commutator must be turned up again true and smooth.

A badly balanced armature will cause sparking if the bearings have worn much, and the remedy is to refit the bearings, and also to have the armature returned to the makers to be properly balanced.

Finally, a dirty commutator may be the primary cause, and if so, it should be cleaned with emery, the brushes being removed, and only a very little vaseline allowed in future.

#### MECHANICAL DETAILS.

*Armature.*—The conductors on the periphery of the armature have a great tendency to fly off, and consequently they are always bound round tightly by means of steel or phosphor-bronze wire. The strain on these wires is often heavy, and the conductors have been known to fly out from the iron core. This can be prevented by adopting a winding in which the conductors are threaded through holes in the core.

There is no necessity here to go into the matter of armature windings and the end connections, &c.; this will be found in standard text-books on the subject.

*Commutator.*—The commutator is the portion of a machine which has the most wear, and great attention has to be paid to it. The brushes will grind the commutator away very soon if it is made of unsuitable material. Phosphor-bronze has a good name for wear, combined with conductivity, while hard-drawn copper and gun-metal are used very frequently.

A commutator is made up, as before described, of a great number of segments, insulated from each other by means of mica generally. The usual method of fixing them is by means of two insulating bushes having tongues, which fit into grooves on each of the segments. These bushes are clamped tightly on each end of the commutator by nuts and washers, and fixed to the shaft. The connections from the armature are fixed to each of the commutator segments or bars mechanically, and are then soldered to insure a good mechanical connection.

*Bearings and Lubrication.*—The lubrication of high-speed machinery is a very different problem from that of the lubrication of ordinary shafting, especially as the weights supported are very large, while the speed is high. The bearings must be long, at least three times the diameter of the shaft, and a thinner kind of lubricating oil should be used than for ordinary bearings.

When a dynamo is belt or rope driven it will always be advisable to have a bearing on each side of the pulley in a machine of large size. The wear on the bearings will be much more even, and there will be less liability for them to run hot.

There are three general methods of lubricating bearings:—(1) To let the oil run in; (2) to lubricate under pressure and circulate a large quantity of oil many times over; (3) to lift up the oil from a reservoir by means of oil rings.

The first method is so well known that it needs no comment, except to state that it is not satisfactory for dynamos.

(2) Lubrication under pressure is being adopted very extensively, and is quite automatic in many designs. A small force-pump is often used, worked by an eccentric on the shaft, with an oil circulating tank fixed to the bed-plate, or the oil reservoir may be contained in the standards. These arrangements work very satisfactorily, especially if grit is kept from the oil.

If the oil is clear when put in the tank then there is very little chance of grit entering it, as everything is enclosed. It is always advisable to have ordinary lubricators on the bearings as well as the force-pump, in case the pump ceases to work.

The ring oiling is quite reliable, and is very satisfactory for small machines. Two or more rings which are usually about twice the diameter of the shaft, hang on the shaft, and work in grooves. The rings dip into oil chambers, and as they are rotated by the shaft they constantly lift up the



oil and pour it over the shaft, and a continuous lubrication is obtained.

#### CHOICE OF A DYNAMO.

The points which should be considered are:—

1. High efficiency. 2. A good commutator. Sparkless collection when the brush-holder is rocked through as small an angle as possible from nothing to full load. This angle should never be more than 5 degrees. 3. Capability of sustaining the full load continuously for twenty-four hours with a rise of temperature of, say, less than 70 degrees Fahr. above that of the surrounding air. 4. Capability of taking, say, 25 per cent. overload for some hours without undue heating or sparking. 5. Sound mechanical construction, freedom from vibration, hot bearings, &c. 6. Good insulation of armature coils (mica preferred), and magnet coils. 7. A well-designed brush-holder, with adjustable pressure for brushes while running. 8. If a shunt-wound dynamo, a small increase in speed to give full voltage at full load. The actual limits allowable in 2, 3, and 4 will vary according to circumstances, price proposed to be paid, &c.

These points must be compared before a tender is accepted on the mere score of cost, and a guarantee as to points 1, 2, 3, and 4 should always be obtained.

#### EDINBURGH ARCHITECTURAL ASSOCIATION.

A MEETING of the Edinburgh Association was held on the 17th inst., the president, Dr. Rowand Anderson, in the chair. After preliminary business, Mr. David J. Vallance, curator of the Museum of Science and Art, delivered a lecture on "Decorative Woodwork," chiefly taken from the Peyre collection recently acquired by the nation. The lecture for the most part was devoted to an exposition and exhibition by means of lantern photos of the collection of French woodwork recently acquired from M. Emile Peyre, of Paris. The sum paid was 9,328*l.* 16*s.* 9*d.* For a number of years M. Peyre's collection, of which the woodwork is only a small part, had been known to several of the authorities at South Kensington, who were interested in it with a view to the purchase of a portion of it. M. Peyre for years held out against selling his collection otherwise than *en bloc*, and it was only after protracted negotiations that he agreed to dispose of a select portion of it, viz. the woodwork now under consideration, which became the property of the nation in 1895, and was in that year brought from Paris and placed under the care of the Science and Art Department. By a fortunate arrangement which enables Edinburgh and Dublin to share in such important additions to the art treasures of the nation as are conveniently divisible, the Edinburgh Museum paid 1,300*l.* of the purchase price and Dublin a similar sum, each museum receiving an equivalent share of the specimens, while the remainder found a home at South Kensington. The addition of a share of the Peyre collection to the furniture and woodwork in the Edinburgh Museum coincided, fortunately, with a structural change in the interior of the building, for this change has provided a suitable place for the display in collected form of all the decorative woodwork. At the north-east corner of the museum there was, until recently, a hall which for many years has scarcely ever been used for the primary purpose for which it was designed. For many years it has been practically closed to the public. Some time ago the director, Sir Robert Murdoch Smith, in view of the growth of the collections and of the certain necessity of their requiring at no distant day rearrangement and separation into sections, determined to make an effort to have this long-closed hall put into such condition that its area might be added to the exhibition space of the museum. His efforts were eventually successful. A floor of concrete, supported by iron girders and pillars, was laid and tiled on a level with, and in the same manner as, the rest of the museum. The space below this floor forms an ample apartment for unpacking and storage, and to add to its convenience a large door has been broken through the wall facing West College Street. This alteration, which has been in progress for several months under the charge of Her Majesty's Office of Works, has only now been completed, and the result is surprisingly successful. Instead of the closed doors and blank wall which formerly met one at this part of the museum, an open floor stretches to the extreme corner of the building and the visitor can wander at will till a windowed wall and a view into Chambers Street show him he has reached its furthest limit. This alteration adds considerably to the floor space available for exhibition purposes, but it does more; for the feeling of lightness and openness which it has brought to this part of the building seems to add much more to its spaciousness and extent than the actual measurement of the addition would have led one to expect. The new hall when it is opened to the public will be devoted to

the display of the collection of furniture and woodwork in the museum, and it was to a few of the specimens that would find a place there that Mr. Vallance directed attention. The lecturer then proceeded to show a number of illustrations of decorative woodwork taken from the Peyre collection, arranged so as to show the changes of style from the Gothic days of the fifteenth century on to the modern decoration of the Regency and Louis XV.'s time. At the close of the lecture a complete set of hand photographs of the whole Peyre collection was laid on the table for further inspection by the audience, and it was intimated that these photographs might be consulted or drawn from at the museum. A vote of thanks was given to the lecturer.

#### THE CARNEGIE MUSEUM, DUNFERMLINE.

THE old tower at the Pends which, through the generosity of Mr. Andrew Carnegie of New York, has been converted into a museum, has been formally handed over to the managing committee of the Dunfermline Museum and Archaeological Society by Mr. Hawks of Her Majesty's Office of Works, Edinburgh. The museum, says the *Press*, has been constructed for the purpose of preserving articles of interest connected with the old monastery and abbey, but it serves perhaps a more important purpose, and that is the preservation of the historic building itself. For many years the lower portion of the tower was used by the superintendent of the churchyard as a tool-house, and a complete transformation has been effected. The floors of the four apartments have been laid with small squares of Arbroath pavement and the windows filled in with stained-glass. Doors of solid oak have been provided, and a staircase also of solid oak leads from the lower to the upper room. The latter is the museum proper. It is 26 feet by 16 in size. The north window is filled in with cathedral glass, with the town's arms and motto in the centre. The south window displays the Royal Scottish Lion and motto. Mr. Carnegie's initials appear in the staircase window. It is interesting to note that the old kitchen grate of the palace has already found a place in the museum near the spot it occupied originally.

#### A GERMAN VIEW OF BRITISH ART.

THE Berlin correspondent of the *Standard* says:—The official organ of the Ministry of Public Works has published an extremely interesting article by Herr Maethaesus, Technical Attaché to the German Embassy in London, on "William Morris and the Fifth Exhibition of Industrial Art." It contains the following remarks:—"The exhibition shows the art industry in England at a stage which can only be regarded as the result of decades of earnest endeavour. Great progress has also been made during the last twenty years in other countries, and the need has made itself universally felt of arresting the grievous decline of German handicraft which set in with the classical revolution at the end of last century, and which, by the middle of the present century, had become intolerable. A return to old traditions has been eagerly sought everywhere. What, however, distinguishes England from other countries is the new and independent spirit she displays. Absolutely novel forms have been found, and the resulting ornamentation shows real creative power. England has entered on new and successful paths, while we others have hitherto contented ourselves with copying our old masters. We ought to have learned from this that mere imitation of other phases of development can never satisfy us permanently, and this very experience should restrain us from all idea of now simply adopting English achievements. What the best artists there have attained by the sweat of their brow belongs to them alone, and we shall never be able to look upon it as our property. It does not accord either with our true inner taste in any respect, and if only for this reason will never have with us more than the importance of a passing fashion. Further successful development can only be looked for if lines are followed which correspond with our national character, and through our own energetic labours, just as the leading English artists have cultivated only what their nation sympathises with. Other circumstances have, it is true, also contributed to the gratifying results the latter have in this way arrived at. Thanks to the undisturbed political and economical development which the country has enjoyed for over two centuries, forces have grown up in England which have prepared most favourable ground for endeavours such as the foregoing. These forces are chiefly the wealth of the country and the healthy domestic spirit of its inhabitants. The latter attribute is especially conspicuous in England, and redounds to the credit of the nation. An excessive influx of wealth generally brings with it, in the history of nations, a corruption of morals. The morals of England have remained comparatively clean; the cultivation of domestic life, and the preference for resi-



dence in the country, which animate even the rich, and the rich most of all, are nowhere more in evidence. In my opinion it is in this healthy fostering of domestic life, united with the existing wealth, that the conditions are to be found which are responsible for the success of industrial art. Although a strongly-developed love of home may create a desire to beautify the daily surroundings in the house by means of art, this wish can only be realised if the necessary means are forthcoming. 'Le superflu, c'est une chose très nécessaire,' says a French proverb. It is only when considerations of cost no longer play the first rôle in the household that an active cultivation of domestic art is possible. Then only are the manufacturers placed in a position to invite the first artists to prepare the designs for their productions. This has been the case in England to an abundant extent. The best artists are employed on industrial art designs, and a number of them—among them William Morris and Walter Crane—have made this the principal end of their life's work. Art and handicraft have here entered into a real confraternity, and we shall have to wait for a similar movement on our part before any striking results can be looked for."

### THE NATIONAL PORTRAIT GALLERY.

THE following acquisitions have been made recently by the trustees of the National Portrait Gallery, and will be exhibited to the public as soon as place can be found for them in the galleries.

By presentation:—

William Morris, poet and decorative artist, painted in 1880 by G. F. Watts, R.A., and presented by the artist in continuation of his former gift.

Coventry Kersey Dighton Patmore, poet, painted in 1894 by Mr. Sergeant and presented by Mrs. Patmore; accepted by the trustees, in spite of the recent event of Mr. Patmore's death, both on account of Mr. Patmore's high position in English literature and the merits of the portrait as a work of art.

John William Colenso, D.D., Bishop of Natal, painted in 1866 by Samuel Sidley and presented by the artist's son.

Amelia Opie, modelled in 1829 by P. J. David d'Angers and Sir John Bowring, modelled by the same in 1832—two bronze medallions, presented by the director.

By purchase:—

Thomas Cromwell, Earl of Essex, K.G., an early painting of the school of Holbein.

Adam, First Viscount Duncan, the victor of Camperdown, painted by H. P. Danloux.

Harriet Martineau, painted in 1834 by R. Evans.

Henry Fawcett, the original model in plaster for the alto-relievo portrait executed by Miss Mary Grant for the memorial fountain on the Thames Embankment.

Sir Francis Grant, P.R.A., and Charles Stewart Parnell—original casts from busts executed by Miss Mary Grant.

John Tradescant, the younger, who with his father owned the physic garden and museum in Lambeth known as "Tradescant's Ark," the rarities in which were given by him to Elias Ashmole, and form the nucleus of the Ashmolean Museum at Oxford; a painting attributed to William Dobson.

Thomas Cartwright, Bishop of Chester and High Commissioner for Ecclesiastical Causes under James II.; painted by Gerard Soest.

William Chaffinch, the notorious "backstairs" courtier and servant of Charles II.; painted by John Riley.

Sir Henry Sydney, K.G., Lord Deputy of Ireland, and father of Sir Philip Sydney and Mary, Countess of Pembroke; a contemporary portrait, artist unknown.

The trustees of the National Portrait Gallery give notice that the gallery will be open to the public on Sunday afternoons from 2.30 to 5.30 P.M. from Sunday, April 4, to Sunday, September 26 inclusive.

### THE COCKBURN ASSOCIATION.

THE annual report of the Cockburn Association states that during 1896 the attitude of the public towards questions affecting the amenity of the city of Edinburgh was well illustrated in connection with the discussion of sites for the Usher Town Hall, the intense and universal interest in that question contrasting strongly with the general apathy exhibited in other important matters, such as the threatened loss of the view of Edinburgh from the Arboretum, the threatened mischief to the surroundings of Holyrood Palace by the feuing of Croft-an-Righ, and the building operations now in contemplation at the Castle. The report says:—"No ordinary town could purchase with all its wealth what was at stake in the two first of these cases, or what still is at stake in the last. But the public seemed indifferent when the Town Council purchased the ground adjoining the Arboretum, and so preserved the distant view of the city, and before the Government acquired the ground called Croft-an-Righ, for the preservation of the surroundings of Holyrood, the

public maintained the same attitude of indifference as they now do while the War Office matures its plans for alterations to the buildings on the Castle Rock. No general interest in the distinctive beauties of the town for their own sake seems to exist. One of the original ambitions of the Association was the development of such an interest, but this ambition has only partially been realised. Great progress has, however, been made since the Association was founded in 1875, and the excitement caused by Mr. Usher's gift, though really due to quite other causes, should indirectly help forward the work." The report then goes on to say that "one of the most crying evils on the large scale in Edinburgh is the spread westward of dreary wastes of masonry, unrelieved by open spaces. The new town that is now rising up in the direction of Dalry spreads much on the lines of the old country roads and cross-roads, without definite plan and without open spaces." The following occurs in the reference to the Usher Town Hall:—"Mr. Usher's gift of 100,000*l.* to Edinburgh to enable the citizens to build a town hall is, from the point of view from which the Association must approach civic affairs, one of the most welcome and interesting events which has occurred within recent years. The legitimate influence exercised by the Association is, in this connection, shown by the fact that the site which had been authoritatively declared to be "on all grounds, practical and æsthetic, the best that can be got, unless at an enormous expense," has not again been seriously discussed in public since, by the intervention of the Association, the three letters printed in Appendix A (those written by Sir Noel Paton, Sir George Reid and Professor Baldwin Brown) were, through the courtesy of the Press, communicated to the public." The report afterwards details a number of points touching the amenity of Edinburgh and vicinity, to which the Association has given attention in the course of the year.

### FIGURES ON CHANCEL SCREENS.

AT a sitting of the Consistory Court of St. Albans, held on February 19 last, application was made for the grant of a faculty in respect of certain figures which it was desired to erect on the chancel screen of Holy Trinity Church, Great Bardfield, Essex. The application was unopposed, but, owing to the importance of the question raised by it, the Chancellor, Mr. A. B. Kempe, took time to consider his decision, which was pronounced at a court held on Thursday, March 18. The Chancellor said that in this case an application had been made to the Court to decree the grant of a faculty authorising the vicar and churchwardens of the parish of Great Bardfield to restore the chancel screen of the parish church by placing three figures upon it. The application was unopposed, and the parishioners in vestry assembled had unanimously expressed their approval of what was proposed to be done. In the absence of figures on the pedestals, the screen unquestionably presented a maimed appearance. From his own inspection of the church and from the evidence of the vicar, he was satisfied that there was nothing whatever in the building and would be nothing in the services which would in any way conduce to the figures being regarded as objects of superstitious reverence. The Court had not in this case to deal with the general question whether, in the absence of such special circumstances as here existed, the erection upon a chancel screen of a figure of the crucified Saviour with the accompanying figures of the Blessed Virgin and St. John ought to be sanctioned. In the determination of that question there were, as it seemed to him, two opposing considerations which would require to be most carefully weighed. On the one hand, it would appear to be most material to bear in mind that, while the Church of England before the Reformation not merely sanctioned, but, as pointed out in "*Clifton v. Ridsdale*," actually enjoined the adoration of the crucifix—a practice to which the Church of Rome still adhered—in the Church of England any such "superstitious reverence" was now, and for over 300 years had been, regarded as "a fond thing vainly invented, and founded upon no warranty of Scripture, but rather repugnant to the Word of God"; so that any practices or preaching on the part of the clergy which would tend to the encouragement of such superstitious reverence would be contrary to law. In view of this attitude of the Church, it would seem clear that in the absence of any practices or environment conducive to the payment of such superstitious reverence, or indicating the likelihood of its existence, the probability of its now being paid was not lightly to be assumed. Under the special circumstances of the case before him—and it was with that case alone that he had to deal—he could not consider that those circumstances would justify a judicial decision that there was ground for such a just and reasonable apprehension of abuse or superstitious reverence as ought to lead him to declare that these figures would not be lawful. There would be a decree that a faculty was to be granted for the erection upon the three pedestals of three stone figures, without gilding or painting, in accordance with the design deposited with the petition.



## NOTES AND COMMENTS.

WHEN LOUIS XIV. gave an architectural commission to Dr. PERRAULT, who was thereby transformed from a *méchant médecin* to a *bon architecte*, His Majesty could not have realised how much wrong was to follow. The putting of square men into round holes, and *vice versa*, was henceforth to become common in Governmental departments. The factory at Sèvres is a notorious example of the consequence of the system which LOUIS XIV. initiated. An inventory of the various directors would be enough to suggest that, as every man is made of clay, in like manner we are all born potters. Why, for example, should M. CHAPLAIN, who is one of the few great medallists of modern times, be compelled to accept an office for which he did not possess the requisite experience or the desired aptitudes? He bravely held his post for a year, but at the end of that term he was exhausted, and was compelled to resign. The Government apparently have determined to make compensation for the PERRAULT precedent, and have appointed M. SAUDIER, who is an architect. We hope he will remain longer in office than some of his recent predecessors, for every change in the directorship causes expense as well as inconvenience. Generally the first exercise of power is displayed in making costly changes. Meanwhile, the potters and artists are in revolt. They see in their various masters proofs of the indifference of the Government, and who can wonder if they also conclude that the old royal factory is on its last legs?

A PAPER on "Blue Lias Lime," which was lately read by Mr. H. J. HARDING before the Clerks of Works Association, has been published in pamphlet form (SPOTTISWOODE & Co.), and will therefore be more accessible to architects and contractors. The author rightly insists on the term "blue lias" being restricted to lower beds of the liassic series, for, unfortunately, various artificial mixtures are passed off on the public as the genuine product. If such a clause as the following, which is taken from a specification for waterworks, were generally adopted, there would be no risk of failure:—"The whole of the lime shall be thoroughly and uniformly burnt by some firm or firms of good repute from the best hydraulic limestone of the lias formation, and shall be free from overburnt lime or any impurity, and such lime shall in no case be inferior to the best blue lias lime burnt by Messrs. GREAVES, BULL & LAKIN, of Warwick." In the clause a precise standard is fixed, having a value which all would recognise, and therefore any departure from it can at once be brought home to defaulters. Another means of insuring genuine blue lias lime is to insist on having bags marked with the registered trade mark of firms of good repute. Firms of that class would, of course, in their own interest endeavour to aid in the prosecution of dealers who supply compounds that will endanger the stability of any building or other structure in which they are used. There are many suggestions in Mr. HARDING's paper which merit the attention of every one who has to employ blue lias lime.

WE suppose no modern Pope would care to have his name associated, however remotely, with ALEXANDER VI., and on that account the rooms forming the Appartamento Borgia added by him to the Vatican were kept closed for a couple of centuries. But it is hard that the fame of PINTURICCHIO as a wall-painter should be obscured because he received a commission from a pontiff who was neither of the primitive nor of the modern type. In justice to the artist, LEO XIII. ordered restoration to be undertaken. The paintings in the first or guard room are too defaced for reparation. Accordingly the walls have been covered by tapestry of the fifteenth century. In the second room, what remains of PINTURICCHIO's work has been preserved untouched, but an attempt has been made to fill up the spaces from which his work has vanished by paintings in his style on canvas. Intarsia panelling, by GIOVANNI DA DOLCI, has been placed in the third room. In the fourth room, says the Vatican correspondent of the *Times*, the old pavement has been reproduced by Professor RITROSI. This pavement is of a very beautiful design, which has been admirably carried out. A few fragments of what remained of the original floor have been placed on one of the walls.

fine chimneypiece by SANSOVINO, formerly in the first room, has been placed here. The fifth room has a new design on the walls done by Professor MORANI. The old pavement has been reproduced. In the sixth room, where the walls had no decoration before, a new design in harmony with the period has been made by Professor FRENGUELLI. An arch which formerly divided this room was removed by Count VESPIGNANI. This was a most difficult matter, and it was successfully carried out. Count VESPIGNANI has had the control of the whole work as architect, and under him the well-known Professor CAVALIERE SEITZ has been charged with the supervision and direction of it. The work of restoration has been done by Professors RITROSI, MORANI and CINGOLANI. The pavements were executed partly by the Museo Industriale of Naples and partly by Cantogalli, of Florence. The restoration of this famous apartment has been carried out in a thoroughly conservative manner. Nothing has been destroyed and only repairs, absolutely necessary have been allowed.

ALTHOUGH subways are not so generally constructed in London as in some other cities, it appears that beneath the City streets, and under the control of the Commissioners of Sewers, there exist at the present time about 2,360 yards, or nearly  $1\frac{1}{2}$  mile of subways. The lengths of gas, water and hydraulic mains, and telegraphic, telephone, pneumatic tubes, and electric lighting conduits, laid in these subways amount to a total of  $7\frac{1}{2}$  miles. Access under proper supervision is given to the officers and workmen of the various companies. The inspector in charge reports that 4,717 workmen and others were admitted during the past year for various purposes. The usefulness of these subways is evidenced by the fact that in the streets beneath which they have been constructed no openings have been made for access to pipes, &c., except those for taking pipes into the ends of the subways, since they were constructed.

THE proposal to remove Christ Church, Birmingham, which the late GEORGE DAWSON considered to be the ugliest in the country, is again giving rise to much discussion. A Bill to obtain powers is now before Parliament. The site is one of the best to be found in Birmingham, and a Parliamentary committee may ask what class of building is to be erected on it, for the amenity of the Midland city will not be promoted by the substitution of an ugly warehouse for an ugly church. Everyone who has visited Birmingham will agree with the writer of an article in the *Daily Post*, who says: "We do not want to hurt the feelings of architects or owners, but we must say that there are business premises in Birmingham—huge erections, mainly of glass and iron—which ought not, under any circumstances, to be allowed to occupy the site of the doomed church. If any such erections, dominating the open place in front of the Council House, were to be permitted, it would be a scandal, a perpetual source of discredit to public taste, and a reproach to the Commissioners who under this bill are to be entrusted to deal with the site. Whatever building is put up there should be stately in its proportions, suitable in its purposes, and should be designed in accordance with recognised rules of architectural art. In order to secure this result there should, we think, be a controlling or revising power given to some competent public body—say to the City Council, with power to call in experts to advise. We urge this all the more strongly because a good deal has already been done to spoil the immediate neighbourhood from want of such a power as that indicated. If there had been such authority vested in the governing body, we should never have had the grotesque construction which used to do duty for a post-office, nor the remarkable structure which is now used for the same purpose."

## ILLUSTRATIONS.

SALISBURY CATHEDRAL.—CHOIR AND NAVE, LOOKING WEST.

BANQUETING HALL, STAFFORD HOUSE, ST. JAMES'S.

ST. PAUL PREACHING AT EPHESUS.

See article, p. 200.)









ST. PAUL PREACHING AT EPHESUS.

FROM THE PAINTING IN THE LOUVRE.

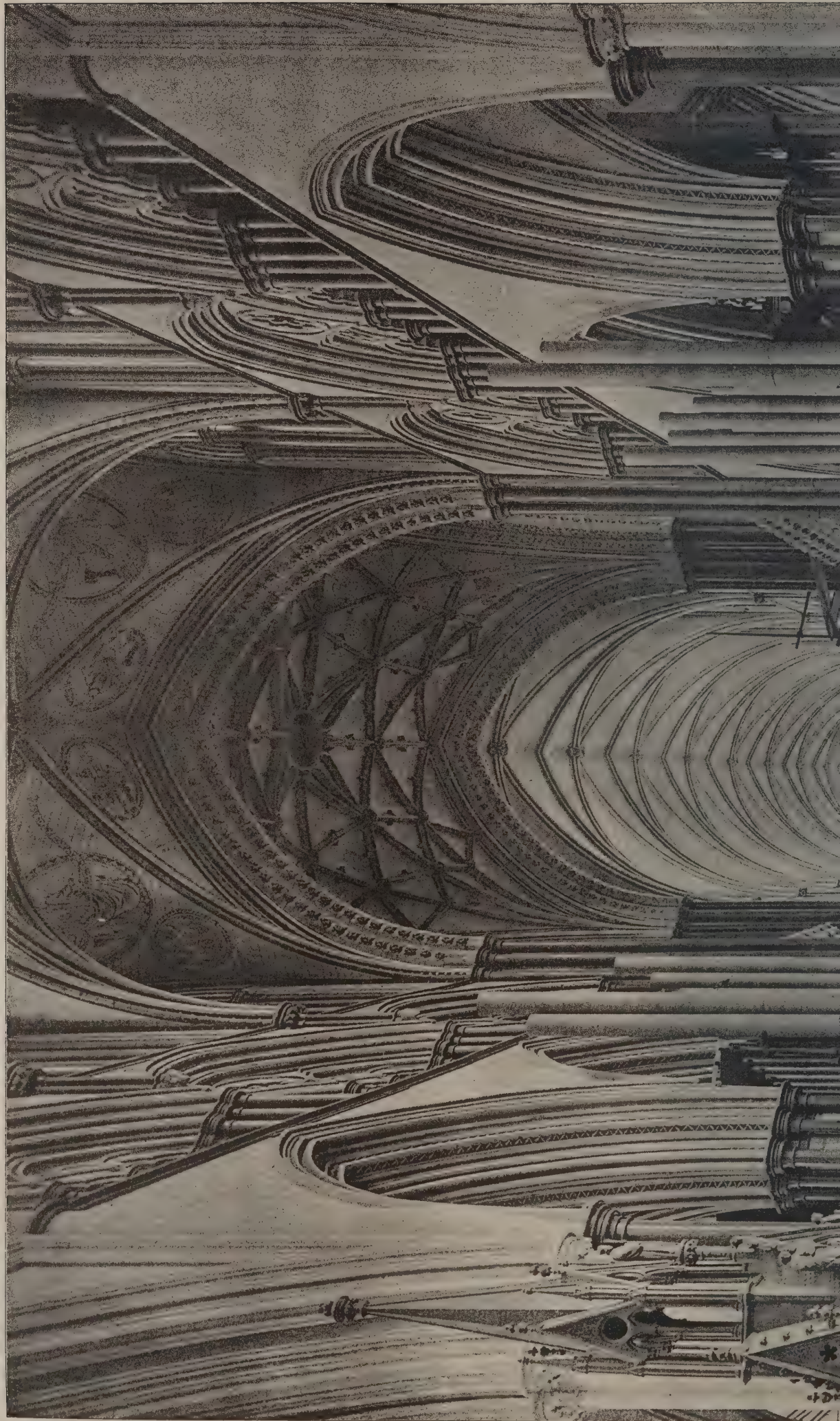
BY EUSTACHE LE SUEUR



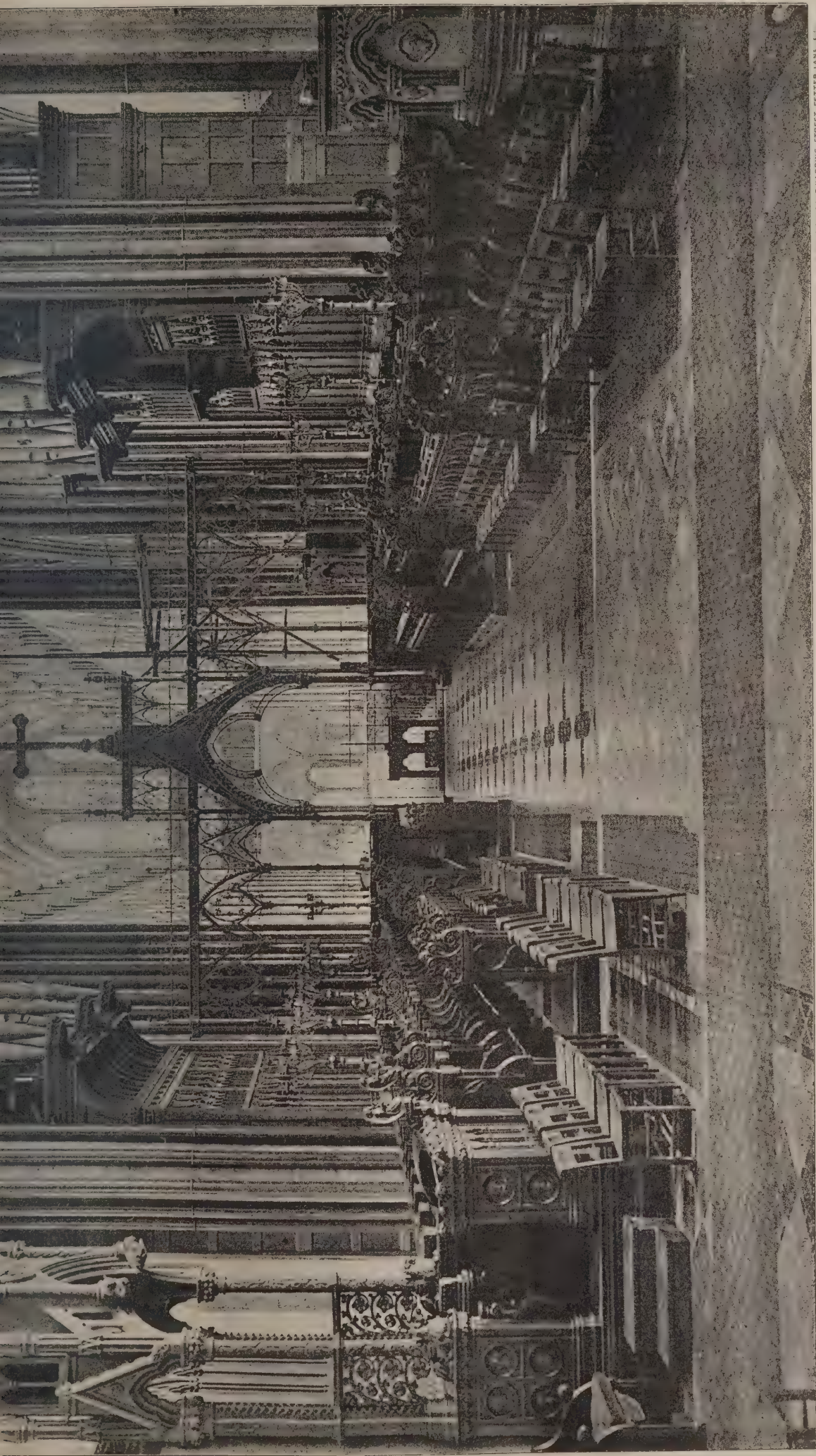




The Architect, Mar. 26<sup>th</sup> 1897







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CATHEDRAL SERIES, No. 19.—SALISBURY: CHOIR AND NAVE, LOOKING WEST.

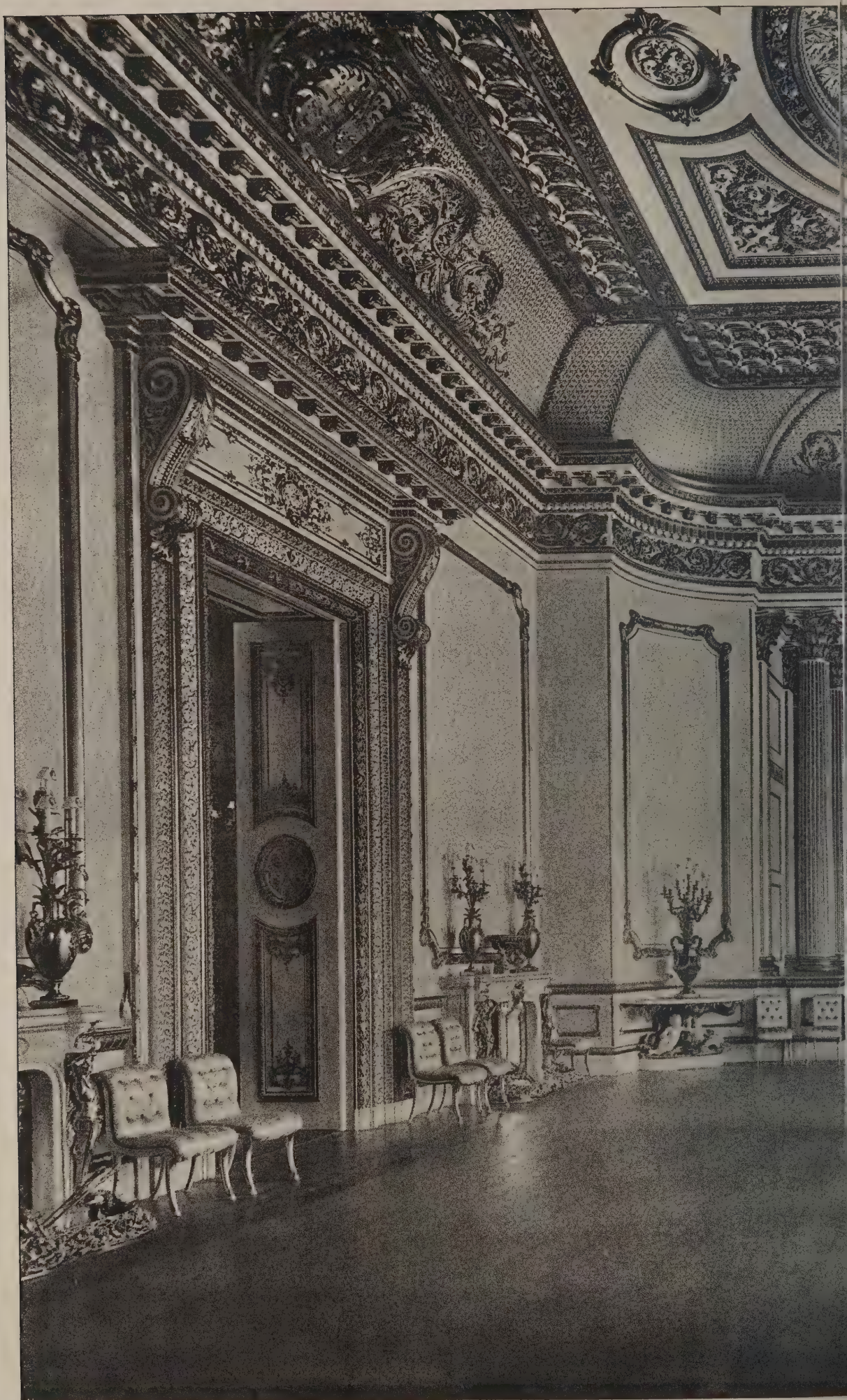












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BANQUETING HALL: STANLEY  
MANSION OF THE DUCHESS OF DEVON



Mar. 26<sup>th</sup> 1897



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RI HOUSE, ST. JAMES'S.  
DI SUTHERLAND, K.G.







## SALISBURY CATHEDRAL.

IT was the fate of each of Mr. PECKSNIFF'S pupils to improve himself during his three or five years' term "in making elevations of Salisbury Cathedral from every possible point of sight." Accordingly, among the treasures of the establishment were many rolls of drawing-paper representing the building from the north, the south, the east, the west, the south-east and the north-west, which exemplified the great development of talent under the Pecksniffian system. To DICKENS and his readers there was comicality in supposing that an English cathedral, and especially one which belonged to so rural a place as Salisbury, was worth so much labour. In 1844 a great many English people who did not read novels would agree with DICKENS. He and others were incompetent to realise that from the peculiarity of its character Salisbury Cathedral could not be delineated to excess, for its details were no less interesting than the general views from various points of sight. The majority of cathedrals have grown, and afford evidence of the process, which was often slow in operation and with long intervals between the stages. Salisbury could hardly have been raised with more expedition in the thirteenth century. If one man did not prepare the plans and direct the whole of the operations, a respect was shown for the designers' intentions which was not common among Mediæval builders. As a revelation of that peculiar unity which is found in Salisbury, there cannot be too many drawings, for the more the building is scrutinised and its parts presented for examination in one's study, the more it appears to have a sort of organic completeness.

As we have already remarked, it is an advantage to see the cathedrals and other buildings of which Englishmen are proud as others see them. In the case of Salisbury we have the conclusions of one of the safest and most learned of French archæologists. We refer to M. VITET, of the Académie Française, who co-operated with PROSPER MÉRIMÉE in directing the operations of the Historic Monuments Commission in France. He was naturally an enthusiast for French work, and the precision which is seen in Salisbury would of course appear to him to be as chilling as English manners. But the merit of every part of the building could not be overlooked by anyone who was devoting his life to the study of Mediæval art. He wrote :—

The cathedral of Salisbury, which the English regard as a type of its class, as the perfection of perfections, is undoubtedly a magnificent building. The proportions of it are grandiose ; the plan is of so simple an ordonnance, so perfect a symmetry, it can be realised by a glance. The façade is beautiful and shows delicacy of ornamentation, with the exception of the doorways, which are poor and suggestive of a village church. The building is surmounted by a spire in stone of a great height and of extraordinary richness ; there is moreover the only tower (clocher) of any importance which is to be found in England. The interior of the building has a regularity which is marvellous, but the coldness of it can hardly be expressed. The defect is owing to the entire absence of every kind of sculpture. Not one stroke of the chisel is to be discovered, nothing which suggests man's hand, nothing that is living or animated. The capitals are all alike, and are composed of two or three simple mouldings, which seem to be produced mechanically or by some turner of the legs of chairs, or they might have been formed of carton-pierre.

It is, however, easy to comprehend why Salisbury should enjoy so immense a reputation. In spite of its imperfections of detail it is, in the first place, one of the grandest and most complete of cathedrals, and then it is a picture of which the interest is increased by the framing. The greater number of English churches have the privilege of being closely united to the green sward, but probably there is not one among them which is shaded by trees so imposing and gigantic as those at Salisbury. On one side we see noble elms and the finest grass, on which the building seems to repose ; on the other a cloister, vast, silent and deserted, but so well kept, so respected, that the monks seem to have only just left it, and, when the office in the cathedral is ended, will resume their perambulations. A combination of the kind cannot be described, but at least the relief, the *éclat* it imparts to the beauties of the cathedral, can be imagined.

On entering the cloister, and following the way under the long line of vaulting, we arrive at a door which leads to a grand octagon, dazzling in its brightness of illumination, and for which we may in vain seek for a model on the Continent. It is the chapter-house. In the centre rises a tall column of

stone—rather it is not a column, but the trunk of a vast palm tree, of which the head bends down like an immense sunshade, and shelters under its symmetrical branches the whole area of the floor, the branches being united with parts of other palms which spring from the angles of the octagon.

It is impossible to imagine anything more gracious, light and majestic than this arrangement of vaulting. The fairies of the Alhambra have produced nothing which surpasses in fantastic elegance these bowers of palms, in which, too, the severest laws of taste can discover no defect, either in the curves or the planning. There is nothing to be seen in France from which a notion can be formed of so delightful an example of decoration. In the art of disposing and ornamenting their vaults it is evident the English are our masters. They have for that work a peculiar aptitude ; it enables them to exercise their imagination and their practical studies, and hence they have produced various effects which are of extraordinary richness ; but among all their inventions they have not one which is more original and more happy than the bower of palms at Salisbury.

M. VITET was a rigorous critic, but he was compelled to surrender himself to the beauty of the work of the Salisbury stonemasons. The objection he raised is very often heard at the present time. The uniform excellence of the cathedral is not a common characteristic of Gothic buildings. Accordingly, it is concluded that it is not in keeping with the style, although in Classic work a variety of degrees would be treated as not worthy of an art like architecture. What gives rise to such objection in our time is the resemblance between the work at Salisbury and modern work which is produced entirely or partially with the aid of machinery. They could not employ labour-saving machines in the thirteenth century, but it is assumed that as the masons who worked at Salisbury were compelled to sacrifice their individuality, they were not much superior to machinery. If more variety were attained in the cathedral, and if the details exhibited occasional roughness in the execution, we suppose the admiration of the building would be less qualified. Fallible men are tolerant of weakness that can no longer cause them the least inconvenience, and, on the other hand, it is not gratifying to know that a degree of perfection was attained six hundred years ago in Salisbury which cannot be easily surpassed in our time. The hesitation to admit the true value of the architecture is, however, only one of the signs of the fastidious discontent of the age. Salisbury Cathedral must be judged by another standard to what is generally applicable, and it would be vain to inquire whether the standard must be higher or lower. In Salisbury we may assume we have one man's design ; as a result there must be differences between it and buildings in which many designers co-operated. The style too is of one period, which had attained a sort of maturity, and therefore must be wanting in some of the graces which belong to infancy and adolescence. There is nothing which can be called tentative at Salisbury, for it becomes evident that every part was determined by principle which might have been expounded beforehand in a written book. Dr. JOHNSON is not credited with the possession of refined taste in judging works of art, but it would be well if some later critics would accept his opinion when he said "Salisbury Cathedral and its neighbour Stonehenge are two eminent monuments of art and rudeness, and may show the first essay and the last perfection in architecture." We may hope that some day evolutionary power will create a type of Gothic compared with which Salisbury will appear rude, but as yet that time seems remote, and meanwhile we may as well enjoy the best examples we are allowed to possess.

It would, however, be an error to believe that dissatisfaction with the excellence of Salisbury is a testimony of the more exact method of criticism which is one of the products of our age. In 1803 we find JOHN CARTER expressing himself reluctantly on the subject in a manner which is entirely modern. He says :—

Salisbury's founder and first architect, if their spirits could have leave to revisit our earth, must have known much felicity in witnessing their general plan carried into execution throughout the whole work—a work which to this day has so well endured. We who bear witness to this see a regular uniform design of one pure style of architecture pervading every part (allowing for a few partial deviations in some of the smaller lines) ; the plinths, dados, heights of windows, parapets, roofs, &c., all running in conformity, one object level with another. Consistency in architecture, as seen on the walls of Salisbury



Cathedral church, is certainly to be admired, as most creditable to the architect who has conformed to those rules laid down in the examples of the Roman and Grecian schools; yet that indescribable delight received from the beautiful irregularity conspicuous on our other cathedrals has also its consistent charm, equal, if not superior, to the squared precepts of regular design.

If Bishop POORE and his architect could have anticipated modern criticism they would not have made many sacrifices to irregularity. They were no more hampered by any restrictions or traditions than a modern architect who has to erect a church as a first step towards the development of a suburban building estate. The site was simply the most eligible spot that was to be found on the bishop's land, and it could not be supposed there was any oratory, church, or building on it in an earlier age to give rise to associations which it was necessary to respect. The cathedral which existed at Old Sarum, and which was about to be abandoned, was an object lesson to the architect. From it he could calculate how much space it was necessary to provide for the requirements of such a diocese, and it exemplified also the necessity of a change in the planning. The old cathedral was placed in the most secure position that could be provided, but the altered circumstances of the thirteenth century no longer

made it imperative to have warriors around; in fact, it was found the protectors were more dangerous to the clerics than were the populace. The plan is, therefore, most interesting, for it is an almost unique example of adaptation to the needs of ritual without any other consideration. If we assume the altar originally stood at the crossing of the eastern transepts, the suitability of the plan will be more apparent than it is under the existing arrangement. Mr. FERGUSSON, in treating the subject, says:—

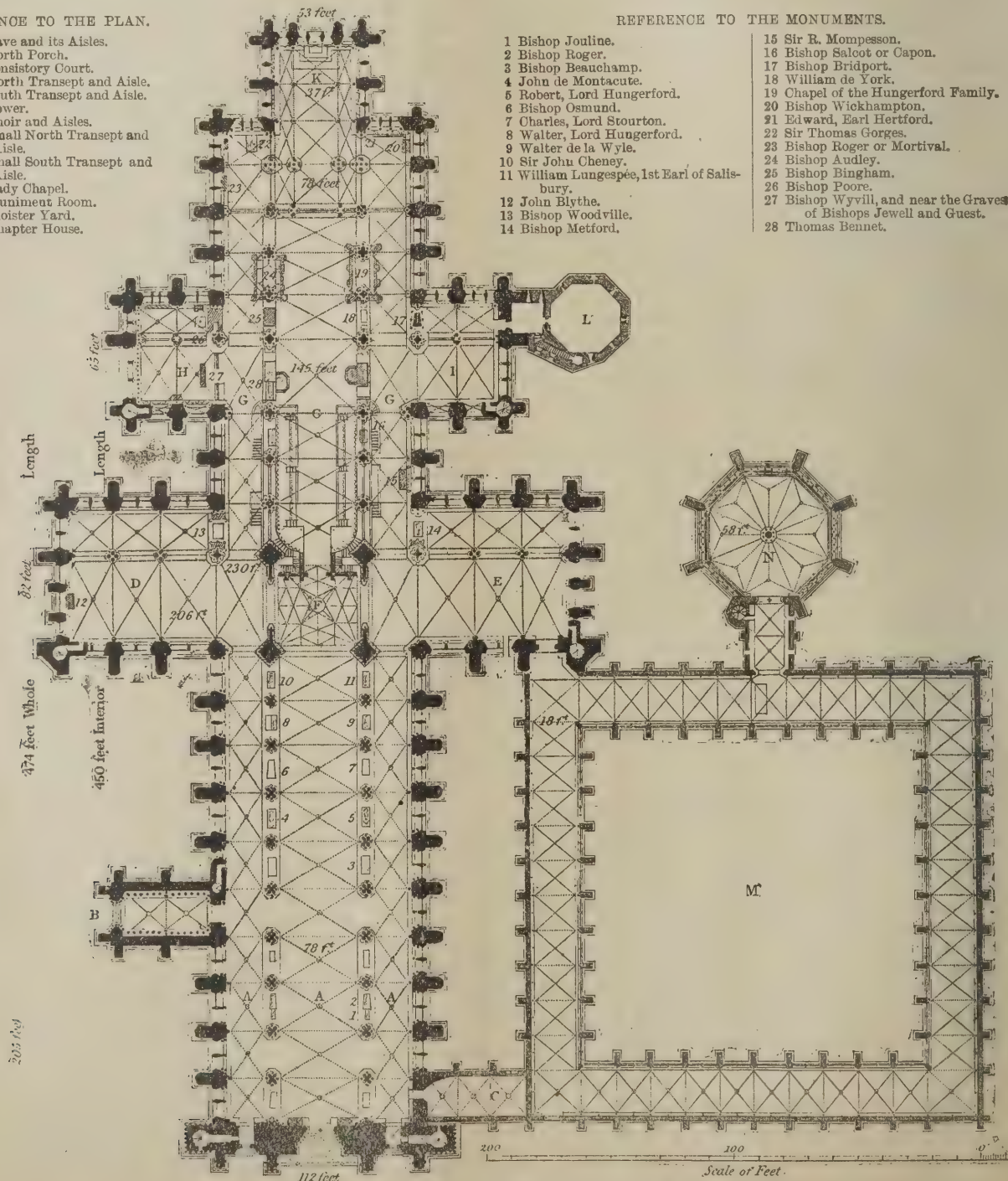
In this church we have a plan not only extremely beautiful, but perfectly original. There is scarcely a trace of French or foreign influence; everything is the result of the native elaboration during the previous century and a half. The internal dimensions, according to Britton, are 450 feet by 78 feet, a little under the English standard, but sufficiently long for effect. The apsidal arrangement so universal in Norman cathedrals has disappeared, never to return, except in Westminster Abbey (1245-69) and in some readjustments, as at Tewkesbury; and the square eastern termination may henceforth be considered as established in this country—the early symbol of that independence which eventually led to the Reformation. Once the Salisbury plan came to be considered the true English type, the Norman cathedrals were gradually modified to assimilate their arrangements to it.

## REFERENCE TO THE PLAN.

- A A A Nave and its Aisles.
- B North Porch.
- C Consistory Court.
- D North Transept and Aisle.
- E South Transept and Aisle.
- F Tower.
- G G G Choir and Aisles.
- H Small North Transept and Aisle.
- I Small South Transept and Aisle.
- K Lady Chapel.
- L Muniment Room.
- M Oloister Yard.
- N Chapter House.

## REFERENCE TO THE MONUMENTS.

- 1 Bishop Jouline.
- 2 Bishop Roger.
- 3 Bishop Beauchamp.
- 4 John de Montacute.
- 5 Robert, Lord Hungerford.
- 6 Bishop Osmund.
- 7 Charles, Lord Stourton.
- 8 Walter, Lord Hungerford.
- 9 Walter de la Wyle.
- 10 Sir John Cheney.
- 11 William Lungespee, 1st Earl of Salisbury.
- 12 John Blythe.
- 13 Bishop Woodville.
- 14 Bishop Metford.
- 15 Sir R. Mompesson.
- 16 Bishop Salcot or Capon.
- 17 Bishop Bridport.
- 18 William de York.
- 19 Chapel of the Hungerford Family.
- 20 Bishop Wickhampton.
- 21 Edward, Earl Hertford.
- 22 Sir Thomas Gorges.
- 23 Bishop Roger or Mortival.
- 24 Bishop Audley.
- 25 Bishop Bingham.
- 26 Bishop Poore.
- 27 Bishop Wyvill, and near the Graves of Bishops Jewell and Guest.
- 28 Thomas Bennet.





## THE ARCHITECTURAL ASSOCIATION.

AN ordinary meeting of the above Association was held on Friday evening last in the rooms of the Royal Institute of British Architects, Mr. W. H. Seth-Smith, vice-president, in the chair. The minutes of the last meeting having been read and agreed to, Mr. F. Bowles was elected a member.

A vote of thanks was passed to Mr. C. H. Phipps for conducting members on the occasion of the last spring visit, which was to Her Majesty's Theatre.

The Chairman read a letter from Mr. John Belcher, in which he mentioned that a work entitled "Later Renaissance Architecture in England," by Mr. Macartney and himself, was about to be published, and some plates were sent for exhibition at the meeting. It was hoped that the book might correct "the extravagant and excessive use of ornament which has vitiated the public taste of late years, and so promote also an increased regard for proportion and a greater simplicity and refinement of style."

Mr. J. A. Gotch read the following paper :—

## Eighteenth-Century Work.

The eighteenth century saw the final development of that great movement in art which began in the early years of the sixteenth. When mankind had once made up its mind that the masterpieces of Italy were the only examples to be followed, nothing but time and determination were wanted to produce in all the lands of Europe a general sameness of appearance and treatment in every branch of art. In no art was copyism so contagious as in architecture, and in no art was it so injurious. For architecture is essentially a constructional art, a fact which the eighteenth century did not realise, and a fact which wants no little reiteration at the present time, when there seems to be a tendency to neglect construction for the more attractive accessory arts, and to desert the stately queen for her more lively handmaids. A constructional art, to be healthy and natural, must develop from within and not from without.

Architecture in the eighteenth century was the Five Orders and nothing more. An old Roman, called Vitruvius, who had been dead seventeen hundred years, was dictator, and those of his followers who differed from his precepts, although sometimes excused on account of their success, were admonished to be careful how they risked any deviation from the paths of perfection pointed out by him. Gothic architecture was despised and regarded as barbarous. It was not that the votaries of the art preferred a Classic dress to a Gothic; for them the buildings erected in the Middle Ages were not architecture at all. The "Gothick Order," as they called it, is described by one of them as "the Folly and very Ape of Architecture." Such an attitude of mind is hardly intelligible to us who recognise Gothic architecture as at once the most logical and daring form of construction that man has yet employed. It is hardly less difficult to understand how they can have failed to be impressed with the majestic solemnity of a great Gothic cathedral; and yet they did fail—even such cultivated men as Evelyn and Addison. The phrase about the "very Ape of Architecture" occurs in a treatise by a lively Frenchman, M. Freart; and considering the subject, a very entertaining treatise it is. But Evelyn's views were those of a sagacious, unimpassioned Englishman, and are worth quoting at some length as illustrating the standpoint from which the early eighteenth century looked at the subject. In treating of architecture, he says :—

It is the Antient Greek and Roman Architecture only which is here Intended, as most entirely answering all those Perfections requir'd in a Faultless and Accomplish'd Building; such as for so many Ages were so Renowned and Reputed, by the Universal Suffrages of the Civiliz'd World, and would doubtless have still subsisted . . . had not the Goths, Vandals, and other Barbarous Nations Subverted and Demolish'd them . . . Introducing in their stead, a certain Fantastical and Licentious manner of Building, which we have since call'd Modern (or Gothic rather) Congestions of Heavy, Dark, Melancholy and Monkish piles, without any just Proportion, Use or Beauty, compar'd with the truly Antient: So as when we meet with the greatest Industry, and expensive Carving, full of Fret and lamentable Imagery; sparing neither of Pains nor Cost; a Judicious Spectator is rather Distracted and quite Confounded, than touch'd with that Admiration, which results from the true and just Symmetric, regular Proportion, Union and Disposition; Great and Noble manner, which those August and Glorious Fabrics of the Antients still Produce.

It was after the Irruption, and Swarms of those Truculent People from the North . . . when instead of those Beautiful Orders . . . they set up those Slender and Misquine Pillars, or rather bundles of Staves, and other incongruous Props, to support incumbent weights and ponderous Arched Roofs, without Entablature; and tho' not without great Industry . . . nor altogether Naked of Gaudy Sculpture, trite and busy Carvings; 'tis such as rather Gluts the Eye, than Gratifies and Pleases it with any reasonable Satisfaction: For Proof of this (without Travelling far abroad) I dare report my self to any Man of Judgment, and that has the least Taste of Order and Magnificence; If after he has look'd a while upon King Henry the VIIth's Chappel at Westminster; Gaz'd on its Sharp Angles, Jetties, Narrow Lights, lame Statues, Lace and other Cut-work and Crinkle Crinkle; and shall then turn his Eyes on the Banqueting-House

built at White-Hall by Inego Jones after the Antient manner; or on what his Majesties present Surveyor Sir Christopher Wren has lately advanc'd at St. Paul's . . . and compare them judiciously without Partiality and Prejudice; and then Pronounce, which of the two Manners strikes the Understanding as well the Eye with the more Majesty and Solemn Greatness. . . . In this sort have they, and their Followers ever since fill'd, not all Europe alone, but Asia and Africa besides, with Mountains of Stone, vast and Gygantick Buildings indeed; but not Worthy the name of Architecture: Witness . . . what are yet standing at Westminster, Canterbury, Salisbury, Peterborow, Ely, Wells, Beverley, Lincoln, Gloucester, York, Durham, and most Cathedrals and Minsters.

Thus far Evelyn. That Addison had no clearer insight into the nature of architecture will be seen from the 415th *Spectator*, where he says :—

Let any one reflect on the disposition of mind he finds in himself at his first entrance into the Pantheon at Rome, and how the imagination is filled with something great and amazing, and at the same time consider how little, in proportion, he is affected with the inside of a Gothic cathedral, though it be five times larger than the other, which can arise from nothing else but the greatness of the manner in the one and the meanness in the other.

The fact is that architecture to them was, as already said, the five orders and nothing more—to some of them less, indeed, since they only admitted the claims of two out of the five grudgingly and of necessity. Architecture, in their opinion, dealt almost exclusively with the external appearance, and they dismiss in few sentences such considerations as the disposition of rooms. Planning to them meant, first and foremost, the arrangement of their building in regard to its appearance, not in regard to the functions it had to fulfil. Broadly speaking, a well-designed building is as much a product of evolution as natural scenery or the forms of plants and animals. Natural scenery is almost entirely governed by the geological formation of the district. Plants and animals have assumed their various forms chiefly as the result of the necessities of their growth, which, again, are dictated by the functions they have to fulfil. And so it is, or ought to be, with a building. Architecture is not only the art of building finely, it is the art of building finely in order to comply with certain specific conditions.

This notion of architecture was unthought of by the eighteenth century, brilliant though it was, and so the chief aim of its architects was to dazzle and impress the spectator, not to please and satisfy the indweller. Lord Chesterfield told General Wade, for whom the Earl of Burlington had designed an inconvenient though handsome house in Burlington Street, "if he could not live in it to his ease, he had better take a house over against it and look at it;" a piece of advice by which many a nobleman might have profited.

It has been observed that when people take to writing about art they have ceased to practise it to perfection. So long as it is, so to speak, spontaneous, its followers need no directors; it carries them along, they do not force it. But when its natural vitality is spent and its followers are no longer borne unwittingly onwards, then spring up more or less gifted observers, who point out the ancient tracks and show how they may be continued; but unless among them be some who know what kind of force went to the making of the tracks and can kindle the fire to produce the force, all the most accurate and beautiful drawings of those splendid vestigia will not enable one single one to be repeated.

Ever since the beginning of the sixteenth century—that is, for 200 years before our period—Europe had been studying the footsteps of the Romans. For more than half that time England had thrown herself into the pursuit, and now the patient efforts of many writers were to be rewarded, and it was to be the aim of every generous patron and every architect of ability to make our English buildings as much like those of Italy as they could. Architectural design was to be a matter of rule and compass. What could be easier? The text-books gave the proportions, not only of the modern buildings of Italy—or rather the proportions of the Orders which adorned them—but also of some ancient ones upon which the sacred eye of Vitruvius himself must have rested.

Macaulay has observed that during the latter part of the seventeenth century, and the early part of the eighteenth, the heroic couplet was so much in vogue and was brought to such perfection by constant use that every poetaster could employ it with as much facility as Pope himself. So it was in architectural design. The rules were so well known that it required no genius to use them—nobody expected any skill in planning—and so the same dull propriety characterised every building that was put up. Just as in poetry it is not the polished form of the verses that marks the true poet, but the ideas contained in them; so in architecture it is not the correct marshalling of columns and the "nice conduct" of entablatures that must be our criterion, but the manner in which the whole building satisfies and expresses the wants which it is supposed to supply. Judged by this standard, how many of the designs in Campbell's "Vitruvius Britannicus" would come within the category of true architecture? And yet those volumes contain nearly all



the larger houses built in the first half of the eighteenth century. One of his designs Campbell introduces thus, "This design of my invention in the Theatrical stile is most humbly dedicated to Tobiah Jenkyn, Esq." The theatrical style, he tells us, "admits of more gaiety than is proper either for the temple or palatial style," and in that word "theatrical" lies the key to much of the designing of the period. It is all more or less theatrical, done to impress the beholder; just as in the second half of the century the laying-out of gardens and grounds was contrived with the aim of producing the effects found in the pictures of Claude Lorraine and other landscape-painters, down even to the introduction of artificial ruins.

In describing the plan of his house in the theatrical style dedicated to Tobiah Jenkyn, Esq., Campbell dwells not on the convenience of arrangement, not on the cheerful aspect of the rooms or any special contrivance for the comfort of the inhabitants, or whatever goes to make a house a home, but on the proportions of his principal apartments. "Here," says he, "is the double and single cube, the hall being 27 feet by 54 feet. Here is 18 feet by 27 feet, which is the *sesqui altera*, and 21 feet by 28 feet, the *sesqui tertia*, and you pass gradually from the larger to the lesser;" all of which may have satisfied the wants and aspirations of Tobiah Jenkyn, Esq., but do not compensate his descendants for the absence of those arrangements which make daily life tolerable.

The needs of daily life went but a little way to model the great houses of that time. Architectural grouping, in order to impress the beholder, often led to dividing the mansion into separate blocks, one for the family rooms and State apartments, one for the kitchens and servants, and one for the stables. The kitchen, therefore, would be hundreds of feet off the dining-room, a drawback against which Evelyn warned his readers, "or else," says he, "besides other inconveniences, perhaps some of the dishes may straggle by the way." Sometimes the servants' quarters were located in two detached blocks hundreds of feet apart, balancing the composition, of which the family rooms formed the centre, and joined to the latter by open colonnades. How the service of the house could be carried on with the two halves of the staff separated from each other by a five or ten minutes' walk is not very clear; but of course the mansions were not built for the servants, but a little for the family itself, more for its grand guests, and most for the casual spectator who was to admire the lordly pile as he passed by.

The servants had to put up with what accommodation they could get. Their hall might be a vaulted underground room lighted only by areas, as at Buckland in Berkshire, and their bedroom windows might look out on to the back of the parapet. The butler might have to sleep in a room without any outside wall and no direct light and air. But in those days servants were merely servants, and could hardly expect to be exempt from suffering for architectural effect when their employers were content to suffer as well, though in less degree. And they must have suffered; for, wholly apart from considerations of bad service, the family were often located in a low basement with all the weight of the state apartments over their heads. Their rooms were not contrived to catch the morning sun or to get a splendid view, or, indeed, for any particular purpose relating especially to them; but they were arranged to fill up the space beneath the great rooms of state, and if they were comfortable, it was more by good luck than good management.

The architects of those days were, in fact, more or less of amateurs, and the kind of architecture in demand was such as amateurs could supply. Pre-eminent among them—at any rate in social position—was the Earl of Burlington; and when we consider this fact for a moment, can we be surprised at the amount of unreal and theatrical design that was produced? Who could expect an earl to concern himself with the niceties of household planning? No wonder that General Wade received that advice from Lord Chesterfield, to take a house over against his new mansion and look at it. Yet all through the century Lord Burlington was looked up to as the greatest patron of art that England had ever produced, and especially of architecture. Horace Walpole extols his taste and his ability, he "had every quality of a genius and artist, except envy"; yet, withal, he cannot disguise from himself that Ripley, who was an architect by occupation (or, as they were still called in those days, a surveyor) "in the mechanic part, and in the disposition of apartments and conveniences, was superior to the earl himself."

Pope, of whom Lord Burlington was a patron, satirises Ripley more than once, but then Ripley did not belong to Pope's faction. Pope himself, in one of his epistles, points out a way in architecture which no one seems to have followed, not even the nobleman to whom the epistle was addressed. Writing to Lord Burlington, he says:—

You show us Rome was glorious, not profuse,  
And pompous buildings once were things of use.

And again:—

Something there is more needful than Expense,  
And something previous ev'n to taste—'tis Sense:  
Good sense, which only is the gift of Heav'n,  
And tho' no science, fairly worth the seven.

Towards the end of the epistle he reverts to the same text:—

'Tis use alone that sanctifies Expense;  
And splendour borrows all her days from Sense.

It is rather amusing that a sermon founded on such an excellent text should contain so much that is at variance with it. Nor can we help smiling that the earl's work should be supposed to embody the principles here laid down, when we remember poor General Wade's house, or the villa at Chiswick, beautiful no doubt in grouping and proportion, but of which Lord Hervey said, "The house was too small to inhabit and too large to hang to one's watch." Walpole, who records this witticism, has some remarks on the house which are worth repeating. It is "a model of taste," he says, "though not without faults, some of which are occasioned by too strict adherence to rules and symmetry. Such are too many correspondent doors in spaces so contracted; chimneys between windows, and, which is worse, windows between chimneys; and vestibules, however beautiful, yet too little secured from the damps of this climate. . . . The ground apartment is rather a diminutive catacomb than a library in a northern latitude." Then he adds a few sentences which throw some light on one of the motives that actuated the eighteenth century. "The larger court, dignified by picturesque cedars, and the classic scenery of the small court that unites the old and the new house, are more worth seeing than many fragments of ancient grandeur, which our travellers visit under all the dangers attendant on long voyages." There you have it—"the classic scenery," and the "fragments of ancient grandeur," which were to be rivalled by English villas.

It is from the opinions of men who lived in the eighteenth century that we can best gather the motives that underlay their actions, and therefore a further quotation from Walpole may be excused:—"It was in this reign" (of George II.), he says, "that architecture resumed all her rights. Noble publications of Palladio, Jones, and the antique, recalled her to true principles and correct taste; she found men of genius to execute her rules and patrons to countenance their labours. She found more and what Rome could not boast, men of the first rank who contributed to embellish their country by buildings of their own design in the purest style of antique composition." We have seen one of these men of the first rank, Lord Burlington, and what he did. Another was Lord Pembroke, and he is worth singling out because, according to Walpole, "no man had a purer taste in building than Earl Henry, of which he gave a few specimens, besides his work at Wilton." Now his work at the house at Wilton is about as dull as anything can be, and far behind the "theatric bridge," as Walpole calls it, which he threw over his river. This bridge is less objectionable than the other "theatric" work of the time, inasmuch as it imposes no special inconvenience on any one, but whether a bridge of this kind is in harmony with English scenery is a debateable question.

Taste, of course, was the great requisite in that age. Lady Teazle endeavoured to acquire it along with other fashionable accomplishments, to her husband's great scorn—what had she, a country-bred girl, to do with elegant expenses and fashion before she married him? "For my part," replies the lady, "I should think you would like to have your wife thought a woman of taste." "Taste!" cries her husband, "zounds, madam, you had no taste when you married me."

The extravagancies of the second quarter of the eighteenth century sprang from an indulgence in taste apart from considerations of propriety, and it was the often mentioned Lord Burlington who led to them, partly by his own work and partly by his publication of the designs of Inigo Jones and Palladio's antiquities of Rome. But it only wants a comparison of Inigo Jones's work with that of Burlington and his successors, or a comparison of Wren's with theirs, to see how those two men were really architects, while the others were but amateurs dabbling in what they did not thoroughly understand, and into the details of which they scorned to enter.

But while we cannot but feel that in the true essentials of architecture they were sadly lacking, yet we must concede that they produced striking results. One of these fine palaces, when it was surrounded by its original gardens, must have been remarkably imposing. Take Blenheim, for instance. If we regard it as a home, we must be disappointed; but as the dwelling of a great noble, living in state and surrounded with all its attendant ceremony, receiving other great nobles with their retinues, and housing them in more magnificence than comfort, in these respects it has much to claim our commendation. There is much excuse for it in the fact that it was a gift from the nation to its greatest son; it had to be splendid at all costs—yet it did not meet universal appreciation even in those days, as witness the lines of Swift—

It's very fine,  
But where d'ye sleep or where d'ye dine?  
I find by all ye have been telling  
It is a house, and not a dwelling.

Great as the progress in architecture has been within the



last forty years, it has either been imitative or eclectic. We want it to be neither, for imitation architecture proclaims that we admit the superiority of our predecessors and eclecticism is but the pillaging of former architectures and rearranging the pieces; while what is wanted is either a new creation or a new and superior development, just as man is a superior development of the monkey, or even as the Apollo Belvedere or the Venus of Milo are superior developments of the average man and woman. I have insisted in these lectures on a much more complete and thorough knowledge of the art of construction than at present exists among us, because this is the foundation of our constructive art, and without a solid foundation no permanent monument will stand, but besides this an accurate knowledge of the strains on certain features gives the rough form they, or parts of them, must take. We saw in Byzantine that the abacus of columns had to be deeper and wider to support larger piers and greater weight; that the cap had sometimes to be cubic and only superficially carved to convey the weight to the shaft. The stone rings to connect the lengths of thin shafts together in Gothic have been turned into ornamental features. Structural knowledge, however, is far from being all that we want. We know we want this knowledge, and we also know that it may be acquired; but we at least equally want, if we do not more greatly want, creative genius, either to create something new and original, or to develop that which has gone before, as nature does, or has done, in all her works. This power, however, on the æsthetic side we know not how to attain; all we know is that it is the offspring of deep emotions, high aspirations and intrepid resolves in the nation, acting on a certain love and skill in the artists. The successful resistance to the Persian invasion caused all the fine arts in Athens to blossom, and if you will consider the circumstances of the Saracen, Gothic and Renaissance epochs you will see that the arts were forced into blossom by important national achievements, and that the artists of the period only wanted this stimulus to make them achieve their brilliant successes. As individuals, artists can only contribute in a small degree to such intellectual upheavals. Their business, however, is to be ready for them. We may hope that in a short time every student will have a thorough acquaintance with construction and materials, and will have learned the art of moulding to suit the climate. We also hope that each student will strive to develop the shaping of forms so as to captivate the most refined taste, so that when the flood comes that will again float the bark of architecture, so long stranded, they may be ready to man her and steer her to new discoveries and new conquests, so that the twentieth century may be one of the most flourishing architectural epochs the world has yet seen. In that epoch I feel sure that those who were Royal Academy students will not be the least conspicuous.

But when these grandiose ideas were applied to the houses of ordinary noblemen, much as they may have been cherished at the time, those noblemen's descendants find it hard to live in their palaces, and hard to maintain them.

There is not time enough on the present occasion to dwell much on the gardens that surrounded these great houses, but they were an acknowledged part of the general design, and now that they have in most cases disappeared, the vast houses lacking their support seem more wanting in common sense than they otherwise would. Among the illustrations in Campbell's "Vitruvius Britannicus," which may be considered as the epitome of the period under discussion, there are not a few showing the lay-outs round the great houses, which were founded partly on Dutch and partly on French examples. It was, however, probably Versailles that set the example to our English nobility, though nothing was done here on so vast a scale. The Duke of Montagu, who was Ambassador at the French Court for a number of years at the end of the seventeenth century, occupied the first few years of the eighteenth, after his return, in "erecting his seat at Boughton, in Northamptonshire, after the pattern, and as his dimensions would allow, after the very model of Versailles." It must be admitted that Boughton House is a very plain copy or rather reminiscence of Versailles; at the same time, its garden and wildernesses were of unusual magnificence and size, and adorned with numerous statues and a considerable extent of canals and ornamental water, enlivened by *jets d'eau* quite in the manner of Versailles as recorded in prints.

The house itself, although of a rather plain and sombre cast, is interesting as an almost unaltered example of an eighteenth-century mansion, simply though richly furnished. Its floors are polished, its walls panelled in large panels surrounded by a bold bolection moulding, the doors are lofty and set in thick walls, the chimneypieces are simple and massive and surround wide and deeply-recessed open fireplaces. The ceilings are (many of them) by that rather dull painter, Verrio; still, they impart a large amount of character to the place. Here and there is a panelled room or a fine chimneypiece of a hundred years before, showing that the house was not erected entirely new by the ducal ambassador. The walls are hung with ancient portraits and pictures, and the floors are full of ancient furniture. Through

the heavy sashes one looks out on to the undulating park, and the long and lofty rows of trees which form part of the celebrated avenues. There are attics innumerable scattered in every direction and approached by staircases where the handrail is mitred round the plain square newels, and twisted balusters join in to the swelling string. Through these attics you may go, and down a different staircase, to find yourself in a room that you thought was a furlong off on the other side of the house. Altogether an interesting place and one that gives a good idea of the haphazard arrangement of a large eighteenth-century house.

At any rate Boughton House was a home which could be inhabited all the year round—even the state rooms; which is more than can be said of many of its contemporaries. Nevertheless, with all their drawbacks these palaces were stately. The plans look gorgeous on paper and so do the sections showing the internal decoration. The effect of the places themselves is, perhaps, rather depressing on the ordinary person, the grandeur is a little too obvious—there is no such feeling of homeliness as in the many-panelled rooms of the early seventeenth century; but when all is said, the fact remains that the architects of the later time had a very definite aim in what they did, and they achieved it.

When we leave the mansions of the nobility, and come down to the houses of the squire or the well-to-do merchant, we find ourselves in a much pleasanter atmosphere. They have a quiet dignity about them which is decidedly restful and attractive, especially those of the first quarter of the century. In later times the portico idea became too prevalent, which consisted in affixing to the front of an otherwise plain house some variation of the columned front of an ancient temple. But the earlier houses, with wide corniced eaves, simple horizontal strings dividing the rows of sash windows, and combining with the quoins that emphasise the angles; these will no doubt long continue to form the model for houses of similar use and capacity. It is just a question whether this is quite the type that suits the present age; for our wants seem to grow always more complex, and to require a more elastic style than one depending for its effect on strict symmetry and unbroken horizontal lines.

If we cannot take a wholly sympathetic view of the purely architectural work of the eighteenth century—at any rate, in its more notable examples—neither can we forget that we are indebted to it for much that is suggestive in the work that embellished the architecture, especially in wood and iron. The ironwork of that period has never been equalled in England, and it lends an air of distinction not only to great houses like Drayton, in Northamptonshire, but to little suburban villas at Hampstead. The joiner's work of the time is full of suggestions. The sash window alone was enough to revolutionise architectural treatment, and the far-reaching effects of a mitred moulding are impossible to follow. Through all the changes of two centuries these two facts have remained with us—sash windows and mitred mouldings—and there seems no immediate prospect of their being superseded. The work of the plasterer was not so admirable as that of the joiner. He had become too expert, and was able to perform prodigies of modelling and high relief, which finally undid him, and he and his art perished together.

If we are to seek inspiration from the work of the eighteenth century, we shall find it in two directions. First, in the grand schemes of house and garden combined and in the general grandeur of treatment bestowed upon the great houses of the time. Not that we are to copy any blindly; but it is very desirable to realise how much the house and its surroundings depend upon each other; and equally desirable to learn how a grandeur of manner may be acquired. Secondly, in the sober and simple houses where the plainness of the general appearance is sometimes unexpectedly broken by the quaint treatment of a door or a chimney, and where the joiner's work is full of homely lessons.

It is often from the vernacular architecture of the country that we can get the most useful hints; whereas it is the palatial architecture that gives its stamp to the period and goes to furnish the text-books. The one is for show first and use second; the other is for use first and show second. The palatial architecture of the eighteenth century was surely given to us more as a warning than as an example; but it is worthy of attention, just as all phases of architecture are which have acquired any hold on public affection, and we are not likely, in view of our present methods of study, to fall into that attitude of mind towards any style which Evelyn exhibited towards Gothic. If we bear in mind that architecture must develop from within and not from without, we shall never again become the slaves of a foreign and a dead hand as our forefathers were in the eighteenth century, but we shall go forward, as we are indeed at the present time going forward, on different paths perhaps, and at different rates of speed—sometimes not without sharp divergence of opinion as to the propriety of particular steps—but always towards the same goal, the ennobling of our *Alma Mater*, the mother-art of the world.

Mr. J. M. Brydon said the author had adopted the same



satirical spirit in criticising as the writers of the eighteenth century had. Some of the epigrams in the paper were capital, but, like other satirists, Mr. Gotch in his remarks skimmed over work and did not trouble himself by examining details. In order to understand the buildings of this period, one should go back to those days. It was an age when everyone was craving for display, and the first thing men wanted was a palace, not a home. Thus the main portions of the house were built for display and elegance. The disposition of the plan was for magnificence. It was a revival of commercial enterprise, and was accountable for what is now called the middle class. These people wanted something to live in, so that we find those homely houses with comfort stamped on them outside and in. The eighteenth century gave us houses which in themselves were very often beautiful objects in composition, but more than that, they were models in proportion—one of the elements of architecture. Sir Joshua Reynolds praised Vanbrugh because he was a master of proportion and knew how to fit everything in. In the paper the architects of that period had been spoken of as amateurs. In those days no gentleman was considered to have finished his education unless he had some knowledge of art and especially architecture. He had great pleasure in proposing a vote of thanks.

Mr. E. W. Mountford, who seconded the vote, was supported by Mr. Lovegrove and Mr. H. W. Pratt.

Mr. Gotch returned thanks.

### THE CITY OF PALLADIO.

THIS little city of Vicenza, says a correspondent of the *Manchester Guardian*, may well detain the traveller for a short time. Though it cannot take rank, from the point of view of picturesque charm, with some other Italian provincial towns, it possesses many interesting buildings and pictures, as well as most beautiful surroundings; and as the birthplace of Andrea Palladio and the chief scene of his labours, it has a certain importance in the history of art. Here one observes how much better the Palladian style of architecture is adapted for the construction of buildings intended for public pomp and ceremonial and for private luxury than for that of churches. The two principal churches of Venice which Palladio designed, S. Giorgio Maggiore and the Redentore, though hardly perhaps meriting the execrations which Mr. Ruskin bestowed upon them, are certainly very poor and spiritless attempts to graft the principles of construction of a Greek temple or Roman basilica on a Christian church; but the colonnades, for example, here in Vicenza with which Palladio masked the late Gothic town hall or Palazzo del Consiglio can hardly fail to awaken admiration. And the Teatro Olimpico, still belonging to the Accademia Olimpica, for which it was built, and used for occasional representations, with its deep-sunk orchestra and semicircle of amphitheatrically disposed seats fronting a stage with an elaborate perspective, is certainly a very interesting production of a Greek or Roman theatre. Another striking building is the Rotonda, a villa on the lower slopes of Monte Berico, built with the most ingenious regularity, with four colonnades of Ionic pillars, topped with pediments, each opening into a large circular-domed hall painted in fresco and occupying the centre of the building. Had the Rotonda been provided with a loftier central cupola it might easily be mistaken at a little distance for a domed church with four equal arms, such as Bramante intended St. Peter's to be, and of which we have an example, though a bad one, in the Madonna del Monte on the hill above. The narrow ill-paved and arcaded streets of the city are often lined on both sides with palaces, many of them the work of Palladio. Side by side, however, with the stately unadorned Palladian edifices, with their pillars and porticoes, are beautiful Gothic palaces, showing clustered windows on the first floor and graceful, lion-guarded balconies, like those which rise above the windings of the Grand Canal; and also some fine work of the early Renaissance, especially in the portals, carved fancifully in delicate low-relief, with which some of the late Gothic palaces seem to have been afterwards provided. These earlier palaces still, in many cases, show traces of the frescoes with which their façades were originally covered—melancholy ruins and fragments of form and colour, no definite designs or entire figures being distinguishable, and the plaster in many cases having peeled off in great flakes and exposed the naked brickwork beneath. Nor must one omit to mention the red towers which distinguish Vicenza, like most of the cities of the Venetian *terra firma*, making such an agreeable contrast for the eye with the edifices of grey stone and stucco; in particular the marvellously slender tower which soars to such a majestic height from the side of the Palladian Basilica in the Piazza de' Signori, and near which, again, is the pillar bearing the Lion of St. Mark, which testifies to the long subjection of Vicenza to the great Republic of the Adriatic. Another picturesque feature of the city, an interesting memory of its varied history, is the tower of grey brick, battlemented

and machicolated, of the Scaligers (who preceded the Visconti of Milan as lords of Vicenza), and which rises immediately beside the gate, Porta del Castello, by which the city is entered from the railway station. But in the main Vicenza, as we see it now, bears the impress of the genius of its famous architect of the late Renaissance, the last great architect whom Italy produced, those who succeeded him—like Scamozzi and Longhena—having done little more than imitate him in a more or less feeble manner, and prepare the way for that wretched abnegation of all genuine style which is known as Baroque architecture. Many of these Vicentine palaces have fallen miserably from their once high estate—boarded windows, courts grass-grown and occupied by stables, basements turned into banks, offices, printing establishments, and the like, all testifying to the decay or extinction of many of the ancient noblesse.

Vicenza, like every provincial North Italian town of any importance has of course its Museo and Pinacoteca, where its local school of painting may be studied. It is not a collection of first-rate interest, even for a provincial gallery, but it contains some good pictures, and is, moreover, housed in one of Palladio's finest palazzi. Vicenza produced two painters of some importance: Bartolomeo Montagna and Giovanni Buonconsiglio, who often appends to his signature the word "Marescalco," or smith, to signify his profession, or perhaps that of his father—a word still current in Vicenza. They are barely mentioned by Vasari, in that curious jumble of information, correct and incorrect, which he calls the "Life of Vittore Scarpaccia," but it seems highly probable (it is stated as a fact by Lanzi) that Montagna was a pupil of the greater Mantegna of Padua; while a certain stiffness and angularity in figures and draperies seems to indicate a possible indebtedness to Dürer, whose presence in Venice during the last decade of the fifteenth century was certainly not without effect on Venetian art. It may be, however, that certain features in Montagna which recall Dürer and the Germans are due to the intermediate influence of Mantegna. The best work of Montagna is, however, not to be found in the Pinacoteca; Vicenza itself probably possesses nothing finer from his hand than the profoundly impressive *Pietà* in the church of the Madonna del Monte Berico, just beyond the gates of the city, which bears his signature and the date 1500. It is a work hardly unworthy of the great Paduan who was probably his master; nor is the expression of grief in the faces of the women and St. John, though sufficiently violent, at all more excessive than is to be seen, for example, in Bellini's *Pietà* in the Ducal Palace at Venice, or in Mantegna's striking but curiously ugly *Death of the Virgin*—with a kind of beauty in ugliness—at the Prado in Madrid. Buonconsiglio—a rare master, of whom there are two fine examples in Venice, *S. Sebastiana with SS. Lorenzo and Rocco* in S. Giacomo dall' Orio and a group of saints, a fragment of a large altar-piece, in the Academy—is also represented here by a fine *Pietà*, decidedly the most striking picture in the room or the Pinacoteca which is devoted to the Vicentine masters, and with an arabesque of sea-horses, putti and foliage in grisaille on a green ground painted below it as a kind of predella, which Lanzi refers to as perhaps indicating his indebtedness likewise to the Paduan School. The best picture, however, by Buonconsiglio in Vicenza is the *Madonna Enthroned with Four Saints*, in S. Rocco, a noble painting not unworthy of the eulogies of Lanzi, and which, though not mentioned in Baedeker, is probably the finest work existing in Vicenza by any Vicentine master. Apart from the painters of the local school, the most interesting pictures which the city possesses are, probably, the *Madonna Enthroned with Two Saints*, by the ever delightful Cima, in the Pinacoteca; a powerful and admirable *Madonna with Saints*, by Palma Vecchio, in S. Stefano; a reported Giorgione—*Christ Bearing His Cross*—in the Palazzo Loschi; and Bellini's *Baptism of Christ*, in S. Corona. These pictures would alone suffice to give to Vicenza a certain artistic importance. The Cima in the Pinacoteca, penetrated, like all his work, by a profound religious feeling, is interesting as being his first dated picture, also as being painted in tempera (sadly damaged, alas! in places), he having soon resigned that medium for oil, under the influence of Antonello da Messina. The John Bellini in S. Corona is a fine late work, and when compared with early Madonnas by his hand of the Byzantine type, shows what an immense advance in his art he made during his long life, and how he may be said to form a link of connection between the Venetian primitives and the thoroughly matured art of Giorgione and Palma. Still, though he doubtless deserves all the praise which Ruskin bestows upon him, it must be said that, beautiful as is his later work alike in drawing, composition, tone and sentiment, his faces are almost invariably somewhat deficient in expression and character. It is possible, I think, to receive a greater amount of satisfaction and pleasure both from Cima and Carpaccio than from the more perfect work of the master who, alike in contemporary and permanent renown, far surpassed them.

Better, however, than the palaces of Palladio, better than Montagna and the other Vicentine masters, as seen in the



churches and the Pinacoteca, are the beautiful environs of the city. It is good to be almost anywhere in the country when the first fresh loveliness of spring descends upon the world, but best of all to be able to ramble in such a gracious region of hill and wood as the Monte Berico, which is famous, by the way, in the annals of Italian patriotism for the desperate but unsuccessful resistance of the brave Vicentines to the Austrian yoke on June 10, 1848. Just above the ugly white pilgrimage church of the Madonna del Monte (in the refectory of whose convent, now a house of the Servites, is a *Banquet of Gregory the Great*, by Veronese, pulled to pieces by the Austrians, but afterwards restored) there is a modest osteria, once doubtless attached to the monastery, and very possibly an albergo for pilgrims. There, sitting beneath a vine-trellis, which in summer must afford a grateful shade against the ardours of the sun, one enjoys a prospect of the little city beneath, of the green country around and beyond, and of a vast semicircle of snowy Alps, the Alps of Recoaro and Bassano, which is more than a compensation for the plainness of the fare and the acidity of the country wine. The road, which thence goes serpentine along the top of the hills, with a wide prospect on either hand—the isolated volcanic hills of Arquà, with their softly rounded summits, being seen to the left, as they rise in vaporous blue from the purple plain—must be delightful at all seasons, but never more so than now. Only the day before, at Padua, the weather had been wintry, with a cold rain falling and little signs of spring; but here were flowers, flowers everywhere, almost the first I had seen this year—violets, both the deep-hued fragrant one, Milton's "glowing violet," and the almost scentless white; the bright yellow stars and burnished leaves of the little celandine, purple and white fumitories, blue periwinkles, little fields of white wood-anemones and daisies everywhere. And down among the mazes of a little copse below the road, and afterwards in abundance in many places, I found a little violet flower peeping up from among the brown leaves of autumn, and recognised it with a thrill of pleasure. It was the beautiful hepatica, the harbinger of spring in Switzerland, where in March its delicate six or eight petalled cups, thrusting their heads above the brown forest-carpet of withered leaves before its own leaves have yet unfolded, are the first flowers which break the winter torpor of the woods. And beside it was another Swiss flower, a large hellebore, with green drooping flowers and many-fingered leaves. Nearly all the townspeople, out for their Sunday walk, laughing and happy, had flowers in their hands or bosoms or buttonholes—bunches of purple violets and sprigs of whitethorn from the hedges and handfuls of daisies. There are many pretty villas along the road and on the slopes of the hills, which are apparently well cultivated and yield much wine; and here, amid the undulations of his native hills, Antonio Fogazzaro, one of Italy's chief living novelists and men of letters, the author of "Daniele Cortis," has his summer home. Among the charms of this pretty hill district are the many field and wood paths, affording a facility for rambling from the main track which is not too common in Italy, as well as the wide, unimpeded prospect commanded by the carriage road, which keeps near the summit of the hills. Another day, descending the southern slopes of Monte Berico, I found in an open piece of sun-bathed meadow a large scarlet anemone. It was but a solitary flower, yet the whole of spring and summer seemed to be already present, in the germ as it were, in the splendid scarlet fire of its beautiful cup. And the singing of birds to their mates, the humming of bees, the flash of an occasional butterfly, and the scampering of the black lizards up and down the limestone hedges—as well as the genial warmth of the bright afternoon—all testified, in spite of the leafless oak copses around, to the advent of a spring that would soon pass, by leaps and bounds, into the fiery glow of an Italian summer.

### THE EMPEROR WILLIAM MEMORIAL, BERLIN.

THE great monument of the Emperor William I. has been unveiled in Berlin by his grandson. The *Times* correspondent gives the following account of the work:—

As early as March 1888, within a fortnight of the first Emperor's death, the Imperial Diet had unanimously resolved that a monument should be erected to the founder of the German Empire. A special commission was appointed and a free competition in designs for architects and sculptors was instituted. Models of the various schemes were exhibited, but although several of them were rewarded with high premiums none was found to conform to the ideas which the reigning Emperor and his advisers entertained regarding the form which so important a national tribute and emblem at once of loyalty and patriotism should assume. His Majesty himself took an opportunity of giving very distinct expression of his approval to the Schlossfreiheit as the most appropriate site for the monument, and he, at the same time, passed a sweeping condemnation upon all the ambitious architectural schemes which had been proposed, some of which, indeed, involved projects like the bodily removal

or elevation of the whole Brandenburg Gate and the rebuilding of the great square into which it leads, the Pariser Platz. The Imperial Diet finally decided to leave the whole question to the decision of His Majesty, who, as had been anticipated, selected the Schlossfreiheit as the site of the monument and the sculptor Reinhold Begas as its architect and author. Meanwhile, a spirit of economy as well as of general opposition had begun to inspire the Diet, and when the subject of ways and means was brought before it the Deputies, instead of voting 8,000,000 marks for the structure, as had been demanded by the Government, only consented to grant 4,000,000 marks. "Not joyfully," as Herr von Boetticher announced, did the Government accept the reduced estimate of the Imperial Diet, but Professor Begas undertook to execute his task within the limits assigned him.

Opposite the monumental west portal of the castle, named after its architect the Cosander Gate, and separated from it by the roadway of the Schlossfreiheit, Professor Begas has erected a semicircular double colonnade, the diameter of which is about 87½ yards and its radius about 44 yards. The whole edifice is set on a raised platform of white sandstone and is strongly buttressed by a wall of heavy masonry on the side next the water on which, indeed, it abuts. Either extremity of the semicircular colonnade is surmounted by triumphal cars like those on the Arc de Triomphe in Paris. The cars and the four steeds by which they are drawn are cast in bronze, and in each is borne an allegorical figure holding an unfurled standard and representing respectively North and South Germany. The semicircle of the colonnade is adorned by numerous other symbolical groups and figures, some of them representing the kingdoms of the German Empire—Prussia, Wurtemberg, Saxony and Bavaria—others art, science, agriculture and industry, and navigation. These subordinate details of the structure are the work of Begas's pupils and of other sculptors.

The bronze statue, colossal as are its proportions, does not fail to convey the features and form of the late Emperor as he may have appeared in what was his prime—though for most other men it would have been old age—the period when he was between seventy and eighty. He wears the uniform of a Prussian General, with a pickelhaube or spiked helmet and his martial cloak. The steed he rides has been magnificently modelled by Begas and is led by a genius in the form of a beautiful maiden bearing in her hand a branch of palm. The entire conception is highly symbolical. The Emperor's countenance bears the impress of calm tranquillity, and his character is conceived as being transferred from the earthly form of the mortal hero into the countenance of his immortal genius.

The pedestal is of bronze, resting on a cruciform block of granite, on each arm of which is a couchant lion in bronze. At the front and back of the pedestal are bronze shields bearing respectively the inscriptions, "William the Great, German Emperor, King of Prussia 1861-1888," and "In gratitude and true affection—the German people." At each corner stands a winged figure of Victory. On the sides are two allegorical scenes in relief representing War and Peace. In the former the Fury of War, borne on a snorting charger amid storm and lightning and bearing aloft in her hands flaming torches, is seen trampling down in her wild career a field of waving corn. In attendance on her are two demons, armed with sword and scourge. Peace is represented by a maiden with flowing hair descending from the mountains to the valley. By her side walk two children, the one bearing a palm branch, the other with a basket of flowers above his head, with which Peace is strewing the way. In the foreground kneel a peasant with his wife, their hands stretched out in supplication to the approaching maiden, while on the other side a mother and her boy are planting a young oak. In the background a shepherd is reposing amid his flock and a herdsman follows with rapt gaze the retreating figure of Peace.

The total height of the monument is 65½ feet, the equestrian statue of the Emperor measuring 29½ feet. In itself the statue is a monumental and most effective work of art, but its size seems to dwarf the colonnade behind it.

### SUSSEX ARCHÆOLOGICAL SOCIETY.

THE annual report of the Sussex Archæological Society refers at first to the success of the Jubilee celebrations, comprising a dinner at Brighton, a perambulation of Lewes, a conversation by the mayor and mayoress, an exhibition of antiquities, a visit to Arundel Castle and to Parham. Grateful appreciation is expressed concerning the hospitality of the Duke of Norfolk, Lord Zouche, for his reception at Parham, and to the mayor and mayoress of Lewes, Mr. Councillor and Mrs. G. J. Wightman. The committee regret that a fire at the bookbinders in London, necessitating the reprinting of some of the sheets, has delayed the publication of volume xi. of the collections, but they will do their best to hasten the issue. The committee express their regret at the resignation of their honorary secretary and editor, Mr. Henry Griffith, F.S.A.,



and place on record their appreciation of the services he has rendered to the Society. In his place they have appointed Mr. H. Michell-Whitley, F.G.S., as honorary editor. Consideration has been given to the desirability of promoting and fostering a photographic survey of the county, upon lines recommended by the Congress of Archaeological Societies, in union with the Society of Antiquaries of London. The matter is being dealt with by a sub-committee, and if sufficient interest is taken in the subject by the local photographic societies it is hoped some useful work in this direction might be undertaken. During the past year several valuable gifts have been made to the museum and library, including, amongst others, an early sepulchral urn, of large size, found at Eastbourne, presented by the Duke of Devonshire (a vice-president of the Society); some specimens of carved stone, discovered during the rebuilding of a portion of East Mascalls, Lindfield, presented by Mr. W. Sturdy; three curious pilgrims' bottles, found in a house in the Cliffe, Lewes, and presented by Mr. J. Huggett; a bronze celt and piece of bronze, apparently a portion of a founder's hoard, dug up at Aldrington, and presented by Mrs. Hammond; two rare engravings, representing a naval engagement off Beachy Head in 1690, presented by Mr. John Haines; and the history of the Hundred of Blackheath, Kent, an illustrated folio, presented by Dr. Henry H. Drake. The books in the Society's library have been rearranged, and a new manuscript catalogue has been completed. The tapestry in the Barbican has been rehung. The committee hope to be able to arrange during the coming year for holding, in different places in Sussex, sessional meetings for the reading of papers and the exhibition of antiquities. The present number of members is as follows:—Ordinary, 465; life, 81; honorary, 8; total, 553; showing a clear gain upon the year (after deducting all losses by death, withdrawal, &c.) of 20 ordinary members and one life member.

The receipts for the year, including 247*l.* from subscriptions and 121*l.* for admissions to the Castle, amount to 398*l.* 3*s.* 3*d.*, and a balance in hand of 220*l.* made the total revenue 618*l.* 10*s.* 9*d.* The expenses, including 75*l.* for printing volume xi. of the Society's Collections, were 422*l.* 6*s.* 3*d.*, and a balance remained in hand of 196*l.* 4*s.* 6*d.*, in addition to 566*l.* in Consols.

Mr. Michell-Whitley has been appointed as hon. secretary, and Mr. J. H. A. Jenner as hon. curator, with Mr. C. T. Phillips as hon. local secretary for Brighton and Hove. Rotherfield was chosen as the place for the annual excursion.

#### LORD LEIGHTON'S SKETCHES.

IT has seemed to some of Lord Leighton's friends that an attempt should be made to keep together for the benefit of the public a representative collection of his drawings. In no more appropriate manner can the gifts and industry of a great artist be commemorated than by securing for his country a collection of his works. It is an uncontested fact that the drawings are among the most beautiful works which Lord Leighton has left. A careful selection of these has been made, which date from his boyhood to the last months of his life. It is hoped that before long they will be placed on the walls of the house which has been offered to the nation by his sisters under certain conditions. The price to be paid for this collection, which numbers several hundreds, is 1,150*l.* Between four and five hundred pounds of this sum have been already subscribed. Any who wish to help in acquiring this collection for the public are cordially invited to send to the honorary treasurer, Mr. Henry Percy Horne, 4 Lincoln's Inn Fields, for a printed catalogue giving the price and particulars of the sketches, or to send directions to 1 Great College Street, Westminster. His Royal Highness the Prince of Wales has expressed his sympathy and his approval of the scheme.

#### BIRMINGHAM ART GALLERY.

THE Society for the Preservation of Pictorial Records of Ancient Works of Art, which has from time to time presented a number of most interesting water-colour drawings to the Corporation Art Gallery, has just forwarded, through the hon. secretary, Mr. S. C. Cockerell, two more drawings, which are now hung in the Long Gallery. The drawings are by T. M. Rooke, of the Royal Water-Colour Society, and are faithful and beautiful renderings of the two subjects selected. The larger one of the two is a fine drawing of the west doorway of the collegiate church of St. Ours, at Loches, in Touraine. This little town is one of the most picturesque places to be found in the Loire district, and the church of St. Ours is a very interesting monument of Gothic architecture, standing quite alone in its singularity. It was begun by Geoffrey, Count of Anjou, in 962. To the west of the belfry tower is a low, square, vaulted porch, or narthex, of early Romanesque work, added in the twelfth century, out of which opens the very large and perfect Romanesque doorway, which Mr. Rooke has so faithfully reproduced. It is rich in mouldings and sculptural figures, and the general design is intended to represent the Divine

Power seated, enthroned, and adored above the arch of a strange world, the portal of the Holy Place. The second and smaller drawing is a copy of one of the stained-glass windows from the cathedral of Notre Dame, Chartres. This church, one of the most magnificent in Europe, has for one of its most striking features a perfect treasure of painted glass, not to be equalled in France. More than 160 windows are completely filled with it. Those of the nave and choir illustrate subjects from the Bible and legends of the saints; in their lower compartments are shown representations of the various trades of the city, the shoemakers, basket-makers, and so on, showing that various guilds and corporations were the donors. The one selected by Mr. Rooke was presented by Thibaut of Châteaudun and the vine-dressers of the district. A compartment of the window is devoted to each of them. The other subjects in the window are Joachim and Anna, the Announcement to Joachim, the Announcement to Anna, Little Mary in her Bath, a Dream, the Meeting at the Golden Gate, and the Refusal of their Sacrifice. A portrait of great local interest has also been presented to the city by Miss Ellen G. Hill. It is the portrait of her grandfather, Thomas Wright Hill, the well-known founder of Hazelwood School, in the Hagley Road. This was the most notable educational establishment in the neighbourhood of Birmingham at the beginning of the present century. Mr. Hill began life as a brassfounder in the town, but found it uncongenial; and, having developed an aptitude for teaching in the New Meeting Sunday School, he opened a school of his own at Hill Top about 1803. He was the father of Sir Rowland Hill; Matthew Davenport Hill, recorder of Birmingham; Edwin Hill, who was at the Stamp Office; Frederick Hill, inspector of prisons in Scotland; and Arthur Hill, who was headmaster of Bruce College School. Rowland Hill assisted his father with the school, which was removed to Hazelwood about 1819. A most interesting account of it is given in the "The Making of Birmingham," by Mr. R. K. Dent. Thomas Wright Hill died in 1851. This portrait of him was painted by Mrs. Charles Pearson, whose maiden name was Dutem. She was born in 1799 and died in 1871. Early in life she married a solicitor named Pearson, who was afterwards a member of Parliament. She exhibited portraits at the Royal Academy from 1821 to 1842, two of them being portraits of Lord Mayors.

#### GENERAL.

**The Competition** for the new fire-brigade station, Aberdeen, has been decided in favour of Mr. A. H. L. Mackinnon, architect, Union Street, Aberdeen—estimated cost of design, 10,400*l.*; 2nd, Mr. A. Ogg Allan (11,000*l.*); 3rd, Mr. John Rust, city architect (11,400*l.*); 4th, Messrs. J. & J. A. Souttar (12,000*l.*). All are resident in Aberdeen.

**Messrs. Clayton & Black**, of Brighton, are the architects for the new workhouse to be erected at Kingston for the Steyning Union, which will cost from 35,000*l.* to 40,000*l.*

**Messrs. W. D. & H. O. Wills** have offered to subscribe 25,365*l.*, or about a quarter of the amount required, towards the erection of a sanatorium in Bristol.

**The Government** consider that 75,000*l.* will suffice for the expenses of the British section in the Paris International Exhibition. For the expenses of the German section 5,000,000 marks, or 250,000*l.*, will be allowed.

**An Art Gallery** is to be erected in Bath as a memorial of the Queen's reign. The money will be provided by a bequest of upwards of 8,000*l.*, supplemented by subscriptions.

**The Leighton Memorial Committee** have decided to entrust the execution of the work to Mr. Brock, R.A. There will be a recumbent figure in bronze of the late President of the Royal Academy in his peer's robes. When finished it will be placed in St. Paul's Cathedral.

**A Syndicate** has been formed to erect a new theatre at Tunbridge Wells. Mr. John P. Briggs, of Effingham House, Arundel Street, has received the appointment as architect.

**The Receiving Day** for pictures intended for the forthcoming exhibition of the New English Art Club at the Dudley Gallery is fixed for Monday, March 29th, and the jury has been elected as follows:—Mr. P. W. Steer, Mr. F. Bate, Professor Brown, Mr. H. Tonks, Mr. G. Thomson, Mr. M. P. Lindner, Mr. G. L. Henry, Mr. B. Sichert, Mr. A. S. Hartrick and Mr. A. Tomson. It will be necessary for non-members of the club to procure the written invitation of two members to submit not more than two works to the jury.

**The Members** of the Edinburgh Architectural Association will to-morrow visit Hatton House. This is a large mansion, comprising a keep of the L plan, closely surrounded by a seventeenth-century mansion house, ornamented with several round towers. The building is in fine preservation and stands in the centre of an old garden, ornamented with arbours, terraces, statues and walls. Hatton belonged to the Lauder family and passed by marriage in the seventeenth century to the Maitland family—the Earls of Lauderdale.



# The Architect.

## THE WEEK.

A CASE which was heard lately in the Ripon County Court is instructive. Mr. MALLINSON, architect, sued Mr. TREES, a contractor, to recover 30*l.* 5*s.* for quantities prepared of almshouses at Ripon. There was a competition in 1890, when the plaintiff was successful. He drew the plans and got out quantities, which were approved in April 1891. The defendant was accepted as contractor. The plaintiff was, however, informed that the trustees of the almshouses did not propose to use his plans. His solicitor afterwards applied to the contractor for the payment of 30*l.* 5*s.*, and threatening legal proceedings. In reply it was stated that, as the plaintiff had ceased to be architect, he could have no claim on the contractor. At the trial Mr. MALLINSON gave evidence, and said that his quantities and specifications were new. As Judge TURNER accepted the statement, he held that the plaintiff was entitled to payment, and gave judgment for the amount claimed with costs. The case is interesting, especially as it does not appear that the plaintiff's plans were used.

In their last report the Council of the Surrey Archæological Society express regret that the deficit on the yearly account shows a slight increase; this is partly to be accounted for by the increased rent which has fallen upon the Society since the loss of the part tenancy of the London and Middlesex Archæological Society. Up to the present the Society has been unable to secure another tenant. In order to lessen this deficit and to keep the annual expenditure within the annual income, it will be necessary, unless a large addition can be made to the number of annual subscribers, to cut down the size of the "Collections," and reduce the number of illustrations. To a certain extent this has already been done. To further reduce the expenditure on this item will only tend to impair the efficiency of the Society's work. The losses by death and resignation have been unusually heavy during the past year, and the number of new members elected has only been small. The number of members now stands at 297, viz.:—Annual, 202; life, 93; honorary, 2. During the year 7 new members were elected, viz.:—5 annual and 2 life. By death the Society has lost 8 members, viz.:—3 life and 5 annual. By resignation, 10 members. Total, 18; loss over gain, 11. The Council for some time past have had under consideration the advisability of raising the life composition, as at the present rate of interest the composition is found to be unremunerative. At the annual meeting it was accordingly decided that henceforth the amount to be paid will be 7*l.* 10*s.*, with the usual entrance fee, an increase of 50 per cent. Mr. MILL STEPHENSON, one of the honorary secretaries, has resigned his office. Viscount MIDDLETON, the president, said he considered, on account of the state of the finances, that the headquarters of the Society should be removed to Guildford, and by having a home in Surrey more subscriptions were likely to be attracted.

A CASE was lately heard before Mr. Justice WALKER at Victoria, British Columbia, in which the plaintiff, a contractor, claimed damages from the trustees of a church for delay in furnishing him with plans and specifications, in addition to extras, amounting in all to 7,869 *dols.* The judge's remarks would be worthy of the English High Court. He said:—"Building contracts, like all other contracts, have, according to a well-known rule, to be construed by the Court; and as plans and specifications, when referred to in the contract, form a part of it, they are, of course, included in this rule. Hence the question of what are and are not extras in the present case depends on the contract and the specifications, and is a question for me to determine; and even had I left it to the jury, their opinion, however sound, would have been inoperative. My object was to get their valuation of the work charged for, so that if the plaintiff should be entitled, according to the construction of the contract, to the benefit of any item

so valued, I would be enabled to give it to him. Before dealing with each of these items, as I propose to do in their order, it may be useful to quote the first paragraph of the contract, which speaks for itself, viz.:—"The specifications and drawings are intended to co-operate, so that any works exhibited in the drawings and not mentioned in specifications, or *vice versa*, are to be executed the same as if mentioned in the specifications and set forth in the drawings." Although the jury recommended that several items should be treated as extras, the judge declined to allow any which were specified or appeared on the drawings. The plaintiff therefore obtained only 130 *dols.*, while the defendants on a counterclaim were awarded 300 *dols.*

AMONG the models in the South Kensington Museum is one of a portion of the "stanze" of the Appartamento Borgia in the Vatican. In 1885 the museum authorities obtained permission to have it made, and in 1888 it was completed and forwarded to South Kensington. The delicate relief decoration of the groins and bands was executed in the model by Signor ADOLFO CONSOLANI, and the copies of the frescoes were painted by Count LEMMO ROSSI SCOTTI, of Perugia. The frescoes represented in the model are *St. Catherine before the Emperor Maximin*, the *Escape of St. Barbara*, and the *Visit of St. Paul the Hermit to St. Anthony*, by PINTURRICCHIO. The subjects of the paintings on the ceiling are scenes in the story of OSIRIS. It is believed that the construction of this model aroused great interest in this suite of rooms at Rome, with the fortunate result that His Holiness Pope LEO XIII. ordered the books belonging to the Vatican library, until recently kept on shelves placed against the walls of the Appartamento, to be removed, and arrangements were made so that the public might have access, a privilege until now exceedingly difficult to obtain.

THE TAYLOR art scholarship and prizes were awarded in Dublin on Tuesday. The judges were Viscount POWERSCOURT, appointed by the Royal Dublin Society; Mr. NATHANIEL HONE, R.H.A., appointed by the Royal Hibernian Academy; Mr. WALTER ARMSTRONG, Director of the National Gallery, appointed by the trustees of the will of Captain TAYLOR. The following awards were made:—Class I.—Scholarship 50*l.*, Miss ALICE M. LATIMER; prize 15*l.*, Mr. WILLIAM N. M. ORPEN; prize 5*l.*, Miss FRIDESWIDE S. PERROTT; extra prize 5*l.*, Mr. DAVID GOULD. Class II.—Prize 10*l.*, Miss E. M. RICHARDSON. Class III.—Prize 10*l.*, Miss FRIDESWIDE S. PERROTT. Mr. GOULD is a student in the Belfast School of Art. The other prize winners studied in the Metropolitan School of Art, Dublin, of which Mr. BRENNAN is head master.

MR. ALDERMAN KENRICK, M.P., has presented four panels to the Birmingham Town Hall which were designed and executed by students of the School of Art. They are as follows:—"Instrumental Music," by Mr. SIDNEY H. METEYARD; "Vocal Music," by Mr. HENRY A. PAYNE; "Lench's Trust Almshouses," by Miss KATE E. BUNCE; "Dr. Sacheverel," by Mr. BERNARD SLEIGH. The estate committee have expressed to Mr. Alderman KENRICK their hearty thanks for his generous gift. The return of the number of days and the purposes for which the use of the town hall was granted or let during the year 1896, shows 151 gratuitous lettings, as compared with 179 in the previous year, and 22 lettings on payments, as compared with 27. The number of free organ recitals given during the year was 34.

A CONVENTION of brickmakers has been held at Buffalo at which the subject of efflorescence was considered. The conclusion arrived at was that the solution of the difficulty lies in slow firing and drying, and in maintaining as large a flow of air as possible through the kiln until the water smoke shall have evaporated the moisture.



## PLASTERING.\*

THERE are books which resemble one class of men, for they appear to be destined to ill-luck. We hope Mr. MILLAR's volume on plastering is not to be numbered among them, but there seems to be a fatality about it. He is a working plasterer who was ambitious to write a comprehensive book about his craft. He prepared himself by study, travel, experiment and discussion with fellow workmen. He made some progress with the composition, but "troubles came upon him—illness, misfortune, domestic afflictions and last of all a fire, which not only bereft him of house and home, but burnt all his treasured manuscripts and drawings and all he had written for his book." Mr. MILLAR was no more daunted than his countryman, THOMAS CARLYLE, when the "French Revolution" was consumed. He set to work anew and prepared the manuscript and drawings, but the failure of the publisher to whom he confided them disappointed his expectation. The result of a third attempt is now before us in the shape of a volume measuring 11 inches by 10 inches by 2 inches and weighing half a stone. Fortunately for him, Mr. BATSFORD came to his rescue, and to the publisher's enterprise we are indebted for a miscellany which is so vast it might be called an encyclopædia of plastering. It is easy to understand why any one who has had experience of books, like Mr. BATSFORD, should endeavour to enrich technical literature with a work which is unique. The "practical treatise" has all the qualities which such a title should suggest. In its pages the subject is treated as if plastering were the most important of the decorative arts which attend on architecture. A page or two will be enough to suggest that the author is not only a master of his craft, but is possessed by pride in its importance, and such a combination is not to be met with every day by those who have to trade in the literature of technical subjects. It is no wonder an experienced publisher should be eager to launch the volume at the present time. We would advise those who may wish to have the book not to judge of its character by the frontispiece. That is a reproduction of the certificate of membership of what is called "The National Association of Operative Plasterers." Nearly all plates of the kind are hideous, but the Plasterers can claim to possess the worst of all. It is supposed to be an architectural composition, and it suggests how little is known by men who have to assist in the completion and adornment of buildings about the simplest architectural forms. As Mr. MILLAR professes his admiration for the design, he compels his readers to believe he is also deficient in knowledge, and that what he says about form should be skipped. The illustrations of his own work, however, suggest the possession of more than the average designing power, and his selection of subjects is generally creditable to his taste. Mr. MILLAR, we are afraid, accepts the certificate as one of the outward signs of trades unionism, and is willing, in common with a host of men, to sacrifice his judgment to comradeship. But we doubt whether the National Association of Operative Plasterers will in return be munificent enough to purchase one copy of his volume.

The art of the plasterer is one of the oldest, for the early builders could hardly fail to observe what an excellent medium for concealing defects was offered by plaster. It also lent itself to simple as well as elaborate adornment of a building. Mr. MILLAR has ascertained that the Egyptians were as familiar with "three-coat work" as any operative in London. The plaster was made from gypsum, and when used on partitions the stucco was "laid on reeds, laced together with cords for lathing, about  $\frac{3}{4}$  of an inch thick, barred and finished just as we do now." The Greeks used plaster not only in buildings but in paintings. A nephew of PHIDIAS made a ground of stucco mixed with milk and saffron and polished with spittle rubbed on by the ball of the thumb. Mr. ROBINSON says he found at

Agrigentum plaster from one of the temples existing in a perfect state, and not thicker than an egg-shell. The illustrations of plaster-work from Rome and Pompeii reveal the exquisite forms which were produced in the first century. They seem to be enlargements of antique gems. But we cannot follow the history of the art. During the Renaissance stucco was in universal use, and in England it would be hard to say when the people were entirely ignorant of its utility. Experience suggested the edict of King JOHN in 1212, which commanded that "all houses which till now are covered with reed or rush, let them be plastered within eight days, and let those which shall not be plastered within that time be demolished by the aldermen and lawful men of the venue." The Plasterers' Company dates from 1501. In England and Scotland we have countless proofs of native and foreign skill. A very large number of examples will be found illustrated in Mr. MILLAR's book.

In treating of history Mr. MILLAR has to depend on intrinsic evidence. But in dealing with materials and operations he is able to utilise his own varied experience. He appears to be impartial throughout, and his abstracts and descriptions will be useful to practical men. The subject may appear to be dry, but plastering, like other things, has its curiosities, and the selection of materials is one example. Thus in one paragraph we read:—

The admixture of various materials with lime and with plaster to form stucco is referred to by many ancient writers. Pliny mentions fig-juice as being mixed with stucco. The Egyptians mixed mud from the Nile with plaster for some of their work. Elm-bark and hot barley-water was mixed with the stucco for Justinian's Church of the Baptist, Constantinople. We find bullock's blood employed for this purpose as well in mortar for Rochester Cathedral in the latter part of the ninth century. Bishop Gundulph (1077-1108) is stated to have mixed blood with lime to make it hard. Hot wax mixed with lime was used at Rockingham Castle in 1280. White of eggs and strong wort of malt were mixed with the lime used for Queen Eleanor's Cross at Charing Cross in 1300. Pitch and wax were mixed with the lime used for Edward II.'s works at Westminster in 1324. Mediæval builders habitually used beer, eggs, milk, sugar, gluten, &c., for mixing with mortar for cathedrals. Frequent entries found in the archives prove this. One reads, "For beer to mix with the mortar." Bess of Hardwick's masons used beer in their mortar, having to melt it in the cold winter of her death. Old plaster is found to have rye straw mixed with it for binding, and was very strong. A brown substance, somewhat like plaster but full of fibre, was in use in the sixteenth century. The accounts for the repair of the steeple of Newark Church in 1571 contain an entry, "6 strike of malt to make mortar to blend with ye lyme and temper the same, and 350 eggs to mix with it." During the building of the Duke of Devonshire's house at Chiswick, the exterior of which was plastered with stucco, the surrounding district was impoverished for eggs and butter-milk to mix with the stucco. Peter le Neve's mention of rye dough stands not alone, as Sir Christopher Wren's "Parentalia" (1750) records the use of "marble meal" as the old and still the modern way of stucco-work in Italy. "Marble meal" simply meant marble dust ground as fine as meal. This dust was used for fine work. Sugar and the gluten of rice are used in Ceylon and India. The Chinese use a rich unctuous earth in combination with lime. In some parts of France urine was used with plaster in the sixteenth century. Nearly all these admixtures are to retard the setting, to allow more time for the manipulation of the stuccoes. Some are to accelerate the setting, and some are to increase their ultimate hardness.

As the book has been written by a workman, it is needless to say that curious facts derived from the by-ways of history of plastering form a very small portion of the pages. The greater part treats about the execution of work, and deals with such subjects as materials, lime plastering, decorative ceilings, running diminished and circular mouldings, exterior plastering, modelling, moulding and casting, model and running mould making, gelatine moulding, fibrous plaster-work, reverse moulding, compositions, scagliola, foreign plaster-work, terra-cotta, concrete, &c. As the book is a large quarto the plates are on a scale which allows detail to be manifest. It would be paying a poor compliment to Mr. MILLAR to say that there is more information on the subjects he treats in his pages than in any other book on plastering in the language. Compared with its predecessors his massive volume appears like a giant beside dwarfs. What is more, the information is expressed in such a way that the book is almost fascinating. The author appears to be a thorough craftsman by nature, and hence he is proud of the ability of many of his fellow-workmen. He does not puff himself, although apparently his works are deserving of praise. We imagine the book is produced through enthusiasm rather than from a desire to make

\* *Plastering: Plain and Decorative.* A practical treatise on the art and craft of plastering, including full descriptions of the various tools, materials, processes and appliances employed; also of moulded or "fine" concrete, as used for paving, fireproof stairs and architectural dressings; together with an introduction treating of the history of the art, with numerous examples. The whole fully illustrated with fifty-three full-page plates and about 231 smaller illustrations (comprising 506 figures) in the text. By William Millar, plasterer and modeller; with an introductory chapter by G. T. Robinson, F.S.A. London: B. T. Batsford.



money, for so large an amount of printed matter and so small a price will not be likely to allow of a large balance in the author's favour. The book is of phenomenal cheapness and interest, and we cordially recommend it to our readers. As an example of the comprehensive nature of the volume, we take the following description of methods for preparing architectural models :—

Various materials are used in the construction of architectural models. Cardboard or thin slabs of fibrous plaster are generally used for large, plain surfaces. Corrugated paper is useful for many parts of cardboard models. Paper models are fixed with wax, glue, wire, &c. Water-colour is used for getting any desired tint. Liquid wax is sometimes spread over cardboard surfaces on which sizes and forms of stones, &c., can be shown by indentations and modelling. French putty is sometimes used for sketch models. It can be coloured with powders, and when spread over cardboard readily takes any form of surface. It is, however, too soft for permanent work, and is only used for trial work or for temporary purposes. Modelling wax, also paraffin wax and Venice turpentine, dissolved together, are excellent materials for surfaces. Powdered colour will give any tint, and any desired texture is obtained by the mixture of suitable materials, such as silver sand, bird sand, marble dust, granite dust, cork dust, &c. Ground rice gives a fine granulated surface, and French chalk a soft, silky one. Wax gives the best results, as it takes and retains both colour and texture with permanence. Fibrous plaster slabs for the construction of architectural models may be cast to the desired sizes, or large slabs cut up to fit the various parts of the model. Mouldings may be "run down" and then fixed as required. A better way is to cast them with the slabs in one piece. Ornamental parts may be cast in a similar way, or they can be worked on the model in modelling wax, gesso, or plaster. Small models may be entirely constructed of modelling wax. A plaster core is fixed on a modelling board to reduce the quantity of wax and steady it while being modelled. Architectural models may also be entirely composed of fibrous plaster. The model is first made in plaster or modelled in clay and then jelly moulded, and a fibrous plaster cast obtained. This is a good and economical method where a strong or permanent model is desirable. The cast being in one piece, without joints, it combines lightness with strength. It can also be made in sections to show the interior. The model can be coloured as required. If necessary it may be further hardened to resist damp and wear by the same process as described for fibrous plaster.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### ELECTRIC POWER.

THE transmission of power in factories is one of the subjects which is always of interest to manufacturers, and is therefore worthy of the careful consideration of architects when designing a factory and its arrangements. There is the question, "Is it better to have one engine supplying the whole works, or many separate ones?" and the same question referring to boilers, &c.

The enormous waste of power in shafting is very seldom realised, and the small power taken by most machine tools is almost never appreciated. The effect of what is called "load factor" (i.e., the ratio of the work actually performed to that which would have been done if the machinery had been working at the heaviest load for the whole of the time of running) is not understood, and manufacturers pride themselves on an engine which uses, say, 2 lbs. of coal per indicated horse-power per hour, while they would be seriously perturbed if they knew the pounds of coal per actual horse-power used usefully: it would certainly be over 20 lbs. in most cases, and often forty.

This state of things is due to the fact that the dead load of shafting is usually far more than the power used on the machines. This disadvantage is often got over by placing separate and comparatively small engines in each workshop or room, thus saving the shafting transmission; but even then, if the different engines are far apart, the losses in steam piping are heavy and the steam is wet when it reaches the engines, and consequently bad economy is the result. The boilers may, of course, be subdivided, one being near each engine, but in that case more stokers would be needed and too great an expense incurred.

The inefficiency of small engines is not really grasped until proper tests are made. An example may be given of a works in which there were seven engines of from 4 to 25 horse-power each. These engines took from 36 lbs. of coal per indicated horse-power in the smallest to 8.5 lbs. per indicated horse-power hour in the largest, at a fair load.

(These results are taken from a paper read by Mr. U. C. MOUNTAIN before the N.E. Coast Institute of Engineers.)

A table giving the results of the tests on average electric motors at full load, 3.5 lbs. of coal per electrical horse-power being required (at motor terminals), is here given :—

Effective Horse-power.	Commercial Efficiency.	Lbs. of Coal per Horse-power Hour.	
		Half Load.	Full Load.
50 and over	90	4.87	3.9
40 " "	88	5.00	3.95
25 " "	85	5.12	4.10
15 " "	80	5.47	4.37
5 " "	75	5.80	4.66
3 " "	70	6.25	5.00
1 " "	65	6.72	5.38
$\frac{1}{2}$ " "	60	7.29	5.83
$\frac{1}{4}$ " "	55	7.92	6.36
$\frac{1}{8}$ " "	50	8.75	7.00

Tests on actual small steam engines in use in works at Birmingham have given the figures below :—

Maximum Horse-power.	Nominal Horse-power.	Average Indicated Horse-power in Test.	Coal per Indicated Horse-power Hour.	Probable Coal per Actual Horse-power Hour.
50	20	20	8.5	11.8
30	15	8.6	18.13	22.65
7	4	3.0	36.0	45.0

Comparing the results of the steam engines and electric motors :—

7 horse-power steam, 45 lbs. of coal; 5 horse-power motor, 5.8 lbs. per brake horse-power hour.

30 horse-power steam, 22.65 lbs. of coal; 25 horse-power motor, 5.12 lbs. per brake horse-power hour.

50 horse-power steam, 11.8 lbs. of coal; 50 horse-power motor, 4.87 lbs. per brake horse-power hour.

Thus there will be seen to be a considerable saving by using electric motors, especially in the smaller powers, instead of isolated steam engines. This saving is not the only one; it is obvious that the loss of energy in steam pipes will be much greater than that in cables conveying current. The first cost of the steam pipe is also much higher. As before explained, it is not economical to have too many isolated boilers, and consequently long lengths of steam piping are necessary in a works which covers a fairly large area.

From tests made by Mr. HY. DAVEY, M.I.C.E., on steam piping, the following results have been obtained. A steam pipe  $7\frac{1}{2}$  inches in diameter, 1 inch thick, and 1,100 feet long, steam pressure 45 lbs. per square inch, was tested. It was covered with a non-conducting cement.

This pipe condensed continually 500 lbs. of steam per hour, and 750 lbs. when the engine was working. A  $7\frac{1}{2}$ -inch pipe would, under these conditions, be supplying a 100 horse-power engine as a maximum; consequently, assuming that the engine required 30 lbs. of steam per indicated horse-power per hour, i.e. 4,000 lbs. of steam per hour, the efficiency is 84 per cent. when working, and when not working there is a continual waste of 500 lbs. per hour, or one-eighth of that required for the engine. These results are rather favourable to the steam piping, as no account has been taken of the fall in pressure when working; also the pressure is low, and a few pounds fall of pressure is a large percentage. Another point is that, owing to the low pressure of the steam, the radiation is very much less than would be the case for a higher pressure, and as a set-off against this the engine would require to be a large one to give 100 horse-power with this low pressure. An electric cable to transmit this power, with, say, a 5 per cent. loss at full load, would cost very much less than that of steam piping, and there is no loss when standing idle. It may be said that when idle the steam pipe may be shut down, but this is not the case with such a long main as this. Continual warming and cooling will cause great deterioration of the joints, &c., and even if it is shut down the loss is much greater at all loads, and especially light loads, while the loss in the cables for a motor is low and strictly proportional to the load.

Up to the present the advantage of motors for fairly large powers scattered over a comparatively large area has been discussed, and it is certain that there is a great field of usefulness for them under these circumstances.

There is, however, still another field for the electric motor—that of subdivision in the workshop or room itself. The importance of subdivision in each shop is not grasped at present, and there is perhaps some doubt as to its advisability



in all cases. It is, however, evident that, if the loss in counter-shafting is known, and if the load factor on the engine is known, and also its efficiency, it is easy to calculate as to how far subdivision is economical, and it can be worked out in any particular case.

It may be generally taken that where the machines are run continuously (such as spindles in cotton mills, &c.) there is no advantage in subdivision. When the energy wasted in shafting is small compared with the total transmitted, and the engine runs at practically full load, there is no advantage to have a separate motor for each machine to be worked, and this for several reasons. Small motors are less efficient than large ones, and more expensive as regards first cost, so it may easily happen that the interest on capital added to the cost of energy in the case of subdivision may be much more than the interest on capital and cost of energy (including the waste in shafting) in the case of a single motor.

If, however, the work done is of a discontinuous character, such as that in an engineering workshop, the load factor may be bad. In this case the total energy wasted in shafting may be large compared with that transmitted on an average, and in any case such as this it is of the greatest advantage to have electric machine tools. The actual energy required is generated, and no more. There is no loss in transmission when no work is done, as with shafting, and the interest on capital for engine, dynamo, mains and motors, added to the cost of energy, may be less than the interest on capital for engine, shafting, belting and gearing added to the cost of energy in the case of a shafting transmission.

It is suggested that several small engines about the shop will be more economical. A glance at the efficiencies of small engines and motors will show the immense superiority of the latter, and the capital expenditure for steam pipes and engines and extra boiler-power owing to the increased steam consumption will not be much less than that for the electrical apparatus. As before mentioned, it must be worked out separately in every case by an expert who is not biased in either direction.

*Plant for Transmission of Power.*—It is well to keep the mains for this purpose entirely distinct from those for lighting, as the drop in pressure allowable is greater for power than for lighting, and also there will be greater safety and a more steady light.

There are two distinct types of motor used for power transmission, the series and shunt wound, and their construction is similar to that of a dynamo.

The series machine has the qualities that the speed is almost inversely proportional to the load, *i.e.* it goes much slower with a heavy load than with a light one, but it also has a very large starting torque, and will exert a considerable force at a slow speed. These qualities at once single it out in those cases where there is no necessity for the speed to remain constant, but where large forces are required at a comparatively slow speed occasionally, and where machinery has to be started against a resistance. A few cases like this may be enumerated: machine tools, circular saws, grindstones, &c., also tramway motors, lifts and many other cases.

The other type of motor, the shunt, runs at a nearly constant speed under all loads, but the torque is not nearly so heavy and the rush of current through its armature is much larger at starting, hence it is important to start a motor of this description on a machine which has no resistance to starting, and on which the load does not vary rapidly or beyond certain limits. There are several cases where this constant speed is required, such as a motor for driving spinning machinery, workshop shafting, low-voltage dynamos for electro-plating. The reason that a shunt motor runs at a nearly constant speed on a constant voltage, is that the field magnet is weakened by armature reaction as the current increases in the armature.

The law of the motor is that the speed is such that the back pressure of the motor at that speed, added to the loss of pressure due to the armature resistance with the current flowing, equals the terminal pressure. The back pressure of the motor is the electromotive force it would generate if run as a dynamo at that speed and with the same magnetic field.

It will be seen that if the motor is to run at a constant

speed as the load increases, the back E.M.F. of the motor must decrease as the loss of pressure in the armature (due to resistance) increases to satisfy the condition that the two pressures together shall equal the terminal pressure. The field is weakened in a shunt motor by armature reaction, and with a given armature reaction it is obvious that the armature resistance should be low. In fact, if there were no armature resistance the speed of a shunt motor would even increase with the load, owing to the weakening of the field due to armature reaction.

In ordinary shunt motors, however, the speed decreases slightly, as the drop in the armature more than makes up for the field weakening.

If a motor is required to run at a constant speed under varying loads where the terminal pressure drops with the load (as in the case of a motor connected through wires of fairly high resistance to a constant pressure circuit), it may be made to do so by coupling series coils in opposition to the shunt coils of the field, and a perfectly constant or even an increasing speed can be obtained as the load increases.

Motors with series windings opposing the shunt are rather apt to start the wrong way, owing to the tendency to reverse the field at starting; consequently the series coils should be cut out entirely at starting (or reversed so that they increase the field), and switched in when the motor has attained its proper speed.

Powerful series coils are often placed on shunt motors to be used to increase the field at starting only, and they are cut out when the motor has attained its proper speed. By this arrangement the starting powers of a series motor are obtained, with the regulating qualities of a shunt machine.

*Sayers Winding.*—In connection with this subject there is a method of winding motors which has proved to be a great success on constant-pressure circuits.

It has already been mentioned, in connection with armature reactions in dynamos, that with a forward lead of the brushes the armature magnetism opposes that of the field magnets. It is evident that with a motor, as the current is flowing in the opposite direction through the armature, that the magnetism of the armature would assist that of the dynamo. It is also evident that if in an ordinary motor the brushes were given a forward lead, the sparking would be very bad, and consequently a backward lead or lag must be given the brushes in a motor to obtain sparkless collection.

In 1893 a winding was described and used by Mr. SAYERS, of Glasgow, which overcomes the sparking of motors, and in which the brush has a lead, thus making it possible for the armature to assist the magnetism of the field coils, and even to supply its own magnetism. This device consists of placing a coil between the armature and the commutator in each connecting wire. The effect of this coil is, when the brushes are given a forward lead in a motor, to reverse the current in the coil short-circuited by the brush. The current only passes through this coil when its commutator segment is under the brush. The effect of the coil is so powerful that it is sufficient to entirely suppress the sparking at a place where the tendency to spark is very high. The same arrangement applies to a dynamo, except that the brushes are given a lag.

When this winding is adopted, the design of the motor is altogether different from an ordinary one. The air gap is made as small as possible; in fact, a mechanical clearance, armature reaction is encouraged, and a motor may be run with no windings in the field. As the armature generates its own magnetism it must all be cut by the armature, consequently magnetic leakage is not encountered. In fact, the dynamos or motors are unrecognisable when compared with the usual type. The result is that, owing to the greater efficiency and lightness of the magnetic circuit, very light motors and dynamos may be made of high efficiency.

The brushes will run positively sparkless under all loads without being rocked, and so when run as motors they will give no trouble from sparking. This winding is, however, of more importance for motors than dynamos.

*Details.*—As previously mentioned there must be a resistance in circuit with a motor when started. The starting resistances of ordinary motors should be arranged on strong iron frames, the wires should be insulated by means of porcelain or stoneware insulators. There is a tendency



always to switch in a motor too quickly, and there are several electrical and mechanical devices to prevent this, and one or other should be used. There is a considerable danger of a motor, and especially of a shunt motor, being burnt out by switching on too suddenly. Care must be taken that the resistances are so placed that there is no danger from fire, due to resistance-wires becoming red-hot, and there must be nothing inflammable within some distance, or where wires, &c., could fall on to it.

The motor itself should preferably be fitted with carbon brushes, if of ordinary design, as the brush-holder cannot be rocked very well, and the sparking must be kept within limits.

Enclosed motors with ring or other automatic system of oiling are preferable for dusty and damp positions, and they should always be adopted if there is any likelihood of such conditions existing in the future, if not at the time of installation.

The motor need not in all cases be fixed to a concrete foundation. Motors of less than 2 horse-power are usually fitted by coach screws to joists, &c., and those above that size are fixed in a similar manner to dynamos. Any excessive vibration is to be avoided, and a dry position should be chosen if possible.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

A paper was read by Mr. J. A. Gotch on

### Heraldry of the Renaissance in England.

The author said that during the latter half of the sixteenth century, and the earlier half of the seventeenth century, there was a general desire to make much of the antiquity and respectability of one's family, and one method of doing this was to display one's ancestors. The rearing of a large ancestry was characteristic of the times. Shakespeare plays upon this foible more than once. The simple formula was—"No gentleman, no arms; no arms, no gentleman." A consequence of this was that writers on heraldry found it necessary to bestow arms on many conspicuous persons long deceased, such as Japhet, Moses, Joshua, David; even Christ himself was assigned arms. When the posthumous granting of arms to persons who could have no concern with them is considered, we can realise how far heraldry had travelled from its original starting-point three centuries before. From being matters of daily practical use, armorial bearings had become a mere indication of particular ancestry, and so by implication a mark of gentility. The next inevitable stage was crystallisation. The origin of armorial bearings being forgotten, the application of them tended to become illogical, and heraldry gradually declined, both as a science and as a decorative art. The drawing became too realistic, and lost its proper conventional treatment; the bearings were depicted in the round instead of the flat. Another cause of deterioration arose from its becoming an indication of ancient descent, one of the signs being many quarters to one's shield. The scale of each coat was so reduced as to render spirited drawing impossible. An achievement of the Knightleys in the hall at Fawsley, Northamptonshire, contains 334 quarters, which is 330 too many for decorative effect. But although the heraldry of the Renaissance contained within itself the germs of its decay, it flourished vigorously enough. Buildings, ceilings, chimneypieces, windows, books, displayed the owner's heraldry, and its use in monuments must have mitigated grief. In employing heraldry there are, of course, certain rules and regulations which have to be observed, but, within their limits, the more freedom the better; in fact, freedom is essential to decorative effect. For instance, the rule was that a bend must occupy one-fifth of the field. But the width of the bend ought to depend upon the space occupied by the charges on either side of it, and on the fact of its being itself charged or not, always bearing in mind that it must not be so narrow as to become a bendlet. Another rule was that the chief must occupy one-third of the field; but here also the depth must depend upon the charges in the field. So, too, in the drawing of charges themselves. The characteristic charge that distinguishes the coat must be preserved, but within that limit it may be treated according to the taste of the designer. For instance, a lion rampant must always be made a lion rampant, but there is no need to have his head and his four legs in precisely the same relation to each other, nor need his tail always take the same curves. These things may be varied according to the space to be filled. Broadly speaking, the treatment may be as free as possible, so long as no

new idea is introduced. Thus the lion rampant is one idea; the lion salient (or about to spring) is another. The lion rampant always looks in the direction in which he is going; but if you change the idea and make him look towards the spectator, he becomes a lion rampant gardant. A lion rampant, if he has to fill a tall narrow space, will be thin and long and very upright; if he has to fill a comparatively square space, he will be thin, it is true, but less thin, shorter, and not so perpendicular in attitude; but in both cases he will be rampant.

Of the usual adjuncts of the shield, namely, the helm resting on its upper edge, the crest and wreath on the helm, and the mantling forming, as it were, a background and frame, the treatment should be founded on logic—that is to say, the crest and wreath must accompany the helmet, and not float in mid-air just above the shield. The mantling must be treated as a kind of cloth puggaree, with two sides, which usually are of different colours. Subject to this fundamental idea, its folds and curves and cuts may be arranged purely for effect, but it is obvious that its two faces being of different colours is a most important factor in the scheme of design. When supporters are introduced they ought to stand upon something, and that something should be more substantial than the edge of the ribbon which displays the motto. They should also look as though they were actually supporting the shield and helm, and doing it in a resolute and respectful manner. They ought not to be depicted, as the lion and unicorn sometimes are, as though they were lying down and taking a rest. The designer must be a skilful draughtsman, combining vigour of pencil with a strong feeling for anatomy; so that if an animal has to be drawn its particular characteristics may be presented in a truthful though conventional way, with as few strokes as possible. The designer, too, should have the rationale of heraldry at his fingers' ends, not necessarily a long or tedious thing to do. But when he is properly equipped he will find few fields of design more attractive or lending themselves in a greater degree to pure enjoyment of making lines express beauty and fancy and force.

Several illustrations were shown which exemplified the applications of heraldry to buildings, tombs, seals, &c.

Mr. J. M. Brydon said the subject was one in which they were deeply interested, for they had often to deal with heraldic representations. They were bound to consider heraldry in its historical as well as in its decorative aspect; the latter appealed to them more strongly. He proposed a vote of thanks to Mr. Gotch, and he thought it was a most delightful sequel to Mr. St. John Hope's paper read at their last meeting.

Mr. St. John Hope, in seconding the vote, said he agreed with the author that the multiplicity of quarterings was fatal to heraldic representation if considered as decoration, although in a historic sense the quarterings might be of great interest. But of course they could only appeal to a few, while decoration charmed all who looked on it. It was a disadvantage at least for metropolitan students that fine shields were not to be seen within easy distance, and therefore if room could be found for a collection of casts of shields at one of the museums would be of great advantage; impressions of seals would also be of service, and comparisons could be made without much trouble.

Mr. H. H. Statham said he did not profess to have any special knowledge of the subject. Although heraldry had ceased to possess its old value as a study, it was not exhausted. It seemed to him that the species employed were rather few, and apparently there was a field for utilising a larger variety as supporters and for crests. The architectural effect of heraldry was unquestionable.

Mr. Gotch returned thanks.

It was announced that the next meeting would be held on April 12, when Mr. H. H. Statham will read a paper on "The New Government Office Scheme."

## THE PHILOSOPHY OF HERALDRY.

A LECTURE was delivered last week before the York Architectural Society on Heraldry by the Dean. The two fundamental principles which underlay genuine heraldry were, he said, dignity and heredity, and all its many and complex signs were intended as expressions of these. Heraldry must necessarily be ornamental, the display of bright colours and quaint forms and strange creatures could not be anything else, but the object of heraldry was not ornamentation, and if banners became gay and shields brilliant, that was the accident or the inseparable consequence thereof, not the purpose. For those who had eyes to see and could decipher the significance of these things they were tokens that the bearers thereof were either persons specially honoured by those who had the power to confer honour, or were by heredity, descent, or affinity related to those who had been so distinguished—in other words dignity and heredity. The spirit of the present age was rather to disparage, distort, or condemn either or both these



things, and the outcome was that modern heraldry was for the most part a mere frivolous fancy, which meant nothing more than the caprice or taste of those who employed it, or a careless appropriation of that to which they were not really entitled. Hence modern heraldry was rapidly degenerating into chaos and confusion, and ceasing to be worthy the attention or employment of any persons of intelligence or self-respect. People seemed to fancy that the bare fact of their surname entitled them without any further inquiry to the armorial bearings associated therewith, and thus the strangest and often most ludicrous confusion took place. That, however, was not heraldry. A man's right to do so must depend, on the one hand, whether he could prove his blood relationship to the family whose arms he had chosen, or whether he was empowered by the duly recognised authority to take any particular form or figure as his cognisance; in fact, it depended, as he had already said, on dignity and heredity. There was a tendency, he knew, in these democratic days to speak slightly of the one and the other, and to profess to look down upon them alike with lofty contempt, but experience showed that people were as eager to acquire titles or to court titles as ever they were, and certainly there was no lack of self-laudation, self-advertising, self-asserting. A strong appreciation of them was really common to the human race from the earliest ages, and heraldry was an honest and by no means unsuccessful attempt to bring and to keep them in something like order and under proper restraint. There was very little definite trace of heraldry before the Conquest, but the Crusades, with their romantic and exciting episodes, furnished many occasions for acts of personal courage and devotion, and it was a very simple and natural proceeding that these should be commemorated by some appropriate figure depicted on the warrior's shield, thus distinguishing who and what manner of man he was when his features were concealed behind the iron bars or plates of his helmet; and equally natural that the practice should be continued during the reigns of the Plantagenets, when there were incessant wars amongst the nations of Europe; and equally natural also that as the feudal system became established the great barons should not only assume such tokens for themselves, but grant to their followers distinguishing signs either similar or bearing some resemblance, so that their fidelity might be secured and their allegiance recognised. The importance of bringing these under supreme control would in due time also naturally become apparent to the reigning power, and therefore in the early centuries the *Curia Militaris* was established, or court of the earl marshal, who, assisted by various officers, heard and decided complaints and appeals, examined and settled claims, and made grants of armorial bearings to those who were deemed worthy to receive them. This soon became a complex and difficult matter, for, as the claim of the sons to retain the honourable distinction granted to their father was recognised, and armorial bearings became hereditary, it was necessary to protect families from any appropriation by others of that to which they were entitled, and which would cease to have any distinguishing value if it became common property, which any could assume as they pleased. Again, it became necessary to grant some minor distinction in form or colour on, or of the coat itself, which would distinguish to what branch of any particular family persons entitled to bear the family coat might belong. Thirdly, in course of time it was deemed equitable that daughters should not lose their share in the honours of their fathers by marriage, but might associate their family arms with their husbands upon his shield, and also, if heiresses, might with the family estates transmit also the family honours to their descendants. All this required a code of laws and observances, and special officers appointed by and responsible to the king, and in the reign of Richard III. these were incorporated under Royal Charter into the College of Arms. The Dean having referred to the powers which the College acquired of taking notice of moral and social offences, said that the rapacity of the heralds brought about a decline of that power, and by the sixteenth century the Herald's College had subsided into its present condition. Proceeding the Dean said that heraldry had become the clue of the social or family history of England, and helped the student of our country's past to trace the cause of the effect, to unravel many complications, to discover the secondary causes, and demonstrate the motions which had influenced, actuated and developed many proceedings eventually of national importance. He at least had found heraldry to be a wonderful exponent of history. He believed that our present constitution and government, social order, national character, disposition and taste were the accretion of events and actions which had happened in days gone by, and he liked to examine them, to study the chief actors, to find out who they were and what they were, why they became what they were, and why they did what they did. He learned how God's good providence overruled much thereof to very different ends and results than they themselves anticipated, and often brought out of that which was purely selfish, temporal, worldly, and sometimes utterly unworthy, that which was for the good of the nation at large, and in which we had a share in the pre-

sent day. Heraldry was helpful to all that; it was the rivet which clinched the link once forged, the means which handed on from generation to generation in families, and from age to age in nations, that which should not be ignored or suffered to lapse into oblivion. But then heraldry, if it was to be maintained, must be a reality, and not a mere sham. If people, as he had stated, appropriated armorial bearings without justification, that was not heraldry. It was a mere caprice, if not a reckless attempt to impose on other people. It meant nothing, and it was worth nothing, and he thought it was unworthy of anybody. As members of an architectural society, he thought his hearers had an interest in protecting heraldry, as well as architecture, from being abused, debased, and perverted, and in preserving them as the handmaids of the history of the past.

### THE CUSTOM HOUSE, DUBLIN.

THE discussion which has arisen in the papers over the closing up of the east colonnade of the Dublin Custom House recalls to mind, says the *Irish Times*, the singular history of the building of that fine pile. Most intelligent Dubliners know that its architect was named Gandon; how many that it was only part of a great scheme for making Dublin a beautiful city, conceived by the Right Hon. John Beresford, second son of the Earl of Tyrone and brother of the Marquis of Waterford, one of the most remarkable men of his time? Mr. Beresford was a member of the Privy Councils of Great Britain and Ireland, member of Parliament for Waterford County for forty-four years, and Commissioner of the Revenues in Ireland for more than thirty. He was a man of indomitable will and great ability, and backed as he was by family interest second to none, he enjoyed more power than any single individual in the country. Indeed, it was said of him that he had the law, the army, the revenue and a great deal of the Church in his possession, and that he might be considered the King of Ireland. Why has such an unique figure passed out of the public memory? The late Mrs. Atkinson, in an essay published many years ago, expressed herself as decidedly of opinion that it is due to the cruel way in which John Beresford's third son, John Claudius, did his part in the suppression of the Rebellion of '98. "As was remarked by a worthy man," she writes, "who, himself an Irishman of the truest blood and feeling, had while serving in the employment of the Waterford family many opportunities of observing the high spirit, generosity and other good qualities of the race—'John Claudius ruined the Beresfords.' Be that as it may, John Beresford is forgotten. And yet he ought to be remembered in Dublin as well as Baron Haussmann is remembered in the capital of France. His scheme was certainly a very ambitious one. At that time communication between the Sackville street side of the river and the neighbourhood of the Parliament House was carried on by boats; the bridge nearest the sea was Essex (now Grattan) Bridge; beside this, on the east side, stood the old Custom House, and a little way off the fine Exchange was nearing completion. The Government and municipal offices were in the same locality, as well as the theatres and the warehouses and residences of the merchants and traders. From Essex Bridge to the sea the river followed its course, for some distance confined by walls, but for the rest of its way by irregular banks, reduced in places to swamp by long neglect and tidal inroads. Mr. Beresford's splendid design was to widen and extend the quays and to open an uninterrupted line from the site of the old friary of St. Saviour, near which the site had already been marked for the present Four Courts, to the low-lying waste which stretched seawards beyond the point where Sackville Street was lost in lanes struggling down to the riverside. Here he meant to throw a bridge over the water, and from its southern end to lay out a handsome street running to the Parliament House, like Westmoreland Street as it is at present. Finally, his plan included the erection of a new Custom House half a mile nearer the sea than the old structure at Essex Bridge.

This latter proposal was met with the fiercest opposition on the part of the Corporation, many of the merchants, and what Mr. Beresford himself described as "the most desperate of the mob." The change, it was protested, would injure the trade of the city; there would not be sufficient room for shipping; in any case it was only a madman who would attempt to erect such a structure on a morass. John Beresford, however, had made up his mind on the question, and the clamour failed to change his purpose. He succeeded in getting an order from the Treasury at Whitehall to build the Custom House, and in James Gandon, the grandson of a French Huguenot, settled in London, he found an architect by whose talents he trusted to produce a design worthy of his great purpose. In January 1781 he wrote to the architect that all was ready, and that he had made arrangements to take the land, in a low situation, urging him at the same time to come to Dublin at once. Gandon came and found himself in a curious position for an architect. As a matter of fact, he had to remain in a kind of imprisonment owing to the



opposition to the scheme, and was only able to visit the site secured for the building at unearthly hours of the morning. After some delay with reference to the purchase Gandon was instructed to begin work, and to get clerks and assistants from London. He held a meeting of the principal Dublin artificers, and, finding he could rely on them, proceeded with the opening of the trenches. On the Sunday following hundreds of people assembled on the ground, but instead of filling up the trenches, as was feared, they swam in them. The attitude of the opposition at this period seems to have been that, as it was certain no building could be erected in the swamp, the best thing to do was to humour John Beresford's crazy notion. But when it was seen that the foundations were going on it was quite a different matter. Up got the High Sheriff in his wrath, and with an influential member of the Corporation marched at the head of a rabble with shovels and saws to the ground, and levelled a portion of the fence. John Beresford received news of these proceedings on a Saturday, and we can imagine its effect on his mind when we learn that he immediately wrote to Gandon to replace the enclosure instantly, to make the holes and set his poles the next day, Sunday, and to put the fence up as fast as it was pulled down. "Prevent all opposition," he said in conclusion, "and laugh at the extreme folly of the people."

There were other interruptions of the work, but it steadily proceeded nevertheless, and the building was opened for business in 1791, ten years after the laying of the foundation-stone. In the meantime, Gandon, who had a great admiration for Ireland, though given a tempting offer to go to St. Petersburg, settled down in Dublin, where he made many friends. As for John Beresford, it is pleasant to think that before his death in 1805 he had seen almost completely realised his dream of a splendid city, with noble streets and stately buildings, rising beside the waters of the Anna Liffey.

### THE WALLACE COLLECTION.

THE gross value of the estate of the late Lady Wallace has been estimated at 752,472*l.* and the net value at 701,532*l.* The amount is exclusive of the collection conditionally bequeathed to the nation. The value of the personal estate of the late Sir Richard Wallace, inclusive of the value of the collection, was sworn in 1890 at 963,516*l.* The collection was then presumably valued for probate at about 250,000*l.* or 300,000*l.*

Lady Wallace by her will bequeathed to the British nation her pictures, porcelain, bronzes, artistic furniture, armour, miniatures, snuff-boxes and works of art which are placed on the ground and first floors and in the galleries at Hertford House, on the express condition that the Government for the time being shall agree to give a site in a central part of London and build thereon a special museum to contain the said collection, which shall always be kept together, unmixed with other objects of art, and shall be styled "The Wallace Collection," but this bequest shall not include personal and modern jewellery, trinkets and effects, nor ordinary modern furniture or chattels, but shall include the Louis XIV. balustrade at Hertford House, which the executors are to replace by an ordinary modern balustrade, and the said Louis XIV. balustrade shall be used in the new museum to be erected for the said collection. The testatrix declared that if any doubt shall arise as to whether any object shall form part of the collection or not the question shall be determined by the executors of her will, and their decision shall be final; and she further declared that the said bequest is made subject to the express condition that Her Majesty's Government for the time being shall nominate Mr. John Murray Scott to be one of the trustees of the said collection for the nation, and also that during the time the said collection shall remain at Hertford House (which shall not exceed a period of four years from the date of her decease) it shall be at the risk and peril of Her Majesty's Government, who shall also defray the cost of superintendence and preservation of the said collection.

The codicil, made April 24, 1895, to the will of Lady Wallace contains the following further conditions:—

"Whereas by my said will I have bequeathed to the British nation a collection of pictures and works of art as described therein, now I hereby declare that the said bequest is made subject to the express condition that the British Treasury shall within one year of my decease remit or repay to my estate the amount of probate, estate, or any other duty leviable in respect of such collection, and shall indemnify my estate against any claim that may be made thereon in respect of such collection. And also that the said Treasury shall remit or repay to my estate any duty which might be claimed by them in respect of my 'immobilia' in France or the proceeds of the sale thereof."

In the House of Commons on Tuesday last Mr. Massey-Mainwaring asked the First Lord of the Treasury when he would make his promised statement respecting the terms attached by the late Lady Wallace to her gift of the Wallace

collection to the nation; was the gentleman now examining the collection acting on behalf of the Government, and what were his instructions; and would the First Lord of the Treasury undertake that if it was proposed by the Government to make a selection from the whole collection bequeathed, such selection should not be placed in the hands of any one individual, but should be made by a competent committee of twelve persons?

In reply Mr. Balfour said that the question whether any object at Hertford House is included in the bequest is to be decided by the executors, and Her Majesty's Government have no power of selection. By the courtesy of the executors it has been arranged that in the case of any articles as to which they themselves feel any doubt, two experts—one nominated by Her Majesty's Government and one by the executors—shall examine the article and report their opinion to the executors, with whom the decision rests. Mr. Woods, of the firm of Christie, Manson & Woods, will act for Her Majesty's Government.

### LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.

THE ninth ordinary meeting of the Leeds and Yorkshire Architectural Society was held last week, at the rooms of the Society, Leeds Institute, Cookridge Street, Mr. W. Watson, of Wakefield, retiring president, occupying the chair. The following gentlemen had been nominated at the previous meeting as officers for the session 1897-98, and they were elected, on the motion of Mr. C. W. Tomlinson, seconded by Mr. Richard Wood:—President, Mr. George Corson; vice-presidents, Messrs. W. S. Braithwaite and W. A. Hobson; hon. treasurer, Mr. W. H. Thorp; hon. librarian, Mr. W. H. Beevers; hon. secretary, Mr. F. W. Bedford; members of council (in addition to the permanent members), Messrs. T. Butler Wilson, C. B. Howdill, W. C. Hall, A. E. Kirk, George Atkinson and James Ledingham (Bradford); auditors, Messrs. H. S. Chorley and W. Pott.

Mr. W. S. Braithwaite moved a vote of thanks to Mr. Watson for his services as president during the year, and expressed his personal regret that he had not seen his way to accept office for another twelve months. The Society was called the Leeds and Yorkshire Architectural Society, and in Mr. Watson the members who resided in districts outside Leeds had had a fitting representative. He was sure all the members would thank Mr. Watson warmly for his services, and would hope that he would continue to take the same kindly interest in the Society that he had displayed hitherto. Oftentimes, at trouble to himself, Mr. Watson had come amongst them, and it was a pleasure to know that he would still remain on the council of the Society. Mr. Braithwaite went on to express regret that the Society was not making more headway. In the year on which they were entering the Society would attain its majority, and he thought the council might consider what steps could be taken to enlarge its borders.

Mr. W. A. Hobson seconded the resolution. Mr. Watson had, he believed, been a member of the Society ever since it was started, and in coming, as he had, from a distance to attend their meetings so regularly, he had set an example which might be worthily followed by other members. They were greatly indebted to him for his services during the past year, and they thanked him very heartily.

Mr. George Corson, the president-elect, supported the resolution, and, while expressing his sense of the services rendered by Mr. Watson, joined in the expression of regret that he had not been able to accept office for another year. He had also, he said, to thank them for electing him as president, in succession to Mr. Watson. As the Society would attain its majority that year, and as he was its first president, there was, perhaps, some fitness in his being elected again at this juncture. They had a membership of 120, and he thought they might put their heads together to do something to secure a better attendance. As it was also the jubilee year, they ought to endeavour to celebrate the occasion in some form—festive, if they liked—because, when another twenty-one years had gone over many of them might not have the opportunity of joining in such a celebration.

The resolution was then carried.

Mr. Watson returned thanks, and said he should always take a lively interest in the work of the Society. He regretted that they had had such small attendances at their meetings, and thought the younger members in particular ought to take more interest in the Society, and to attend in larger numbers. He hoped this would be the case in the coming session.

The proceedings then terminated.

M. Faure, the president of the French Republic, will not be able to attend the inauguration of the last Salon, which will be held in the Palais de l'Industrie on the 23rd inst



## NOTES AND COMMENTS.

THE REV. DR. SPARROW SIMPSON, Sub-Dean of St. Paul's, who died a week ago, was a zealous member of the cathedral body. His three books, "Chapters in the History of Old St. Paul's," "Gleanings from St. Paul's," and "St. Paul's Cathedral and Old City Life," were almost revelations. The cathedral church was not sufficiently esteemed by the citizens of London, but Dr. SIMPSON's books were so interesting as to impart a new character to the building, and to recall its predecessor. His researches were a delight to himself. The Archdeacon of London said on Sunday that when he came to the library it was not in good order. Dr. SIMPSON "strenuously reformed it, catalogued it, and added to it year by year with judicious sympathy. All its treasures, contents and peculiarities were part of his daily life." He held the librarianship from 1861, and was Sub-Dean from 1881.

ONE of the incidents recorded in Dr. SIMPSON's last book has new interest at the present time. In 1708 Queen ANNE visited St. Paul's to return thanks for MARLBOROUGH'S victory over the French near Oudenarde. A rumour got afloat that an attempt was to be made to remove a number of screws and bolts from the roof of the church in order that the beams might fall upon the Queen and the members of the Ministry who accompanied her. Dr. SIMPSON discovered a tract in which it was said that ROBERT POPE, an under carpenter, saw a man unscrewing the iron bolts of the west roof; but the rumour was utilised as a libel against WREN, for it was said that the bolts were to be found in the stores, having either never been put in or were taken out again to be made more fit, and it was no wonder if one workman saw another unscrew some of them. Another replied that "all the bolts quite through the roof were actually fitted and screwed into their places in the timbers in such manner and with such care as not to be unscrewed and taken out but with an engine; and yet, after this, several of these bolts were unscrewed and taken away, and to this the affidavit of POPE relates and not to anything done to the bolts when lying in the stores, it being impertinent and senseless for one workman to accuse another of doing what was his proper business; and though a jest was made of the 'Screw Plot,' yet the cheating of the Church and stealing its material is, I take it, a matter of earnest." Dr. SIMPSON considered the "Screw Plot" was a mere fable, but there must have been dissatisfaction at the time when such a fable was possible. There could not be a better test of the difference in loyalty and sense of security between our time and that of the eighteenth century than the fact that no alarmist out of a lunatic asylum would venture to suggest that St. Paul's would become a source of danger on June 22, 1897.

ONE of the most puzzling problems is to ascertain the ratio between artists' fees and the cost of works at different periods. An attempt of the kind has been made in Berlin, *à propos* of the memorial of the Emperor WILLIAM I. For that work the Reichstag voted a sum of 4,000,000 marks, and the expenses, it is believed, will not exceed that sum. Professor REINHOLD BEGAS has received one-fourth of the amount, but as he has not furnished a debit and credit account—nor should he be expected to prepare one for the public gratification—it cannot be ascertained whether he has gained or lost by his great work. But it may well be doubted whether his commission was as profitable as RAUCH'S when he executed the fine memorial of FREDERICK THE GREAT which is so prominent an object in the Unter den Linden. The payment was arranged differently. During the twelve years he was engaged on the work he received 3,000 thalers annually, and he was therefore able to devote himself to his task without anxiety. On the completion of the memorial he received 20,000 thalers, so that in all he obtained 168,000 marks, which was a fourth of the total cost. But the money, amounting to over 8,000%, was mainly for his own services, while Professor BEGAS has had heavy disbursements. SCHLUTER, the sculptor, was paid 2,000 thalers for his design for the memorial of FREDERICK I. or the "Reiterbild des Grossen Kurfürsten," which is so prominent an object

on the Lange Bridge, near the Schloss, in Berlin. About the same time he was entrusted with the superintendence of the enclosure of the royal palace. He received from 800 to 1,000 thalers yearly, but whether that was for sculpture alone is uncertain. It is calculated that he was rewarded with 11,000 thalers, or 33,000 marks, which would be about one-eighth of the cost of the most excellent example of German sculpture in the beginning of the eighteenth century.

MR. RUSKIN has written so much and under varying moods, it is no wonder many people desire to have a summary of his theories within a reasonable compass. The publication of a fifth edition of Mr. MARSHALL MATHER'S "John Ruskin, his Life and Teaching" (F. WARNE & Co.), is evidence that the little book has been successful in supplying what was needed. The author does not attempt to criticise. He declares himself to be "a RUSKIN worshipper," and on that account he is more fitted for his task; as he endeavours to be faithful in expressing the master's doctrines. There can be no doubt about Mr. MATHER'S loyalty or care. His epitome will form a suitable guide to all who contemplate a course of Ruskinism. It is difficult to realise Mr. RUSKIN'S power as a writer from short passages, but he has said he was punished for attaching too much importance to style, since readers gave more attention to how he expressed himself than to what he said. On that account it will be advantageous to discover the nature of his theories when described in the briefest and simplest manner.

AN exhibition is to be held next year in Omaha. One of the chief attractions will be "a silver palace," which is to be erected from plans by Mr. BEMAN of Chicago. The building will not be a miniature structure. It will be 400 feet square with octagonal towers. The style is to be Gothic, apparently of the Venetian type. There will be also a central tower rising to a height of 250 feet. The quantity of silver which will be necessary has to be ascertained. Sufficient experiments are not yet made to determine what thinness the plates can be rolled to with safety. It was originally proposed to employ a sort of silver paint, but that did not correspond with American ambition. The miners, it appears, are prepared to supply sufficient silver, which will be accepted as a loan, and when the Trans-Mississippi Exposition is closed will be returned to the lenders. The idea is novel and it is a pity the project was not originally brought before the authorities of the Paris Exhibition of 1900, who are in need of novelties.

THE catalogue of casts issued by CHAPMAN & HALL, LIMITED, is worth the attention of masters and committees of schools of art. They comprise Classic, Mediæval, Renaissance and Modern examples. Some are taken directly from life. As illustrations are given it is easy to judge of the character of the casts. It is also an advantage for students to be able to select examples which they may prefer and which can be made auxiliaries in self-instruction. The net price is given in each case.

## ILLUSTRATIONS.

SALISBURY CATHEDRAL.—FROM THE NORTH-EAST.

SALISBURY CATHEDRAL.—DETAILS, SOUTH SIDE.

SALISBURY CATHEDRAL.—SOUTH CHOIR AISLE.

GRAND STAIRCASE, STAFFORD HOUSE, ST. JAMES'S.

SEMI-DETACHED HOUSES, SNEYD PARK, BRISTOL.

THESE houses are in course of erection in a new road adjoining the well-known Downs, and are built of native stone with portions tile-hung, the roofs being covered with Broseley tiles. The accommodation comprises three reception-rooms, with seven rooms on the upper floors, together with the usual offices. Each pair of houses in the road is different in design, although conforming to one general style, and have all been erected from the designs of Mr. H. DARE BRYAN, of 38 College Green, Bristol, architect to the estate.



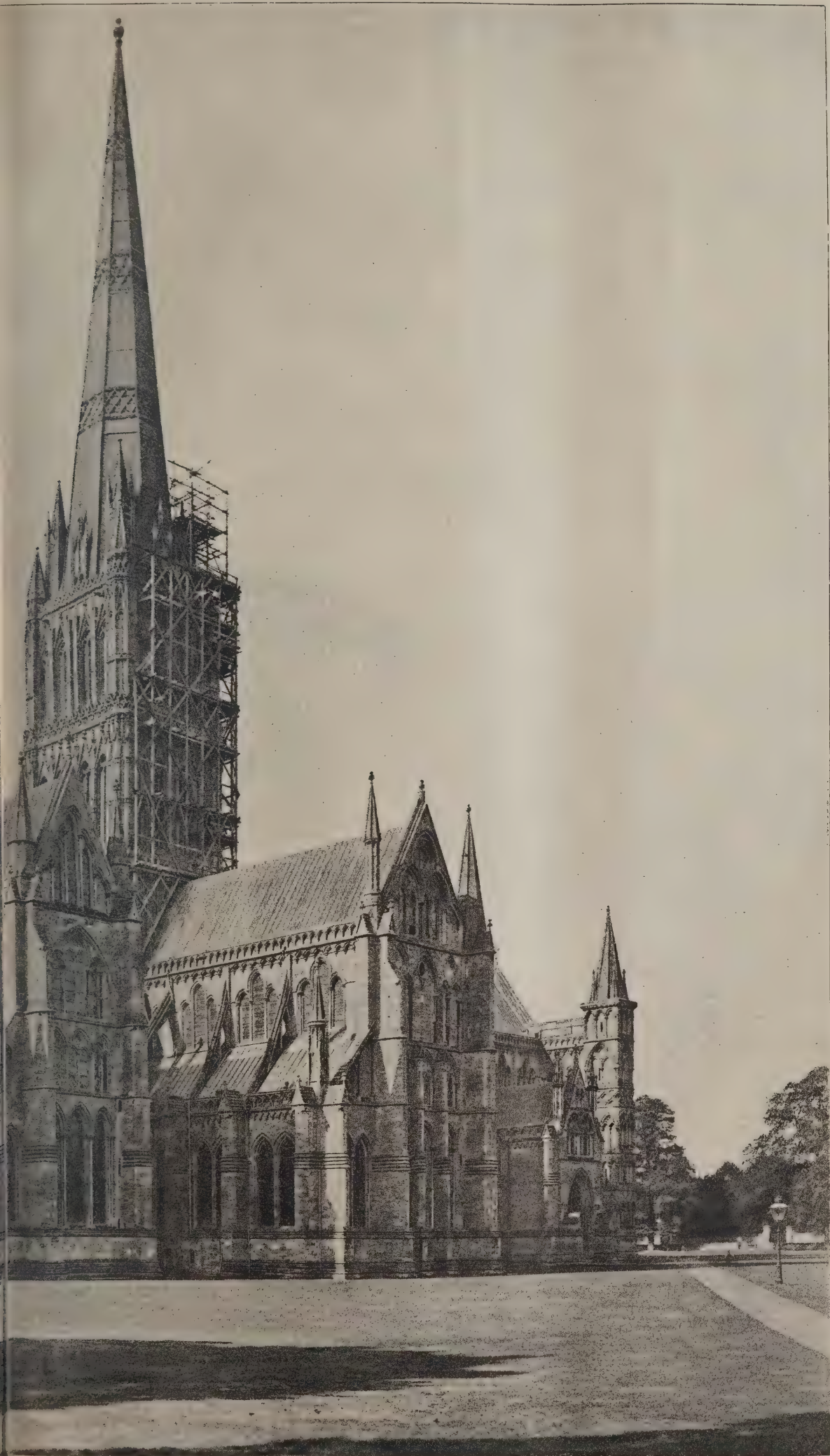






PHOTOGRAPHED BY S. B. BOLAS & CO. II, LUDGATE HILL, E.C.







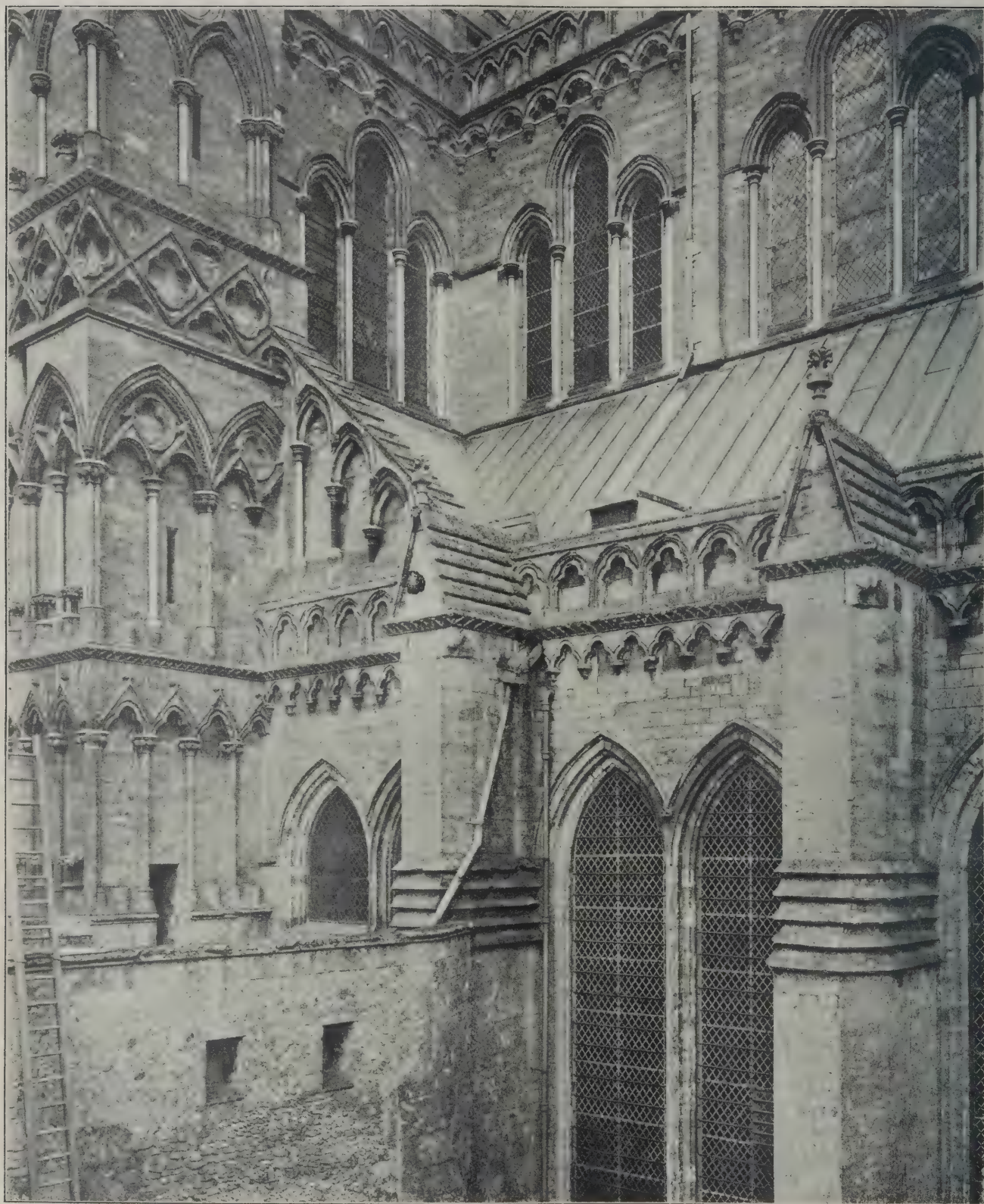








*The Architect*, April 2, 1897.



PHOTOGRAPHED BY S. B. EOLAS AND CO.

CATHEDRAL SERIES, No 21.—SALISBURY: DETAILS.—SOUTH SIDE.



The Architect, April 2, 1897.



PHOTOGRAPHED BY S. B. BOLAS AND CO.

CATHEDRAL SERIES NO. 22.--SALISBURY: SOUTH CHOIR AISLE.













SEMI-DETACHED HOUSES  
ON THE  
DOWNLEAZE ESTATE  
SNEYD PARK BRISTOL  
H. Dare Bryan. Architect.

















PHOTOGRAPHED BY BEDFORD LEMERE & CO.

GRAND STAIRCASE: STAFFORD  
MANSION OF THE DUKE OF





INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.







## SALISBURY CATHEDRAL.—II.

IT is sometimes said that the cathedral of Salisbury is without historic interest. What is suggested is that the building is without any relation to the history of England. The bishops, however excellent, could number few statesmen among them, and it was not necessary to transact any business of political importance in the cathedral. GILBERT BURNET, who ruled the see for a quarter of a century, was one of the busiest and most garrulous of politicians, but, as well as we remember, he does not once condescend to mention his cathedral. Nor is there a record that he was visited in Salisbury by any courtier of importance. Until modern times the city was, as it were, outside the world, and ambitious prelates were disposed to avoid it. On the other hand, it seemed to be the most suitable place for Apology-making JEWELS to train Judicious HOOKERS and send them on their several ways with stout staffs in their hands.

The erection of the cathedral in a place which was uninhabited was so courageous an act that to our modern notions it appears to have been hazardous. We can only understand the reason for the selection by remembering that the part of England in which Salisbury now stands was subjected to several ecclesiastical changes. In the eighth century it belonged to a diocese which was ruled from Sherborne, and which comprised, in addition, the younger dioceses of Wells, Bristol, Exeter, and, we suppose, Truro also. Subsequently Salisbury formed part of the diocese of Wilton. Afterwards it was again joined to Sherborne. But in the reign of WILLIAM THE CONQUEROR it was identified with Sarum, or rather Old Sarum. The position of the cathedral of Lincoln was selected, as we pointed out when describing that building, not so much for picturesque effect, but from the proximity of the Norman castle, which was a safeguard for the organisation which the cathedral represented, and which served many of the purposes of a later university. Old Sarum became a bishop's seat for a similar reason. A castle was found there, and on the north-western side of it a cathedral was erected, which was about 250 feet in length. Bishop OSMUND, the Conqueror's nephew, was an earl, and exercised control over both buildings. His successor and relative, Bishop ROGER, who was regent of England during the absence of HENRY I., was also a warrior as well as a prelate. He possessed other castles besides Sarum. When his nephew STEPHEN came to the throne he became alarmed about the bishop's power. ROGER was arrested, and the king swore that his uncle should be starved to death unless Sarum was surrendered. The king triumphed, and ROGER died of a broken heart. Before dying he gave his treasures to the cathedral, and they were placed on the altar; but STEPHEN forthwith carried them away, and appropriated them to his own use. Sarum Castle was afterwards assigned to the Earl of SALISBURY, and his retainers were not likely to show much courtesy to their neighbours of the cathedral. In 1217 RICHARD POORE was appointed bishop, and he at once resolved to put an end to an arrangement which did not promote the peace of the Church. GODWYN, who wrote in the time of ELIZABETH, says of him:—"This bishop, considering the inconvenient situation of his cathedral see, on a place so dry and bleak, as also wearied with the often insolences and malapert demeanour of the soldiers that guarded the earl's castle, forsook the same, and, sending for divers workmen from beyond the seas, began the foundation of a new church in a place then called Meryfield." The position was about two miles from the castle, and the field is supposed to have belonged to the bishop.

Foundations could not be well commenced unless plans of some sort were prepared beforehand. According to tradition, Bishop POORE employed as architect ELIAS of Dereham, a cleric, but, as is usual in the history of Mediæval architecture, there is no certainty on the subject. The name occurs in several thirteenth-century documents in connection with buildings, and that strengthens the probability. Whoever was the architect he must have been a man of fine genius who was above the weakness of introducing startling features in order to display his invention. He was also expeditious in getting through the preliminary arrangements, for on April 28, 1220, the foundation-stones were laid. The ceremony was performed by PANDULPH,

the papal legate, the five stones being memorials of Pope HONORIUS III., the young King HENRY III., the Earl of SALISBURY, the Countess of SALISBURY and the Bishop. In preparing the plans care was taken to have more repetition of simple elements than was common with smaller works. As a result a sufficient part of the new building was completed to serve as a church five years after the laying of the foundation-stones. On the feast of St. Michael, 1225, the first section, including the choir, was consecrated by STEPHEN LANGTON, archbishop of Canterbury. Bishop POORE was immediately afterwards translated to the more important see of Durham. But it would seem that ELIAS of Dereham was allowed to continue in charge of the works at Salisbury.

ROBERT BINGHAM was the successor of POORE, and ruled the see for eighteen years until 1246. Then came WILLIAM of York, who died in 1256. The privilege of completing the work engaged in by his three predecessors was reserved for Bishop GILES of Bridport. On September 30, 1258, BONIFACE, archbishop of Canterbury, presided at the dedication festival, which appears to have attracted a large crowd, including the king, to Salisbury—"præsentibus rege et prælatorum copiosâ multitudine." Not more than thirty-eight years were required for the erection. It would, in the thirteenth century, have been impossible to erect so large a building within a period so limited if the architect did not facilitate the operations by avoiding an unnecessary variety of details. He introduced also few innovations. But in spite of the restrictions he imposed on himself, the cathedral has a power of which few can resist the influence. The late Mr. STREET has analysed the causes which have produced so much effect in the following way:—

The Isle of Purbeck was in the diocese, and there was every reason, therefore, for indulging as much as possible in the use of its beautiful marble. The introduction of detached shafts wherever possible, and which follows naturally from the use of marble, wholly changes the character of the architecture. The effect is admirable; but, on the other hand, the risk in construction was great. The variety in the plans of the clustered columns at Salisbury was very great. In the nave the common French section of a circular column surrounded by four smaller shafts is adopted, but here the shafts are detached from the centre column. In the choir the columns are surrounded by eight detached shafts. In the doorways and windows shafts are placed in various ways—in clusters and one behind another—so as to produce very deep effects of light and shade, with the advantage that, all the lines being curved, the transition from light to dark is never too abrupt. In the lady chapel this system culminates. The width is subdivided into three aisles, and the vaults are carried—one is almost tempted to say appear to be carried—on shafts so long, and so delicate and frail as to have required the very highest skill to insure their standing even during their construction, let alone standing, as they do, 650 years after their erection. The architect throughout the cathedral dispensed, as did the architect of Wells, with visible flying buttresses; he used them only under the roofs of the aisles, but in order to make the thrust on the walls less, he built his vaults with stone ribs, filling in the spaces between them with concrete made of a very light calcareous tufa. He used an unnecessary thickness of this material, but as it was extraordinarily light, his construction was generally perfectly secure, as in two or three places only has it been found necessary in later times to add flying buttresses above the aisle roofs. Beautiful as the detail of the cathedral is, there is generally some sense of disappointment in its interior. Unfortunately it is a church full of windows, and the grisaille with which these were filled is almost all destroyed. Its roofs and its walls were richly coloured, and the only portion which remained has been restored, and is no longer at all like the old in its effect. The painters, as at Chartres, painted the outside work in places, as, e.g. in the west porch and the porch to the chapter-house. In other places, as, e.g. on the concrete groining of the porch and of the nave and on the walls of the cloister, they coloured the walls and then marked them out in imitation masonry lines of red colour. The ground-plan of this great church is one of extreme beauty. It has not only the usual transept with an eastern aisle, but to the east of this a second and shorter transept devised evidently in emulation of the eastern transept of Canterbury, which itself was no doubt derived from the great Benedictine abbey church of Cluny, now destroyed, and before its destruction the only church in France in which this beautiful arrangement was seen. This eastern transept has also its aisle on the east, and is of less width and proportion than the great transept. East of the choir are three lower chapels, in which are the delicate



arrangements of clustered and single marble shafts which I have already referred to; and it was in the side walls of the centre of these three chapels that, before Wyatt's so-called restoration, there remained an arcade which for perfection of design and execution has never, I am bold to say, been surpassed anywhere in Europe. It is now built into the west wall of the eastern transept, and will ere long, I believe, be seen again in its old place. If it is possible to say so much of the interior, what may we not say of the exterior? With one exception—the destruction of the detached bell-tower which stood in the churchyard till Wyatt's time—the church is now more beautiful than it was when it left the builder's hands. Elias of Dereham might well deplore the changes which men have made in the colour of his interior. But could he see it again he would be amazed with the beauty which time has given to the exterior. There is, so far as I know, no building in Christendom on so grand a scale, which is so complete, so uniform in style, so good in the proportions of the various parts of the whole, and altogether and from every point of view, so thoroughly beautiful as this grand and most English church. Its surroundings are as beautiful. The quiet close—unknown out of England—surrounded by deanery and prebendal houses, by a bishop's palace founded at the same time as the cathedral, the whole group surrounded by its ancient wall and entered by its old gateways, is in itself a sight for an architect; but out of the greensward which surrounds it on all sides the matchless church rises, with its beautiful cloisters, its splendid polygonal chapter-house, its octagonal vestry on its southern side, in such completeness of grace and beauty as leaves nothing to be desired.

Like Wells, Salisbury is a cathedral well worthy of a young architect's study above most others. For not only will he find there the work of the mason in all its varieties; he will find, too, woodwork of all sorts, moulded, carved and plain—roofs, doors, chests, tables, choir stalls, even the great wooden wheel which was used to raise the stone for the steeple; and in every portion he will find evidence of the same sense of the necessity for completeness, which is the true mark of a good architect at all times. The detail everywhere is admirable. The carving of foliage is very different from, though in my opinion generally inferior to, that at Wells, and there is one very singular feature which is seldom seen in England. The arcades of the parapets and in many other places are carried on quite regardless of the buttresses which intersect and stop them. So that, e.g. in the front of the transepts there are arcades not regularly divided, but quite accidentally arranged with half or a third of an arch abutting against a buttress, so as to give the appearance of the buttress being an afterthought put on against the arcade.

The works cost, it is said, 40,000 marks, or about 26,666*l.*, which would be equivalent to nearly twenty times that amount in current coin. The spire, a part of the tower and the chapter-house are not included in the reckoning.

In the eyes of the public the spire is the most interesting part of the building, and in consequence painters when representing Salisbury Cathedral have not hesitated to impart to it an increase of height in order to make it appear more soaring. We need not say the architect of the building did not contemplate so lofty a spire, which to some extent deprives the building of the proportion it was his aim to secure. When it was resolved to make the addition his intention was disregarded, and although he had made no provision for supporting so enormous a mass of masonry, the risk was boldly faced. We may be thankful that the spire was not made to display fourteenth-century peculiarities, and that it did not collapse and destroy the earlier work. There is no record to define the date of the addition. As a license was granted by HENRY VI. in 1417 to permit the chapter to acquire lands of the value of 50*l.* per annum, in order to expend the money on the repair of the spire, several years were likely to have elapsed before the spire had fallen into a dangerous condition. The risks which were incurred with a light heart for the sake of effect were, however, of a kind that made ruin impend before the spire was completed. The late Sir GILBERT SCOTT gives the following account of what he discovered:—

The original thirteenth-century builders had erected a central tower rising sufficiently high to receive the roofs of the four arms of the church. The storey against which these roofs abutted is a very light structure, and was intended to be visible from within. It is perforated in its thickness by a triforium gallery, leaving externally a wall of little more than 2 feet in thickness, whilst the interior consists of a light arcade, with Purbeck marble shafts. The corner turrets have each a staircase, rendering them mere shells. On this frail structure the fourteenth-century builders carried up the vast tower some

80 feet high, with walls nearly 6 feet thick, and upon this a spire rising 180 feet more. It need not, then, be wondered that the older storey, so unduly loaded, should have become shattered. Subsequent builders have bolstered it up by flying buttresses and by every form of prop they could invent, till the sectional area of the added supports exceeded that of the original structure.

All the devices were of no avail, for in spite of buttresses, props and other supports, Sir GILBERT SCOTT was compelled to call in a civil engineer to devise a series of wrought-iron ties, passing round the stair turrets and connected with vertical irons placed on the exterior faces. But both architect and engineer did not dare to meddle with the bent piers which carry the tower. The authorities were accordingly advised "to keep a watch over the piers, and if any increased curvature should be observed, to take some precaution, such as the insertion of iron beams from pillar to pillar." The ties and vertical irons have not been much more efficient than the ironwork introduced in the eighteenth century. Under Sir ARTHUR BLOMFIELD costly works have since been carried out, but the spire must continue to be a cause of anxiety to the cathedral authorities. The case should serve as a warning to those who lightly undertake the improvement of an earlier architect's design.

### ART IN WALES.\*

I DESIRE at once, and quite unreservedly, to repudiate any claim to speak with authority upon any one of the arts, whether graphic or plastic or domestic or decorative. I am a mere wayfarer on the Queen's highway, who in the bustle of the crowd glances to right and to left to appreciate the beauty or the barrenness of the land, and any remarks which I may make to you to-night I make not as an expert, not as one who has any real knowledge or any claim to speak upon these matters, but as an observer and a wayfarer. As we look round upon the life and the activities of our day in Wales, I think we cannot but feel that we are in the glad springtime for Wales; there are buds and blossoms and flowers of promise in every sphere of the activity of the people of Wales and of the Welsh people, whether they live in Wales or over the border, and I think in a season of awakening it is right and well, and perhaps a duty on our part, to see what is the meaning of the awakening, how deep it is, and into what channels the new life which comes from the awakening is spreading itself.

I think one may say at the start—and one admits it with sorrow as well as with frankness—that not the most patriotic of us can claim for Wales the possession of a native school of art, such as is possessed in other small countries which have obtained and enjoyed the priceless gift of self-government. I remember well in 1889 spending a few days in the great exhibition at Paris. I have forgotten most of what I saw there. I have a vague recollection of the crowd and of watching many who came from the various provinces of France, and a vague recollection of the enormous wealth exhibited, the wealth of industry and of art and of commerce, and of the various activities of the great country of France. But the one thing which stands out in my memory, and which I think will stand out so long as I live, is the fact that, not alone had the great countries, France, Germany, Great Britain their separate rooms for the exhibition of the products of their art, but that Denmark, Finland, Servia, Greece and countries very much the same as Wales in population and in ordinary material wealth, had each one of them, even distant Finland, separate rooms in the great exhibition, in order to show, as show they did, the splendid products of the native art of each country. I wondered then, as I often wonder whenever I think of these nationalities now, whether it is possible that in the times to come our own country may claim a place in the galleries which from time to time will show the collective activities of the nations of the world.

But, even without this, one is glad and proud that there have been from time to time witnesses to the latent power for art in the Welsh people. It is true that many of these have shown this latent power well over the border of Wales and in other lands, but I think they have almost all shown it with a personal pride in their early training and recollections and associations connected with their life in Wales. Take, for instance, the fact, which must bring some pride to every Welshman, that the real father of the British school of landscape was Richard Wilson, who was brought up in comparatively humble surroundings in the little village of Penegoes. One of the most prolific and ablest of the sculptors who have brought glory to the British name in sculpture was John Gibson of Conway. Inigo Jones in architecture, and Owen Jones in laying down the principles of

\* An address delivered by Mr. T. E. Ellis, M.P., before the Cymmrodorion Society.



ornament, both Welshmen, have shown that from time to time there will arise from Wales witnesses to the latent power which lies in the race and in our people. In our own day we have witnesses to this same power. Were it not for a happy meeting which I had with a fellow-countryman after coming to the room to-night, I would venture to say a word or two as to the feeling of joy with which we look upon the career and the great promise of a still greater career of our countryman, Mr. Goscombe John; and, at any rate, one can (in the absence of Sir Edward Burne-Jones) express the pride which every Welshman and Welshwoman must feel that it has been left to one of Welsh blood, and who is proud of his Welsh blood and lineage, to bring forth new powers and show forth new secrets in art, in the person of Sir Edward Burne-Jones. Who can measure the wealth of the thought and reading and fine literary discrimination which is signified by the command possessed by Burne-Jones over the entire range of Northern and Celtic and Greek mythology, or the tenderness and largeness of sympathy which have enabled him to harmonise these with the loveliest truths of the Christian faith?

Before I touch upon my actual subject, I ought to refer to one other point. That is the change which has come over Wales in one respect during the last thirty or forty years in the fact that artists—not, I am sorry to say, as a rule Welsh artists, but artists from outside—have from time to time lived and settled down in Wales, in order to interpret the scenery and the life of Wales. My feeling in regard to them is one rather of sadness that the interpretation of the beauty of the landscape and of the life of Wales should be left to artists from outside, and that their products should be for a public outside Wales. Their pictures do not pass through the mind or the heart of Wales, and this must be so until we have a municipal gallery or galleries, or national gallery or galleries, where the products of these artists who have seen the loveliness of Wales can be exhibited for the wise enjoyment of the Welsh people. As it is we have neither galleries nor artists of our own, nor any means, except the wealth and good fortune and taste of an individual Welshman here and there, of securing for our people either temporarily or permanently the artistic interpretation of the landscape and life of Wales by artists who come and live in Wales or settle down there for a season.

But, perhaps, national or municipal galleries are not the main thing necessary for the cultivation among the Welsh people themselves of a sense and capacity for art. I think it quite possible that both in England and in Wales we may have at the same time the production of hundreds and thousands of paintings or pictures, and yet a deterioration of the public taste and artistic taste. I think this is largely due to the fact that art and artists on the one hand and ordinary life and industry on the other hand have, during the last century and a half, been more and more divorced, and I am convinced from what I can read and learn and observe, that we can never expect a real pervasive feeling and taste for art until this divorce between the artist and his studio, on the one hand, and the workman and his workshop, on the other hand, can be done away with, and the gulf between them be bridged over. That being so, I feel that we should not so much concern ourselves about what I may call the great master arts of painting and of sculpture and of architecture, as with the more domestic and decorative arts, to which I desire to refer to-night. For great artists and great sculptors cannot be produced, even like senior classics and senior wranglers, by great schools at great universities. They can only be produced very largely by nature's own pleasure, at her own time, and in her own way, her own, very often, quaint and striking fashion. But though they cannot be produced at schools, yet I think that the history of the art world will show us that they will arise from among the children of an educated race, cultivated in music and in literature, and of a race where there has been developed an innate instinct for beauty, derived from arts practised from father to son, and extended from valley to valley and from workshop to workshop.

I referred a few minutes ago to the divorce which the introduction of machinery and the great industrial revolution of the last century and a half have brought into the art and industry of this country. I think that that divorce has had a bad effect upon both the artists of our day and upon the workmen, the craftsmen of our day. For it comes to this, when the artist, say the architect, has great designs, noble views of his own with regard to the rendering of a great building, he makes this design in his studio, he probably submits it to some national body or to some committee, and when it is approved or accepted, it is then placed in the hands of men whom he has never known, with whom he has never come in contact, and with whom he has, as a rule, very little sympathy. I believe I am right when I say that in the great ages of production, in the ages, for instance, of the building of the great abbeys and the great cathedrals and churches of England and of Western Europe, the actual architects had in all manner of ways a much nearer touch with the actual workmen. As a matter of fact, I believe, that the artificers, the workers, of our great abbeys and churches, were housed very often in the abbey,

church, or in the very house of the great founder; very often the bishop himself was the architect. And I have no doubt that Wykeham and Gower, as well as many others, were not merely architects living in a studio, but that they were in close and constant and loving touch with the actual workmen who carved the stone and placed the wood, and found pleasure in carrying out in the minutest detail the ideas of their great master, the architect of those churches and abbeys. That is not so in our day. The artist very often takes very little interest either in the problems or in the life or in the wants of the actual workman or craftsman, and the craftsman is not taught very often, and is not encouraged to take actual personal pleasure in carrying out the ideals and the plans of his master or his architect. I venture to think that the only way in which that gulf can be to some extent bridged is by so modifying our present system of industry as to make it possible for the workman to take and to feel a personal human interest in the actual details of his work from day to day. As things are at present, owing very largely no doubt to the enormous development of machinery, owing perhaps also to the enormous extension of our great factory system, it is difficult, and in many cases perhaps impossible for workmen to use hand and brain and affection in the way to which I have referred. But I am convinced that it is our duty, so far as in us lies, to make it easy for the workmen and for those for whom homes and schools and chapels are built, to feel and to realise that it is possible to give thought and brain, the highest qualities of art, to the construction even of the simplest form of building, whether that building be a house, or a school, or a chapel, or a hall of council. And, although we in Wales cannot hope to produce at command great sculptors, or great painters, or great architects, yet I am convinced that we can very largely through our public and national system of education do much to kindle and rekindle and nourish the instinct for art in its application to industry, for beauty of design and truth in workmanship, in the mind and the life of the people, and more especially by nourishing the domestic and decorative arts, which are the handmaidens of the mother art of architecture.

You may ask me what is meant by decorative art. I would reply to that in the words of perhaps the greatest witness to the need for domestic art and to the results, and to the beauty and to the value of it to the national life, namely, William Morris. He said that the twofold office of domestic art is to give people pleasure in the things they must perforce use, and to give people pleasure in the things that they must perforce make. Now, let us apply that definition or description of the office of decorative art to two simple things, to the building of a home and to our regard for a book. I will not go to-night outside these two things. I only take them as the two that are nearest to us, as the two that are necessary to us, and as the two that during life give us the greatest possible pleasure and joy; and I must admit, as I look round parts of Wales and parts of England, that we have very much to learn from the generations that have gone by with regard to them.

In our prosperity, our love of change, our tendency to follow the fashion of the day, we have one and all cleared off from Wales most of the memorials of what native art there was. The number, for instance, of the homesteads, whether manor-houses or farmhouses or cottages, of Wales, which are old, is already comparatively small. The vast majority of the old churches of Wales have been restored out of all recognition. You can go to various glens in Wales and various country sides, where some of the very loveliest churches in this country used to be, and instead of those beautiful buildings that attract and extort the admiration even of the most aggressive politician, what will you find? Not these ancient buildings, except one here and there, but spick and span churches, that you would not really spend half an hour in crossing over fields to see. I have felt the deepest and bitterest regret in going to certain parts of Wales, where there were some of those magnificent old churches, and finding hardly a stone or trace of the old church, which has been replaced by some utterly modern and characterless building. But there are enough manor-houses and farmhouses and cottages in Wales still to show us that there was almost instinctively in the builders of these a natural taste for what was fitting and pleasurable and beautiful. Before entering these old houses, one thing, I think, strikes most observers. That is, that our forefathers in Wales did not plant their houses just in the first place that came. Many of our villages now, and of our newer houses, are just planted like railway stations, anywhere, without taking any account of their situation or anything else. But if you observe the old homes of Wales, whether manor-houses or farmhouses, or cottages, you will find that the builder has been very careful in his choice of the site. Not that, as a rule, he chose to build a house where he had the best view of scenery, because peasants do not realise usually the beauty of landscape, but he generally chose it in a spot sheltered from the prevailing wind. The house was built where there was a sense of comfort and of snugness, and instead of leaving the house bare to the four winds and to the tempests



and rains of Wales, the builder generally surrounded it by a belt of sycamore, or ash, or oak, or pine trees. I often wish that the builders of our day, the great landowners of Wales, as the case may be, or you rich London people who go down to Wales and build your houses on our hillsides, would remember these two things that our forefathers did naturally.

Before we go inside the old Welsh home there are one or two other points which are always of great interest to me—in fact, three points, the porch, the window and the chimney. It is very seldom that I see in modern houses in Wales the same charm, either of chimney or of window or of porch as in the old Welsh houses, and these are not matters to be trifled with. I think that the square, squat chimney on a house is one of the ugliest and the most portentous monstrosities that the eye can rest upon, and I feel a certain joy when I think of some of the old houses, especially some old Tudor and Stuart houses in Wales, where the chimneys themselves are things of beauty, not those square, squat piles of stone, but fine long, almost sinuous chimneys, that are a joy to look at. The windows of many of the old houses are not perhaps very regular; they are not placed, as in a good many modern houses, just like a postage stamp on a letter, but there is a certain fittingness about them; there is very often either about the shape of the window or about the casement, or the way of disposing of the glass and the lead or wood, something to attract and to please the fancy. In the porch or door one is glad always to notice in the older houses not alone the solid, honest way in which the door and its framework have been put up, but the fact that the timber itself has been thoroughly well chosen and well seasoned, which is not true of most of the modern houses, and that, instead of having handles and knockers chosen out of those made by the gross at Bilston or Wolverhampton, they have generally finely-wrought handles made deftly and honestly by the village blacksmith, which stand not the racket of a few years, but work as easily and as smoothly to-day as they did when Elizabeth was queen or Charles I. was king.

When you go inside some of these old houses, is there not a certain character about the house which is missing in our more modern farmhouses? Take, for instance, the characteristic of every old Welsh house, the great mantel over the fireplace, not a miserable little grate just stuck at one corner, but a real mantel, which is a feature of the whole room, where there is plenty of room for a fire, and where the family can comfortably sit around it at night, and not feel that one is taking the whole of the fire, and that the others have to take a back or an apologetic seat. It is a joy to me that, in what I may call the better planned houses of our own day, the houses that are planned by our greatest architects, and that are enjoyed by men of wealth and taste, this great feature of the old Welsh houses, the great mantel, is becoming, whether in the hall or in the dining-room, one of the striking and most pleasurable features. I am always glad to find also in old farmhouses, not alone that there is a noble fireplace with a fine mantel, but that there is also in most of the old Welsh houses a collection of really fine fire-irons, and, believe me, there can be the display of as much real art and taste, and honesty of design, and of workmanship in fire-irons as in most of the pictures that are exhibited at the Royal Academy. I always feel when I see these in a good many old Welsh homes that we have there the highest of the elementary requisites of art, viz. fittingness for the work they have to perform, taste in design, and thorough honesty in workmanship. Then look at the furniture. I need not recall to your memory the quite modern furniture of most of our houses, the gimcrack things they are, the miserable things without shape or form, which very quickly give way, and which have nothing in them either of character or of attraction, and nothing in them which would mark them out as forms of furniture which are meant, not alone for one generation, but for a succession of generations, so that the association and the tenderness and the love of home should imperceptibly and unconsciously be carried on even in the very furniture and the very atmosphere and surroundings of hearth and home. Take some of the features of any old Welsh house. Instead of the miserable cupboard, where the hinges very quickly come loose, and where very often the wood has been so badly seasoned that you will see cracks in various parts of even a very presuming piece of furniture, what is the main feature of the furniture in an old Welsh house? A real substantial oaken cupboard—a *cwbpwrdd tri-darn*—that is a joy to look upon; you will very often see upon it perhaps two or three letters and a date, sometimes in the seventeenth, sometimes in the eighteenth century. It is well proportioned, it is shapely; perhaps there is a dainty bit of carving on it. At any rate, it is serviceable; it has served not one generation, but eight, ten, twelve, fifteen and twenty generations in that hearth and home, and are you surprised that there should be in Wales that strong affection and attachment to hearth and home which puzzle very much the modern man, but which I think are a glory and a strength to the Welsh character and to the Welsh nation? I need not mention other parts of the furniture and economy

of a Welsh house—the dresser, the settle and many other forms of furniture which are not merely characteristic of old Welsh houses, but which, as I ventured to say before, unconsciously carry a message from generation to generation, and which add to the associations and to the wealth and to the enjoyment of a home, making it possible, I think, not merely for the most beautiful home affections to be nourished, but making it possible from time to time to have issue from those houses men and women who can and must distinguish themselves in art and in other spheres of activity. Of late years, owing to circumstances and conditions of life and tenure and law, the number of houses which are built by those who have to dwell in them is comparatively small, and we find as a result that, not merely are houses thrown up, so to speak, in our industrial districts suddenly and without much thought for anything except a quick return and a fair dividend, but that even in our agricultural and our peasant districts the person who has to live in the home is no longer, or very seldom, the builder of his own house. It may be that this is inevitable, and that we have to make the best of it, but at any rate I think it is only well to face the fact that some of our greatest teachers say that we can never hope to have beautiful homes and fitting homes so long as they are built, not by those who have to live in them, but by others, who, perhaps, have only some material or cash interest in them. Ruskin somewhere says, I think it is in "The Eagle's Nest," "If cottages are ever to be wisely built again, the peasant must enjoy his cottage and be himself its architect as a bird is. Shall cock robins and yellow-hammers have wit enough to make themselves comfortable, and bullfinches pick a Gothic tracery out of decayed clematis, and your English (and he might add your Welsh) yeoman be fitted by his landlord with four dead walls and a drainpipe? Is this the result of your spending 300,000*l.* a year at South Kensington in science and art?" Without entering into the question of the tenure of houses and land in Wales, or into that most interesting question of the future of South Kensington, I think it is interesting at any rate, and perhaps right that we should study and think over this dictum of Ruskin; for I must admit that much as busy generations and the multitude of the Philistines in this country have laughed from time to time during the last fifty years at the teaching and the dicta of the master, yet time constantly brings him its revenges, and dicta which thirty or forty or fifty years ago, and even to-day, are scoffed at by busy, prosperous, pushing men, have a curious knack of being recognised as permanent and solid truths by the more thoughtful men and women of our time. I must admit that I do feel a certain sense of void as I think of the buildings, the farmhouses and cottages of Wales, their want of character and very often also want of anything like attractiveness of form, and certainly their want of anything like personal individuality. I repeat, I feel a certain void when, as I sometimes have the pleasure of doing, I pass through Swiss or Tyrolean villages and glens, and observe how the Swiss and Tyrolean peasants can and do build themselves a *châlet*, fittingly proportioned, daintily carved with scrolls or inscriptions, and with variations of line, and form and colour which give an individuality to each dwelling.

I hope that, whatever may be the laws which govern the tenure of houses or of land in Wales, we shall do, as I am glad to find the committees of our *Eisteddfodau* do, our very utmost to impress upon the workmen and the handicraftsmen of Wales the dignity and the value and the possibilities of their everyday work. I am not to-night going to enter into the work—precious and priceless pioneer work—which the committee of the Newport *Eisteddfod* and, in a more modest way, of the Festinoig *Eisteddfod* are doing for art and handicraft in Wales. I believe that a perusal of the published programme of Newport, and a perusal also of the programme of Festinoig, give one some sense of joy that the *Eisteddfodau*, not content with instilling a love for and helping the practice of excellence in music and in literature and in poetry, are doing something, and, I believe, something substantial, to make it possible for those who build houses in Wales, those who own them, and those who work upon them, whether carpenters or joiners or blacksmiths or furniture-makers, to put thought and heart and brain into the construction of these things of everyday life and of those homes and surroundings and furniture which imperceptibly have a very great influence upon the old and young, who are trained and who live in their midst.

Having referred to one of my subjects, the home, I will now proceed to say something of our regard and care for books in Wales. Whatever may be our possessions or our want of possessions, our opportunities and institutions, or our lack of them, this at any rate is true, that there is in Wales a respect for and a love for books, and that our countrymen probably draw as much joy and comfort and strength from books as the common people of any country. Some people, I think quite a number of people, believe that any paper, or any type, or any cover is good enough for a book; they say that all they want in the book is the actual word. From my point of view, to treat a book in that way, and to say that any paper or type or cover



is good enough for it, is a form of sacrilege. It is a betrayal of the best friend a man has; it is scurvy treatment of a man's greatest comforter and best friend. For what after all is a good book? It represents the most precious heritage of the ages, it contains the highest thoughts of God, of nature, and of human things. It represents what mankind, by a curious and very sure instinct, looks upon as a permanent and imperishable treasure; and yet some would say that it is good enough for this precious heritage to be huddled anyhow into a tawdry or rubbishy cover or shoddy binding, with careless and blurred type, on cheap and nasty paper. Can we not in Wales give a nobler place, take a righter view of the value of a book, as a friend, as a comforter, as a strength to us? So far, what we have done with our books, as a rule, is to leave them in the British Museum or let them be kept, too many of them, in manuscripts at the caprice of individuals, and subject to the ravages of time and the ordinary accidents of circumstance. Happily, more and more of our books, of our permanent treasures, are being published. Can we not give a further appreciation of the value to the individual and the active life of our people of our books? Can we not, for instance, more and more encourage those who desire to place the great thoughts of the world, not on miserable paper with bad type and characterless binding, without any illustration except perhaps an engraving of some thoroughly cheap and handy reproduction from a photograph, can we not in one way or another, either individually or collectively, encourage these beautiful arts of printing well, of illustrating well, and of binding well? If individually we do this and encourage this, I believe we shall give an enormous impetus to one of the noblest forms of decorative art in Wales, and is it not high time that we should in this way treat the Mabinogion, Dafydd ab Gwilym, Ceiriog's Myfanwy, yes, and even the Pennillion Telyn and the Tribanau? These are racy of the soil of Wales; in one and all of these you feel as you read them, as you look at them, the very pulses of the life of Wales, and yet we are satisfied if we can just manage to get them in a shilling or sixpenny edition, turned out with very little care and very little trouble. Cannot we hope that our artists may find their inspiration, as English artists do in Chaucer and in the great masterpieces of English literature, in, for instance, the Mabinogion, and in illustrating what I may call the home and domestic poetry of the Welsh people? Cannot we also hope that there may be set up in many parts of Wales printing presses which shall take real trouble and go to some considerable expense in securing not the cheapest but the best type, and shall we not also do our utmost, individually and collectively, to encourage what I have always considered, and will consider one of the most serviceable and highest forms of handicraft, namely, the binding of books? I do think that a beautifully bound book is a joy in itself now and for ever to its possessor, and there is no reason whatever why in this matter a great deal of steady and speedy improvement should not be secured in Wales. There is no need for us to go through any great agitation, we have only, one and all, to do our duty towards our best friends, the favourite book of childhood, of youth and of age.

I might easily mention other forms of activity and of craftsmanship where decoration and beauty of design and honesty of workmanship come in, for instance, pottery, tapestry, even posters. I think that really one of the very many increasing joys of living in London is the enormous improvement in the posters of this great town. I feel a considerable interest whenever I go through a town in a good many things in it, in its houses, its churches, its schools, and in the faces and dresses of its people, but I must admit that advertisement hoardings in every town have as much charm for me as anything. I can see there a miniature of the life of the town, I can see what the real activity and interest of the town is. I consider that they form a very fair indication of the life and the taste and the promise of a town. I remember that after visiting one town I came away with a feeling of thankfulness for one poster that I saw pasted up on a hoarding in it. The town was that sink of iniquity, as I consider it, the town which is built just at the entrance to the Suez Canal. I believe that the human rubbish and vice of the world has been carted into a heap in this town. I think I have never seen a town with so many glaring proofs of the hideousness of the moral life of the place, and I must admit that, during my stay of a day or two there, I never felt more uncomfortable in any town. But the morning before I sailed down the canal, I came across one poster which must, I think, have been printed by an Italian printer. It was beautifully done, and on it was a call to the Italians of that town to celebrate, I think, September 20, the entry of the Italian troops into Rome in 1870. It called, in the names of Mazzini, Garibaldi, Cavour and Victor Emmanuel, on all the Italians in that town to meet together on September 20 to commemorate that striking day in the history of their fatherland. The very sight of that poster, which was beautifully printed, and seemed to me to convey a splendid image of the nationality and humanity of the Italians scattered over this vile town, gave me something like

a redeeming glimpse of the life in that dreadful place. Therefore I hope that in Wales we shall not look down upon the value of the poster, and I am extremely glad that both the Newport and the Festiniog Eisteddfod committees have offered a handsome prize for the best pictorial poster for an Eisteddfod.

There are other by-ways of activity, about which one can speak in reference to descriptive art. There are village crosses and memorials, there are memorial windows in church and college, and there are tombs. I shall not refer to-night to any of these, except by the mere mention of them, but I always feel that a very great deal can be done for the rekindling and fostering of beauty of design and honesty of workmanship in all these various features. I think nothing is more attractive in the villages where they still survive than the old Celtic crosses of the early centuries. They are silent witnesses to the generations that have passed away in those villages, and they are witnesses to this day of the beauty of the design and of the instinctive skill which a Welshman in the early, the ninth, tenth and eleventh centuries possessed. I shall be extremely glad when villagers themselves, or those who have left villages and prospered in the world and go back again, realise what a service they do to a village if they help to raise, not perhaps a village cross, but some form of village monument to those who either in the village or out of it have done credit to their birth-place and service to humanity. I was one day last summer in an out-of-the-way little village called Llansannan, which is considered to be a completely out-of-the-world place. There you find at the present day some of the most characteristic Welshmen in the whole of Wales. There you find a certain freshness and vigour of spirit and of activity and a great deal of splendid conservatism on the part of the villagers and the peasants, and I felt as I looked upon the open square of the little village that it would be a real addition to that village, and something that would perhaps kindle the young mind there, if a fitting monument, say a Celtic cross, such as you find in Pembrokeshire and in many parts of Ireland, were raised in honour of the men who have been reared in that parish. Four names at once occur to me as being worthy to be placed side by side, or one after another, on such a village cross. For a parish which has produced at various ages Tudur Aled, William Salesbury, Gwilym Hiraethog and Henry Rees is a parish which can be very proud of itself, and a parish which ought, I think, to rear for generations of its children a monument to show that it appreciates the services which men who have been reared and who have lived in that parish have rendered, not only to that countryside, but to the whole of Wales, and some of them to humanity.

To sum up these stray thoughts of mine, I would say that our duty is, first of all, to banish from our minds the idea that art is something really confined to painting and sculpture, and to impress, in season and out of season, by word and by deed, that the only real hope of art is in its constant application to industry and to everyday life. I would further say that it is our duty in our national system of education, in our primary schools, in our secondary schools, and still more in our evening continuation schools, to impress the necessity for manual training, for training in the use of tools, and for training in various handicrafts. I would further say that we should give every possible encouragement to the suggestion, for instance, which was made at a Cymric gathering by Professor Herkomer, that we should not alone rely upon manual training and training in the use of tools and in handicraft in our schools, but that there should be raised in Wales one or two or three schools of art and craft, where workmen and others can be trained, and from which we can hope to secure an adequate and permanent supply of well-trained teachers. I think also that we should, so far as possible, by this means and by other means encourage the establishment and the fostering of home industries, of village industries in Wales. This does not imply at all any piratical desire to upset what I suppose must be the normal and permanent system of industry in this country by factories and by machinery, but there is still ample and abundant room for the development of handicraft in wood, in stone and in metal. If one asks how this can be done, all I would say is this: it cannot be done suddenly and quickly, the development of taste and gradual accumulation of hereditary skill, and the diffusion of right ideas of design and of art among a people, cannot be achieved by passing resolutions or by plébiscite, it can only come by education, by right ideals and by patience. If we have right ideals, if we give the right encouragement and if we persist in well-doing, then I think we deserve the right to look forward steadfastly and hopefully to the dawning of that fuller and ampler time when the cottages of Wales, when the halls of council of Wales, when the schools where the young of Wales are trained, when the temples where the manhood and womanhood of Wales pays homage to the powers that guide it and create it and maintain it, when all buildings and all products of the national mind shall show that there is a real vitality in the national art of Wales, in that art which shall mirror not only the bright fancy of the Celt, but also that spirituality and that serious outlook upon life which characterise the Cymry.



## GLASGOW INSTITUTE OF ARCHITECTS.

THE usual quarterly meeting of this Institute was held in the rooms, Pitt Street, on the 25th ult., Mr. John Jas. Burnet, president, in the chair. The President reported that the Council had remitted the question as to the lighting of the Lower Church of Glasgow Cathedral to a committee of Council. He also reported that the Corporation of Sheffield had appointed a jury of three members of the Sheffield Society of Architects as assessors to adjudicate upon competitive plans, and that it had been remitted to a committee of Council to consider the position of this Institute with regard to architectural competitions. The President also intimated that the Council had appointed himself and the Vice-President as delegates to attend a meeting of the Sanitary Congress to be held at Leeds in September. Mr. Colin Menzies, 2 West Regent Street, having been recommended by the Council, and being approved of by the meeting, was elected a member of the Institute. Letters from Messrs. Honeyman and Leiper, acknowledging in gratifying terms the congratulations of the Institute on their election as academicians, were read. Letters from Mr. Gourlay regarding the examination of drawings for the Technical College prize were read, and it was reported that the prize, which was to be called the Institute of Architects' prize for the best set of drawings and sketches, had been awarded to Mr. Wm. S. Moyes, whose drawings were extremely creditable. The secretary reported that it had been remitted to a committee of Council to consider as to a curriculum of architectural education.

## EDINBURGH ARCHITECTURAL ASSOCIATION.

THE Edinburgh Architectural Association visited, on the 27th ult., Hatton House, Mid-Lothian, by the kind permission of the proprietor, the Earl of Morton, and the tenant, Mr. James M'Kelvie, under the leadership of Mr. Thomas Ross, F.S.A. The house, it was explained, has a massive central keep, with later additions round it. In the time of Robert II. John de Haltoun was proprietor, and in a few years it passed to the Lauder family, the Lauders of the Bass, in whose hands it remained for several centuries. The Lauder family were implicated in the assassination of the Earl of Douglas, and incurred the deep resentment of that powerful family, who captured the keep, but were ousted by the timely assistance of the king, who sent the "great bombard," supposed to be Mons Meg, to the help of the Lauders, who, again obtaining possession, were permitted to re-edify the keep. Early in the seventeenth century Charles Maitland, brother of the Earl of Lauderdale, and a well-known officer of State in Scotland, became proprietor, and began the extensive additions of which much remains. He appeared to a certain extent to have copied his brother's manner of laying out the gardens at Ham, and the work which was carried on by his successor had made the house with its gardens, terraces, sundials and statuary, one of the most interesting and pleasant in its own part of the country. Mr. Ross expressed his indebtedness for many of his descriptive and historical notes to Mr. J. R. Findlay, at one time tenant of Hatton, and who, he said, prepared an interesting monograph. On the motion of Dr. Rowand Anderson, a vote of thanks was awarded to the proprietor and to the tenant for permitting the visit, and to Mr. Ross for conducting the party.

## JUBILEE DECORATION.

A CORRESPONDENT of the *Times* says that at the present moment there is but one comprehensive plan in the field for the decoration of London in June. It is the work of Mr. Frederick Vigers, an artist, and of his brother, Mr. George Vigers, an architect, and, being the only scheme yet formulated, it is worthy of consideration.

This scheme proposes the erection of triumphal arches in Whitehall to illustrate the alliances of the Royal Family. The Indian Empire would be represented in symbolical fashion in Piccadilly at the top of St. James's Street, the Services would be similarly represented in Pall Mall, Canada in the Strand, the whole British Empire at Ludgate Hill viaduct, Australasia at the west end of Cheapside, Africa in King William Street and the British Empire a second time in the High Street, Borough. There would be a device consisting of three columns on either side of the street at the south side of St. Paul's, bearing portraits and allegories of the two great Queens, Victoria and Elizabeth, and drawn across the street between the sets of columns would be a broad cloth painted with a design of the rose and oak of England and the badges of the two Queens. At the western steps of the cathedral, on either side of a spire-shaped baldachino in cloth of gold and red brocade, would be two long canopies of red brocade with a golden design, the whole supported by pillars, in red velvet

and gold, bearing golden figures of angels with uplifted wings. Two similar canopies of red would be erected beside the Temple Bar memorial. The streets would be lined with masts bearing the names of the famous men of the reign, and between the masts, parallel with the houses, but not crossing the streets—so as not to impair the view of the procession—would be garlands, while across the footway, from each mast to the wall at the back, other garlands would be hung, a different combination of colours being adopted for each street. Around the monuments of Royal personages along the route would be pillars bearing the Royal arms, and around those of great soldiers and sailors pillars bearing "victories" and laurel wreaths. In Trafalgar Square great columns would be erected bearing "victories" and British lions alternately, and tablets containing the names of the men of action of the reign. There would be double columns with shields inscribed with lists of the victories of our greatest heroes. A scheme of illumination on an elaborate scale is also embodied in the projected plan of decoration.

The designs of Messrs. Vigers's scheme have been submitted to Mr. Armistead, R.A., Mr. Calderon, R.A., and Mr. Alma-Tadema, R.A., and have elicited warm expressions of approval. Without claiming for the scheme that it is the best that could be devised, it may fairly be said that it is a very creditable and successful attempt to treat a difficult subject with taste and artistic skill, and should certainly not be dismissed without receiving the consideration which it merits.

## TESSERÆ.

## Roof of Westminster Hall.

THE roof over Westminster Hall was finished about 1399 in the reign of Richard II., the principals being 68 feet in span and about 18 feet apart, each formed of a pointed arched rib in its section upwards of 2 feet each way, spanning the width of hall, intersecting at about half its height with a massive hammer-beam of similar scantling, and extending on one side to the feet of principal rafters, and on the other to a similar extent; so that, if secured on a central pivot, this timber might be acted upon as a scale beam or lever of the first order, and if loaded equally at both ends would remain in its horizontal position, while the entire weight would be concentrated on the pivot and thrown on the supporting arch. Mr. Thomas Morris says that, "If, taking the hammer-beam as a base, we draw a perpendicular line from the inner extremity, it will be found to cut the surface of the roof just midway between the roof and the ridge, and taking this surface line as the hypothenuse, a triangle will be completed. This triangle will be found to have an exact counterpart in the upper half of the roof; but as the weight is proportionate to the superficial area, it is only necessary to explain that this area is divided longitudinally into two equal parts; that under this divisional line a purlin exists upon which is collected the weight of the upper half of the roof, and this weight is transmitted by a vertical post to the inner end of the hammer-beam. The lower half of the roof discharges in like manner its weight on the outer end of the same timber, and the equipoise is thus rendered perfect."

## Greek Proportions.

The Greek architect attached the highest importance to the determination of his dimensions by proportion, and to the execution of those dimensions with minute exactness. Accidents and faults apart, for which a margin must be always allowed, nothing was left to chance, random, or remainder. Dimensions are proportional, in the customary sense of the word, when they have a common measure; but it becomes of importance to decide in what directions they are most appropriately taken, which lines are architecturally characteristic. The Greek architects brought into comparison dimensions measured along the same straight lines, or lines parallel. Thus the height of an entablature may be commensurable with the height of a column, the breadth of a metope with the breadth of a triglyph, the height of a naos door with the height of a pronaos column. Another important form of comparison is between dimensions taken at right angles to each other. Thus it seems obvious and reasonable to estimate the proportion of an oblong plan by comparative statement of the length and breadth; no doubt its form might be recorded and communicated numerically by the statement of the angle of its diagonal with a side; but the eye does not judge such a proportion by reference to the diagonal. The comparison of length and breadth of the temple measured upon the top step, of the height and length of an apartment, of the height and breadth of a façade, or a triglyph, &c., are examples of rectangular proportion. Assuming it to be determined that no dimension shall be admitted into a design that shall not be proportionate to some other dimension, either rectilinearly, rectangularly, or both ways, it still remains to be considered what proportions or what ratios (using an equivalent expression) shall be adopted. Ratios even of low numbers exclusively offer themselves in crowds, and are to be subjected to arrangement



and selection. If we commence with two equal lines, and leaving one unaltered, alter the other by continuous diminutions, we shall find every conceivable or possible ratio occurring between absolute equality, 1 : 1 on the one hand, and absolute disparity, 1 : ∞ on the other. If we pause at certain stages of the progress, as determined by some principle, these resting-places will form a scale of proportion, a series of steps by which we may regulate degree of approach to and departure from equality between any compared dimensions or series of dimensions. On what principles are the resting-places to be determined, the scales constructed? First, the design itself will necessitate the adoption of certain ratios from the requirements of purpose and plan. Secondly, the variety of exigencies demand that the other selected ratios should range pretty widely over the interval to be divided, and give a choice of proportions verging towards inequality and well as towards equality, yet with sufficient interval to preclude confusing proximity.

#### Da Vinci's "Della Pittura."

Eminent and notorious as are the benefits conferred upon art by the written precepts and the painted examples of Leonardo, their value has nevertheless been questioned and depreciated. The malapert spirit of cultivated mediocrity has risen with ingratitude against its most venerable benefactor. The unfortunate and ambitious Haydon sanctioned it by his voice when he remarked that Sir Joshua Reynolds "first brought the principles of art into something like consistency; and, though greatly indebted to Coypel, he first rescued it from the trash of De Piles, the commonplace receipts of Leonardo, great man as he was, and all the old bewildered theorists." Why, Leonardo was to Reynolds what Cadmus was to Augustus Mathiæ: he created the very alphabet of the art of which Reynolds was only the ingenious expounder; he created the very language of the art, and Reynolds, by a precise and laborious classification of that language, rose no higher than to become its grammarian. As well might we rate the first type-founder now living as superior to Gutenberg; as well might we give precedence to a Glasgow engine-builder over the immortal Watt; as well might we regard a modern optician as worthy of more veneration than Newton or Galileo. It is evident that the sarcasm of Haydon is directed against the celebrated treatise, "Della Pittura." That composition is, in itself, a brilliant contrast to the sneer. But artists of unquestionable genius have afforded a counterpoise to the contemptuous allusion of Haydon, by the panegyrics which, both in conduct and expression, they have pronounced upon that renowned treatise. "Della Pittura" was the *vade mecum* of Nicholas Poussin. On first beholding a manuscript copy of the work, Annibali Carracci lamented that he had not perused it before, declaring it to be his conviction that it would have saved him twenty years of assiduous toil. Not to mention the eulogium passed upon the *trattato* by the competent judgment of the Count Algarotti, there is a sufficient guarantee that its chapters cannot consist of merely "commonplace receipts," in the extreme caution which characterised the intellectual researches of Leonardo. In reference to this cautiousness, M. Saint-Germain distinctly asserts that the great artist was more engaged in investigating the theory of his art than in labouring upon his pictures:—"Il employait à la théorie de son art beaucoup plus de temps qu'il n'en mettait à l'exécution de ses tableaux;" or, as the Abate Luigi Lanzi has otherwise expressed it, in his eloquent "History of Painting in Italy," Da Vinci was more solicitous to improve the art than to multiply his pictures, "Più a migliorar le arti, che a moltiplicarne gli esempi," and hence his easel was less prolific than those of his distinguished contemporaries. Another analytical writer has elsewhere penned a sentence which would almost seem to have been a predestined climax to the foregoing quotation. Summing up the qualifications of Leonardo as a painter, André Félibien declares that, as a theoretic artist, he remembers no one who has evinced such wisdom—"Je ne sçay pas mesme si depuis luy il y en a eu d'aussi sçavans dans la théorie de cet art." Though we would by no means imply that the judgments of Saint-Germain and Félibien are to be considered as infallible, we are satisfied that their opinions are, at the least, admissible against the platitudes of Haydon.

#### Wren's Model of St. Paul's.

In contemplating the floor plan of the rejected model of St. Paul's, we immediately see how its author has set at naught the influence of familiar custom as a cause of beauty. We have a general outline and internal disposition of parts perfectly original. Instead of the ordinary rectangular combination, we have the square, the curved, the polygonal, the concave, the convex, the recessed, the salient, affording the most varied play of full light and half light, sharp in contrast with shadow and shade, or softly gradational the one into the other, while the outline of the plan includes within its full-bodied expanse the cross as the skeleton form, whose dome-crowned centre is the "heart of the mystery." In the existing cathedral we see the old Gothic model Romanised, with a dome vice a central tower, and instead of flying buttresses openly exhibited, a

decorated screen looking like an upper storey, concealing them; but in the model we have a design not less original than magnificent, with artistic feeling far exceeding what is displayed in any single building of ancient or modern times. The refined pictorial, of bulk and varied form, here presents itself in lieu of the Gothic picturesque, of attenuated length and transeptal interruption. And now leaving the outline, let us contemplate the floor plan. Let the reader especially imagine the first long and narrow perspective from the west door, the forthright and divergent views on his passing the arch next beyond the vestibule, the view on just entering beneath the great cupola, that from the centre of the same, and that from beneath one of the diagonal cupolettas. All this justly considered he may so conceive of the magical effects realised as to see "with his mind's eye" how comparatively commonplace are the effects produced in the existing cathedral. Well may we believe that its designer wept at the rejection of his model, and well might we weep that it was rejected. In the model the portion for the choir is of a form much more adapted to the purposes of Protestant worship than in the building, and of a capacity equivalent to what Wren pronounced the maximum size for an auditorium, in which all the sitters may distinctly see and hear the preacher, *i.e.* it is equal to a room 80 feet long and 50 feet broad, exclusive of the space required for the organ and the communion recess. Wren was the last man in the world to design a building without a full regard to its use. He rightly felt, however, that a cathedral is not a mere thing of practical utility, but that it should be the offering of art's best to the Giver of artist genius. In St. James's Church, Piccadilly, he considered the matter on mere utilitarian grounds, and even there produced a structure the interior of which remains a monument not more of his scientific economy than of his feeling for the beautiful.

#### Gas-lighting in Picture Galleries.

There is nothing innate in coal gas which renders its application to the illumination of picture galleries objectionable. Its light, though not so white as that of the sun, is equally harmless; its radiant heat may be rendered innocuous by placing a sufficient distance between the gas jets and the pictures, while the heat of combustion may be rendered eminently serviceable in promoting ventilation. Coal gas may be free from sulphuretted hydrogen compounds; it then has little or no direct action on pictures. But it has not as yet been entirely cleansed from sulphide of carbon which, on combustion, yields sulphurous acid gas capable of producing 22½ grains of sulphuric acid per 100 cubic feet. It is not safe to permit this product of the combustion to come in contact with pictures, painted either in oil or water-colours, and in every system of permanent gas lighting for picture or sculpture galleries, provision should be made for the effectual exclusion or withdrawal of the products of combustion from the chambers containing the works of art. Certain colour tests were arranged by a commission consisting of Faraday, Hoffman, Tyndall and Redgrave. They consisted of surfaces covered with white lead or with vegetable and mineral colours (especially the more fugitive ones), and in which also boiled linseed oil, magylop and copal varnish were employed as vehicles, and were, when dry, covered one-fourth with mastic varnish, one-fourth with glass, one-fourth both mastic varnish and glass, and one-fourth left uncovered. Sixteen of these were placed for nearly two years in different situations, in some of which gas was used, in others not. They gave no indications respecting the action of coal gas (except injury from heat in one placed purposely very near to and above the gas burners), but seven of them show signs of chemical change in the whites, due to either a town atmosphere or want of ventilation.

#### Abyssinian Buildings.

There are two sorts of houses used in Abyssinia, the beta nögus or round house and the sakala, whose ground-plan is an oblong square. The latter would seem to be imported from Yemen, for Niebuhr's plate of his reception by the Imam of Sana' gives an accurate idea of an Abyssinian sakala. But the beta nögus is essentially of Ethiopic origin, for it forms the great majority of dwellings from the Takazay in 14 deg. north latitude to Gobo under the 5th parallel. It is essentially a Chamitic feature, if we may believe the tradition universal amongst Abyssinians, that they are descended from Noah's second son. As the founder of the Pyramids, all Ethiopians, whether Abyssinians, Galla, Södama or Dawro, maintain that the interior of man's dwelling ought to be dark, and sunshine is looked on as a disgrace when falling on a table or couch. Almost all the modern churches of Abyssinia are beta nögus, as if the unconscious nation was relapsing into its primæval ways, but when the kings of Axum coined their own money, carried the tide of conquest down to the mouths of the Marab and Ansaba, or sent the sons of Tögroy to wage war against their Himyaric (?) forefathers, when Yared wrote his sacred music and lives of holy men, when Takla Haymanot planted the Cross in Damot and persuaded King Ytbarök to resign his crown, the prevailing taste was certainly for the sakala, as the



stone house at Abba Asfe, the ruins near Maryam Wagayro, the foundation of the Axum temple and the church of Abba Garima abundantly prove. Indeed, the oblong church of Kirkos in the isle of Tsana and that of Daga Astifanos, founded by Zar-a Yaögob in the same lake and towards the beginning of the fifteenth century, show that a love for the classical sakala continued long after the decline of Ethiopian literature and political importance. Herodotus tells us that the ancient Egyptians were descended from an emigration of Upper Ethiopians, and in Goudrou a singular confirmation of this is seen in a cave sided by natural obelisks, giving an exact prototype of an Egyptian temple. The Sidama in their ultima Thule preserve still the sacred fire, although but a spark, in carving their wooden tables, chairs and door-pieces. In Abyssinia fragments of stone carvings in the church of Abba Penteleon, formerly a heathen temple, resemble Middle Age church tracery. The far-famed churches of Lalibala are paltry copies of Grecian and Byzantine models, and the ruins of Maryam Wagayro and Manna in Bagemidr were probably erected before sculpture was dreamed of. It would seem that an iconoclastic missionary preached Christianity in these remote regions, for with the exception of a few Portuguese stone-cuttings, there are no Christian sculptured imitations of animated nature, but the taste for moulding is as national as in the days of Sesostri, and finds a vent on church door-posts and in carving the tabot or wooden tablets for saying mass. These are often elaborately and sometimes exquisitely ornamented, but only in fanciful design, without a single attempt to copy nature.

### Pulpits in Churches.

The pulpit was anciently disposed towards the eastern part of the body of the church, but not in the centre of the aisle. Pulpits are now rarely to be found of an earlier date than the fifteenth century, when they appear to have been introduced into many churches, though not to have become a general appendage. Ancient pulpits of that era, whether of wood or stone, are covered with panel-work tracery and mouldings; and some exhibit signs of having been once elaborately painted and gilt. Mention, however, is made of pulpits at a much earlier period; for in the year 1187 one was set up in the abbey church, Bury St. Edmunds, from which, we are told, the abbot was accustomed to preach to the people in the vulgar tongue and provincial dialect. The most ancient pulpit, perhaps, existing in this country is that in the refectory of the abbey (now in ruins) of Beaulieu, Hampshire; it is of stone, and partly projects from the wall, and is ornamented with mouldings, sculptured foliage and a series of blank trefoiled pointed arches, in the style of the thirteenth century. In the refectory of the ancient conventual buildings attached to the cathedral church at Chester, is another ancient stone pulpit, apparently of the thirteenth century. In the choirs of cathedral and conventual churches, and in the chancels of some other churches, a movable desk, at which the epistle and gospel were read, was placed; this was often called the eagle desk, from its being frequently sustained on a brazen eagle with expanded wings, elevated on a stand, emblematic of St. John the Evangelist. Eagle desks are generally found either of the fifteenth or seventeenth century; notices of them occur, however, much earlier.

### Penrhyn Slates.

North Wales is the chief slate-producing country in the world; some beds were worked as early as the twelfth century. At Penrhyn the slaty series comprises green slates, purple slates, blue and purplish-blue slates, purple and red slates. Here and there bands of grit are met with, while conglomerates occur at the base. The large slate quarry of Penrhyn is probably familiar to all visitors to North Wales. The summit of the quarry is about 500 feet above the base, and the slates are worked out in terraces each about 40 to 45 feet in height. The beds of good slate are about 200 feet in thickness, and are of a rich purple colour, with green spots. The beds have yielded no fossils save some burrows of marine worms and very doubtful traces of Fucoids, termed *Choudrites*. The bluish varieties of slate owe their colour to protoxide of iron, the red and purple varieties to peroxide of iron. The green banding of the slates and the production of the large uniform masses of green are considered to be not only due to independent causes but probably to have occurred at different times. The ordinary form of variegation of the slates consists of nuclei chemically or mechanically formed and environed by pale green slate, the bleaching of which has been due to the abstraction of the greater part of the colouring oxides of iron. This banding and blotching of the slate was formed probably before the slate was cleared, and some of the purple slate has been changed into green at the junction of the greenstone dykes. An analysis of the slate at the Glyn Quarries, Llanberis, showed 60 to 66 per cent. of silica, 13 to 21 per cent. of alumina, with peroxide and protoxide of iron, &c. Dr. Sorby has attributed the pale blotches of slate to concretions lying in the planes of bedding. Slate has been worked also at Cilgwyn and Nantlle.

### Andrea Palladio.

The inclination of Palladio was decidedly for the antique; he even studied ancient tactics, and so well understood them that, being one day in the presence of some gentlemen practised in military affairs, he made some galley slaves and pioneers perform all the movements and military exercises of the ancient Romans without disorder or confusion. After the example of the ancients, Palladio always preferred constructing his edifices of brick, observing that the ancient edifices of burnt earth covered with composition remained more entire than those of stone. It is true that edifices of covered brick are more durable than stone, because the bricks being more porous receive the cement, and, binding all perfectly together, form one complete mass, whereas the pores of the stone being less prevent this union. Besides which bricks are lighter, and not subject to be calcined by fire. With regard to the convenience of Palladio's buildings, a great man has said that the most delightful habitation was a French house, opposite to a Palladian. This is reasonable; not that his internal arrangements were made without discernment; on the contrary, he took many precautions, but, like other celebrated architects, he was obliged to conform to the manners and customs of his time. Architecture, in matters of convenience, must vary according to the manner of living. He made his arrangements with relation to the age in which he lived; he certainly could not foresee the taste of posterity, and, could he have done so, and made it a consideration, he would have disgusted his contemporaries.

### GENERAL.

**The Subscriptions** for the memorial of Pasteur, which is to be erected in Lille, have reached 65,805 francs. M. Cordonnier, the sculptor, will exhibit models of the figures of one of the groups at the coming Salon.

**Mr. E. M. Leist** has delivered a lecture at the Plymouth School of Art on "Old Rochester," in which the castle, guild-hall, cathedral and other buildings noticed by Charles Dickens were described.

**The Seventh Ordinary Meeting** of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, April 5, at 6 P.M. prompt, when a paper will be read by Mr. W. Henman, F.R.I.B.A., architect of the Birmingham General Hospital, entitled "Hospital Construction," illustrated by working drawings, &c.

**Mr. George Dove** has presented to the Tullie House Museum, Carlisle, an urn found recently in making a trench in that city. It is of blue-black ware, slightly scored with diagonal cross hatchings, stands about 9 inches high, and contains the calcined and comminuted bones of a child from seven to eight years old. When found it was protected by a small triangular piece of flagstone, which did duty as cover.

**Mr. W. Halsey Wood**, architect, who attained a prominent position in Newark, New Jersey, died in Philadelphia on March 13. He was one of the few architects whose plans were selected for consideration in the competition for the new cathedral in New York.

**Mr. John Hutchison, E.S.A.**, Edinburgh, is sending to the fine art section of the Victorian Exhibition his bust in marble of the Queen, which was modelled from sittings at Windsor Castle in 1888.

**The Owen Memorial Statue** has been set up in the hall of the Natural History Museum, where it serves as a pendant to one of Charles Darwin. Mr. Brock has represented Sir Richard Owen as Hunterian Professor and holding a fossil bone in his left hand.

**Mr. T. Butler Wilson**, architect, of Leeds, has issued in pamphlet form the paper on "Modern House Interiors" which he read before the Leeds and Yorkshire Architectural Society.

**M. Albert de Meuron**, the Swiss painter, who gained reputation by his studies of Alpine hunters, died a few days ago. As one of the foremost artists of the Republic, he was associated with the organisation of the Swiss section in most international exhibitions.

**The Fourth Ordinary Meeting** of the Dundee Institute of Architecture, Science and Art for the session will be held in Gallery No. 1 of the Albert Institute, on Wednesday evening, April 7 next, at eight o'clock, when a few descriptive and critical remarks by the President and other gentlemen will be given on the drawings and testimonies of study to be exhibited.

**An Exceedingly pleasant conversazione** of the Architectural Association of Ireland took place on the 30th ult. in the rooms of the Royal Hibernian Academy of Arts, the hosts being the President and committee of the Architectural Association of Ireland. The entertainment was varied, and the surroundings, which included the pictures now on exhibition, contributed not a little to the enjoyment of the guests.



# The Architect.

## THE WEEK.

THE report of the special committee, or rather of the majority of the committee, that investigated the irregularities of the Works Department of the London County Council will not satisfy those who have been supporters of the system, and will amaze the great body of metropolitan ratepayers. In the first place, the holding back of the report of the minority is a suspicious circumstance. It is supposed to have been due to an oversight of the officials, but it is remarkable that the officials of the Council always are in error, while the Council never cease to be infallible. Then, again, the proposal to transform the works committee into a works board is a confession of incompetence. The consequences of having a body of men like the majority of the committee to control engineering and architectural works cannot be fully known, but it is not difficult to imagine their seriousness. If in any limited company so much weakness was exhibited there would be an immediate dismissal of the members, but the ratepayers do not resemble shareholders. The majority of the Council appear to consider that their own existence depends on the works committee, and if one dies the other cannot survive. Hence it is that the system of worthless authority must be continued at all costs, the only concession to public indignation being a change of name from committee to board and a reduction of the members. It was always maintained that London was only following the examples of provincial cities and towns in dispensing with contractors, but the report of the Clerk to the Council makes it clear that the practice of playing with works has been performed in London to an extent that is without precedent elsewhere. In maladministration of finances the London Council is unique, and the lapses would not be tolerated in any place where public opinion was properly exercised. It is a fatality that with the Council's administration one blunder is the cause of many, for reform or correction is impossible. Ostentation inspired the erection of an establishment in Lambeth on a scale which no contractor would venture to rival. But in order to conceal the waste of money and to keep the establishment going it will be necessary to expend at least a quarter of a million yearly. The wiser course would be either to dispose of the premises or to allow them to remain as "a folly" in order to serve as a warning to all the public bodies of England. The report of the majority is only another proof that the men it represents are irreclaimable, and that if the principle of municipal government is to be respected it will be necessary to set about a more thorough reform than has been contemplated.

THE libel case, PENNELL *v.* HARRIS and SICKERT, which came to an end on Tuesday, is one of those which suggest the poverty of the English language in technical terms. The defendants had said that some plates executed by Mr. PENNELL, and described as lithographs, were not entitled to be called by that name, because they were not printed from drawings which had been made directly on stone. There is no doubt that SENNEFELDER, when he devised the process, supposed that all work should be executed on stone. But for that purpose it was necessary for the draughtsman to be competent to work, as it were, backwards. To attain that power special training was needed. When it was discovered that a porous stone, if heated, carried off any figures, letters or lines which were produced by a greasy ink on a special paper, it became possible for every one who could write or draw on ordinary paper to become a sort of lithographer. The process of transferring and the heat required made the work on stone less perfect than on the paper. Accordingly, the original process was never superseded. The medals and honours awarded every year in the section of lithography of the Salon are not given for plates which are merely printed from stone—the drawing must be made on stone. For a long time it was not possible to produce figure or landscape drawings resembling those done in crayons unless in that way. But of late years a sort of paper has been in use which, from having a broken surface, allows of subjects to

be drawn on it, and, after transference to stone, plates can be produced which have many of the characteristics of those which are produced by the older method. There are, of course, limitations. Drawing on stone admits of more gradations than is possible when paper is used, and there can be vigorous contrasts. But an artist may select those subjects which are adapted to an inferior medium and treat them in such a way that the advantages obtainable by working on stone are unnecessary. Plates like those of LOUIS HAGHE, DAVID ROBERTS, J. D. HARDING, or HANFSTAENGL's great series from the pictures in the Dresden Gallery, could not be produced if artists were compelled to draw on paper only. Unfortunately no distinction was made when describing the two classes of work; whether produced on stone or transfer paper they were designated as lithography, and men who were unable to write or draw on stone became lithographers. It would be allowable to say of artists of that class that they did not follow SENNEFELDER'S practice, and would not obtain a Salon reward. But to hint, however obscurely, that they were putting forth plates derived from drawings on transfer paper as examples of the old-fashioned and more costly lithography, in order to obtain more profit, is libellous, and consequently Mr. PENNELL obtained 50*l.* damages. For the same reason we suppose it would be risky to say a drawing made with an etching pen was not an etching, although a reproduction might be published which would have some of the characteristics usually belonging to the plates which are printed from coppers. It is time for some new terms to be introduced if critics are to be preserved from costly actions for libel and friendships are to remain unbroken.

THE decision given by Mr. Justice KEKEWICH on Tuesday may have the effect of introducing some modifications in the list of things which are supposed to be fixtures. The action Viscount HILL *v.* BULLOCK related mainly to the contents of certain fixed iron cases which were set up in a gallery or museum at Hawkstone Hall. There could be no question about the cases but the stuffed birds and animals which were affixed to fragments of trees and imitations of rocks were considered by the defendant, as trustee in bankruptcy, to be only chattels, and therefore removable. It was argued that the removal of any of the objects contained in the cases changed the character of the fixtures, and would therefore be illegal. Mr. Justice KEKEWICH agreed that if the cases were emptied the gallery would cease to be a museum. But its original architectural character would remain unaffected. The contents of the cases could not be considered as permanent. They were added to from time to time, and changes might be required to uphold the scientific character of the collection. Lord ROMILLY in one of his judgments had said:—"I think it does not depend on whether any cement is used for fixing these articles or whether they rest by their own weight, but upon this—whether they are strictly and properly part of the architectural design for the hall and staircase itself and put in there as such as distinguished from mere ornaments to be afterwards added." Guided by the same principle, Mr. Justice KEKEWICH came to the conclusion that the objects in question were not annexed to the mansion house, and should, therefore, be considered as belonging to the defendant.

MUNICIPAL officers in England who have to take charge of sanitation, building or other work, often grumble about the variety of knowledge which they are expected to possess. But the most exacting of corporations in this country would not dream of seeking such qualifications as the authorities of Denver in the United States demand from the candidates for the post of building inspector. The following is the advertisement:—"The commissioner of inspection shall have charge of the inspection of buildings and parts of buildings, drains, drain laying, elevators, boilers, gas and electric fittings, gas and electric lights and all other apparatus and machinery requiring inspection and regulation, as the same may be authorised by ordinances; the inspection and control of electric wires, the inspection of weights and measures, the smoke nuisance, the erection and care of workhouses, charities and corrections, and the care of markets and public baths." The salary for the omniscient being is of course very modest.



## HAMPTON COURT.\*

WE cannot expect a foreigner to be always impartial, but there would be probably little difficulty in persuading a Frenchman that Hampton Court was, if considered as a suburban retreat for royalty, more fascinating than Saint Cloud; a Prussian could not fail to acknowledge it was more delightful than Sans Souci; and he must be an ultra loyal Austrian who would say it was not more varied than Schonbrunn. M. FRANCIS WEY, the French littérateur, said that his countrymen cannot walk through the palace or the grounds without regretting Fontainebleau, Saint Cloud and Versailles; but that effect we consider to be a testimony to the sort of domesticity which reigns everywhere at Hampton Court. It might have been planned for a monarch who had retired from business, and its homelike character is enough to compel an exile to think of the land in which he can claim some rights, although only of an abstract sort. But if nature and art have combined to present a charming aspect at Hampton Court, the place only yields its full delight to those who are enabled to conjure up ghosts. M. WEY was aware of that fact, and hence he endeavoured to enlighten his countrymen about the numerous associations which were inseparable from the rooms and the gardens. He showed them WOLSEY, in spite of his immense power, arranging like any common man for a lease of the grounds, and stipulating for a clause to enable his heirs to renew the lease for a further term. Then, after securing the ground, but not being able to discover an architect who was able to design an edifice which should have unity, majesty or regularity, the cardinal was compelled to be satisfied with "un grand amas de jolies constructions." But the inevitable *ennui* was not to be deluded by capricious planning. WOLSEY had scarcely entered into possession of his fairy palace when he was condemned to suffer within it from unsatisfied desires and perpetual regrets. At a time when the Louvre was supposed to be a donjon if compared with the enchanted court in Middlesex, and from Flanders, Germany and Holland courtiers were coming to test the reality of the wonders, WOLSEY knew he had created an instrument for his destruction. By handing it over to HENRY VIII. the day of wrath was postponed, but a death on the roadside saved WOLSEY from the scaffold. It would have been wise, added M. WEY, if the Surintendant FOUQUET a hundred and fifty years afterwards had studied with attention the history of Cardinal WOLSEY. And then he points out how SHAKESPEARE, the great and audacious judge of kings and courtiers, was not afraid to evoke the story of WOLSEY in the time of ELIZABETH and to present it again before men who had assisted in the original drama. If compared with the English poet, how small appears the courage of RACINE when he related the amours of LOUIS XIV. in the cold Roman pastoral tragedy of "Bérénice." In 1718 "Henry VIII." was by order of GEORGE I. performed in the hall of Hampton Court, and there where he had once reigned and succumbed WOLSEY could again cry out against the weakness of those who trusted a monarch's smiles. M. WEY also informs his countrymen of the interlaced monograms of HENRY VIII. and ANNE BOLEYN, symbols of lovers who were to be separated by a stroke of the headsman's hatchet; how JANE SEYMOUR by a timely death at Hampton Court was spared a like fate; how the sombre PHILIP of Spain spent his honeymoon enclosed in the rooms; how ELIZABETH and LEICESTER walked beneath the oaks which have remained discreetly silent; how JAMES I., the "Maitre Jacques" of HENRI QUATRE, presided there at conferences between Catholics and Presbyterians; how CHARLES I. found a refuge from the plague in it, and an asylum from a revolted people; how the property was sold to JOHN PHELPS and purchased by CROMWELL; how it was used for the marriage of one of his daughters, and for the lying in state of the dead body of another. Can we wonder if M. WEY believes that the heavens appear seldom to smile on a place where so many strange scenes were enacted, that silence reigns in it, and that even English visitors appear to be shades roaming through the gardens?

M. WEY was obliged to be sparing in his details through

fear of wearying his readers. But much else could be told concerning Hampton Court which would have interest for Frenchmen. What an excellent lesson on the superiority of French taste was given by FRANCIS I., when, in a conversation with the English ambassador about it, he said he had heard that the English king employed much gilding in his palace, especially in the roofs, while he was content to make roofs of timber finely wrought, producing effect by means of a diversity of woods in their natural colours. We need not wonder if the French king believed gold was employed in pavements as well as roofs. The Bishop of Bayonne, who visited Hampton Court with the French ambassador, stated that "every place did glitter with countless vessels of gold and silver." His description confirms the inventory of CAYENDISH, which recounts that "every chamber had a basin and a ewer of silver, a great livery pot of silver, some gilt and some parcel-gilt, yea, and some chambers had two great pots of silver in like manner, and one pot at the least with wine and beer, a bowl or goblet, and a silver pot to drink beer in, a silver candlestick or two, &c." We learn also that in the presence chamber was a cupboard with six desks or shelves containing gilded plate of the newest fashions, "and the nethermost desk was garnished all with plate of clean gold." WOLSEY did not keep his plate only for show. When he returned one day, booted and spurred, he found the Frenchman awaiting him. Without taking off his riding-habit he called for a bowl of gold filled with hippocras, and drank, first to King HARRY and then to FRANCIS. Then "he desired the Grand Master to pledge him, cup and all, the which cup he gave him;" and some of the suite appear also to have carried off cups.

When WOLSEY obtained his lease there was a manor-house at Hampton Court, but no part of it has survived. The cardinal needed a more capacious palace than the king, for unbounded hospitality was to be one of the elements of his diplomacy. WOLSEY would necessarily have definite ideas of what was needed, and we may therefore assume that whoever prepared the plans was simply following instructions which the minister had furnished. It is true that WOLSEY, in reply to the king's question, professed that Hampton Court was not intended for his own use, but "to show how noble a palace a subject may offer to his sovereign." If, however, such was the intention, then WOLSEY must have failed to anticipate the royal requirements, and in that case was unfitted to be entrusted with the destinies of England. It was necessary for the king to undertake costly works as soon as Hampton Court came into his possession, which is evidence that the buildings, however well adapted to suit WOLSEY and his train, were in a great measure useless to HENRY VIII. As it is now impossible to prepare a plan of the cardinal's buildings, the question of purpose cannot be determined. But we may assume that SKELTON, a contemporary poet, was correct when he imagined multitudes gravitating round the cardinal—

To whose magnificence  
Is all the confluence,  
Sutys and supplycacyons,  
Embassades of all nacyns—

and that WOLSEY made provision to accommodate his visitors.

The selection of a riverside site so far from town was, moreover (if a tradition can be accepted as trustworthy), determined by a malady from which WOLSEY suffered. The water of a spring in Combe Wood was supposed to be entirely free from a calcareous deposit, and in order to have it at command he was supposed to have wished to reside in the neighbourhood. Whether that was the cause which brought WOLSEY to Hampton Court, or a very different one, or whether there was a thought of enriching HENRY need not be discussed. For all time the names of the two will be inseparably associated with the spot, and no discoveries of their different shares in the building can affect that union. But we can no longer judge of their palace in its entirety or test the worth of JOHN EVELYN's judgment when he said, "Hampton Court is as noble and uniform a pile and as capacious as any Gothic architecture can have made it." Uniformity and capaciousness are the qualities which belong rather to WREN's work, and from the necessity to attain them WILLIAM III. is often excused for his vandalism. However, the two styles side by side form one of the strangest

\* *Hampton Court.* By William Holden Hutton, B.D., Fellow of St. John's College, Oxford. Illustrated with forty-three drawings by Herbert Railton. London: J. C. Nimmo.



architectural contrasts we have in England. They are so unlike as to suggest not merely a revolution in politics, but one in national character also. The older style may recall despotism, but it has qualities which must always appeal to the English mind as recalling the past, with all its romance. Hence it was not without reason a similar style was prescribed for the Houses of Parliament, which should form the most national of all our buildings. WREN's innovations are more typical of a modern and scientific age, when the test of architecture was cost, and the picturesque had to succumb to utility. It was therefore to be expected that a utilitarian like FERGUSON should bestow more praise on the later work. He said, "WREN's design could have been made in a day. WOLSEY's bears the impress of long and patient thought applied during the whole time it was in execution, and though, therefore, the conception of the first is grander, the ultimate impression derived from the latter is more satisfactory and more permanent."

It is difficult for an artist to make illustrations out of two classes of buildings which differ so widely in character, and especially when he has a theory of his own about what is worth representation. It is evident that Mr. RAILTON believes with the Greeks that a part may be of more importance than the whole, and when a subject is commonplace it is not easy to apply that theory. He makes no secret of what he most admires, and in this case the Tudor work has the preference it deserves. At one time it is a group of chimneys and battlements on which Mr. RAILTON's eyes rest. At another it is an oriel window. ANNE BOLEYN's gateway is made interesting for its vaulting, and is a framing for the palace beyond. In WOLSEY's "confessory" the fireplace and the paintings are most emphasised, and in another plate the great oriel absorbs attention. In the banqueting-hall, on the contrary, the whole appears, for where so much is fascinating and feudal a selection is difficult. The haunted gallery has that indefinite appearance which ghosts might be expected to enjoy. The fish-court, the orange house, the old pond garden, the chapel court, the clock court, the master carpenter's court, the south-west wing are examples of picturesque drawing which have not been excelled in our time. Mr. RAILTON has never used a finer pen, and yet he somehow has contrived to impart as much breadth to his illustrations as if he had resolved to rival brush-work on a bold scale. Architectural drawing is so closely connected with bills of quantities, and has so often to be produced as if to supply evidence in a law court, it is no wonder that much excellent work is prosy by its completeness and precision. It is therefore a relief to contemplate drawings which are suggestive of enjoyment on the part of the artist, and which allow imagination to be exercised. Mr. RAILTON confers a sort of magic on his bits, and nobody who looks on them can suppose that so delightful a building is under the control of Government officials. The mystery is enhanced by the skilful treatment of the vegetation, which suggests continuous contrasts with the lines of the building.

When a young artist expressed his annoyance to GAINSBOROUGH about the hideousness of the fashionable hats of the period, the great portraitist told him to remember the light and shade which they subserved. The somewhat commonplace design of WREN which "could have been made in a day," and which is shallow enough to all who look on it, is compelled to yield effects of chiaroscuro such as WREN never anticipated. Mr. RAILTON's interpretation of the modern part of the building is the more remarkable to all who have tried to draw eighteenth-century buildings, because the effects had, as it were, to be made to issue under compulsion. It is not a clerk of works style that we see, but that of an artist who can linger over a detail until it becomes productive of beauty. The tact shown in making such diverse styles amalgamate without producing a disagreeable sensation is remarkable, and the young architectural draughtsman can derive invaluable lessons from Mr. RAILTON's plates, while the student of painting can see in them a respect for principles which are commonly supposed to be inapplicable when architecture is the subject.

Mr. HUTTON expresses the delight he felt in "wandering about with Mr. RAILTON, and of trying, under his guidance, to see the familiar scenes with something of his artistic inspiration. Curious nooks, quaint byways, courts

in which a stranger's footfall rarely sounds, here a solitary turret, there a garden that HENRY VIII. may have planned just as it now lies, have appealed with a new force as I saw how they had been or could be the subjects of the artist's most delicate draughtsmanship." But it is evident that Mr. HUTTON has also wandered about with guides of another species—with the spirits of those who have lived, and suffered and enjoyed in Hampton Court from WOLSEY and his king down to the respectable inhabitants of the palace at our time. The book is accordingly a production which is worthy of its subject, and will enable Englishmen, as well as strangers, to find more enjoyment in a place of which we may well be proud.

## ELECTRICAL INSTALLATIONS.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Continued from last week.)

### ARC LIGHTING.

A POINT to be considered in connection with the lighting of large buildings and grounds is whether the arc or incandescent lamp shall be used. This depends on several circumstances, such as capital outlay available, amount and effect of illumination required, and special conditions.

The electric arc is the most efficient method yet known of converting electrical or mechanical energy into light energy by means of heat. The reason of this is that the temperature of the electric arc is the highest attained. If a solid body is taken and heated up, the light given out increases rapidly as the temperature increases, and as the temperature required to volatilise carbon is very high—in fact, the highest known—it follows that the greatest intensity of light will be obtained from volatilised carbon, or more correctly carbon particles which are about to be volatilised. The efficiency of the arc is high because the arc is small, and consequently there is little surface from which the heat can be radiated, and the energy required to keep a body at a given temperature depends upon the surface, the emissivity of the surface at that temperature and the conductivity of the surrounding medium.

It is evident, using carbon in both an incandescent and arc lamp, that an arc lamp can be run at the highest efficiency possible with carbon, while the incandescent lamp cannot be run at a temperature anything approaching this, owing to the volatilisation taking place and breaking the filament.

To form a steady arc, it is important that the carbons should be kept at a given distance (within limits) for each current. The arc should not hiss, and it should not be liable to go out. The mechanism in an arc lamp is designed to automatically effect this, and to feed the carbons as they burn away.

The electromotive force required for a continuous current arc taking a current of about 10 amperes is about 40, and this pressure is usually allowed, together with a little extra to overcome the loss caused by the resistance of the cable, and the resistance in series with the lamp, &c.

There are two distinct ways of running arc lamps—in series and in parallel.

**Series Running.**—In the series system of working arc lamps, a dynamo is used which will give a continuous and steady current under all reasonable conditions, the voltage being altered to overcome the varying resistance in the circuit. The arc lamps are then run in series from this machine. Suppose that there are ten arc lamps each taking 45 volts, the voltage is then 450 volts; if ten more are inserted the voltage will be 900, and if one arc lamp only is used the voltage would be 45. To put out a lamp its terminals are short-circuited. For lamps to work under these conditions the important point is to keep the arc of such a length that the voltage is constant. The voltage required by an arc is greater when long than short, and consequently a fine wire solenoid is the important part of the lamp, and when the carbons (which are fixed to rods) burn away, and the voltage across the carbons increases, the extra current sent through the shunt coil pulls the carbons nearer together. A series coil is, however, usually used for striking purposes, and it opposes the shunt, *i.e.* when the current is not flowing the weight of the carbons brings them together, and when the current is switched on the series coil actuates a clutch



which grips and lifts the carbons apart. When this has happened its use is over, and the regulating is carried out by the shunt coil, its province being to keep the voltage of the arc constant by raising or lowering the carbons.

The clutch is an essential portion of any arc lamp, and exists in many forms which cannot be described here. It is, however, in brief, a mechanism which will grip a smooth rod or drum, if one part of the apparatus is moved a very little (by the regulating solenoid), and it will hold it with a very considerable force while the series coil will strike the arc. Also, as the carbon burns away, and the arc gets long and the shunt coil is at the end of its range, the grip will slacken and allow the rod and carbon to slip nearer together and so reduce the voltage. This action is called "feeding" and should occur very frequently and imperceptibly, *i.e.* the range of the motion of the clutch should be small so that the flicker will be very slight. The necessity in any clutch or brake mechanism is that the grip shall be strong and certain, that the clutch shall tighten and slacken with a very small motion, and that the mechanism shall not stick.

**Parallel Running.**—When arc lamps are run off, say, a 50 volt circuit, the conditions are very different from the above. The volts are kept constant by the dynamo, and it is the current that the mechanism must regulate and keep constant at the desired amount. The result is that in a parallel lamp the series coil will both strike the arc and also keep the current constant. The internal arrangement of a parallel lamp is the same as with a series one as regards the clutch mechanism. When the arc is too short, and the current rises, the series coil pulls the carbons apart, and when the current weakens owing to the extra length of the arc, the coil allows the carbons to approach.

**Series-Parallel Running.**—Of late years much attention has been given to the running of two lamps in series across 100 volt, four lamps across 200, or nine lamps across 400 volt mains. The difficulty has been that the voltage across all the lamps is fixed, but it is difficult to keep the voltages, *i.e.* the lengths of the arcs, constant in each lamp, although, of course, the sum of them is always constant. The result is that each lamp is alternately bright and dull, its own variations affecting the other one or ones. The consequence is often a rapid oscillation of the light. This has of late been much improved by careful regulation of the current coils and the abolition of dash pots (a piston fitting loosely in a cylinder which is filled with oil), or, in fact, anything which damps the action of the coils. The result is that the feeding in the lamps acts at nearly the same time, and the pumping or fluctuating action does not show so much.

The principle of enclosed arc lamps has already been mentioned and need not be referred to further, except to mention that the use of these lamps for running direct on 100 volt circuits has been very much extended. The efficiency is not so high as with two lamps in series, but the inefficiency is more than counterbalanced by the steadiness of running, the great saving in carbons and attention, and the more vertical distribution owing to the arc being longer, and therefore less obstruction to almost vertical rays, and consequently the shadow under the lamp is less than with ordinary lamps. This latter property is a distinct advantage for interiors and pavements in front of shops where a horizontal plane is to be illuminated as evenly as possible, while the lamps cannot be placed high.

**Alternating Current Arcs.**—The use of alternating current arc lamps is not to be recommended for ordinary work, if continuous currents can be obtained. The total amount of light emitted by them for a given amount of energy is only a little over half that obtained from a continuous arc, also the light is distributed in exactly the same manner in an upward as well as in a downward direction. This necessitates the use of a reflector to throw the light downwards, and a further loss in the efficiency is the result.

Alternating current arc lamps may be run in series, parallel, and series-parallel in exactly the same way as continuous current lamps, and the mechanism is similar. Three lamps can be run in series off 100 volt mains. The difficulty is chiefly that the coils have to be wound differently, and that the core of the solenoids must be of laminated iron. The reason of this is that energy will be wasted in the iron, due to eddy currents, if this is not done. Alternating arc lamp mechanisms are less liable to

stick than continuous ones, owing to the constant vibration which destroys the friction.

**Carbons.**—The very best carbons should be used for arc lamps; the positive carbon should be twice as large as the negative and have a soft core. The negative should be solid. In a continuous-current lamp the negative carbon is always underneath where the light is to be thrown down.

#### NOTES ON ILLUMINATION.

It may generally be taken that the arc lamp is the most suitable where a high illumination is required, and that in other cases the incandescent.

A uniform illumination is not always required and in some cases it is to be avoided, because the artistic and useful effect is often assisted by varying intensities of light. The minimum illumination permissible is a factor in determining the arrangement of lamps, and the average may be varied greatly by this.

The following general principles may be taken to indicate the lines along which the arrangement of lamps should run:—

1. With a given number of points, to obtain a uniform illumination place the lamps as high as possible. To increase the illumination increase the candle-power of the lamps.

2. With a given consumption of current to attain a high average illumination as uniformly as possible, use as many points and lamps of low candle-power as can be, and place them higher or lower as the uniformity or maximum illumination is more important.

A few figures giving the usual amount of illumination may be of interest.

Mr. PREECE'S rule is one 16 candle-power lamp 8 feet high for every 8 feet square (64 square feet). This is an average for rooms having fairly light wall-paper; it may need to be halved or doubled to produce the same result. The effect of wall-paper, &c., can be easily seen from the figures given in a previous article.

A 10 ampere arc lamp placed 18 feet from the ground will give a maximum illumination of about  $\frac{1}{2}$  candle foot, and if such lamps are placed 120 feet apart, they will give a minimum illumination of about .03 candle foot. This is hardly sufficient for interior lighting, and is usually greatly exceeded, but it is considered very good for street lighting.

Illumination of a surface is always compared with that produced on a small patch of it by a standard candle at a distance of 1 foot. This is the "candle foot" referred to above.

A rule which may be of use in determining the height of a lamp, whose candle-power is uniform in all directions, to give a maximum illumination on any point is that the distance of the point from the foot of the lamp-post should equal 1.414 times the height of post, or, in other words,

$$\text{height of post} = \frac{\text{distance of point}}{1.414}.$$

This rule applies to incandescent lamps with a fair amount of accuracy, but it does not apply for arc lamps. The maximum candle-power given by a continuous arc is, when short, at an angle of about 45 deg. from the carbons, and it is, of course, the same all round if the arc is burning properly. The angle of maximum candle-power of an alternating current arc lamp is at about 30 deg. above and below the horizontal plane of the arc.

This does not necessarily mean that the circle of maximum illumination on the ground is at this angle. The illumination on the ground is proportional to the candle-power, and inversely to the square of the actual distance of the circle from the arc. If the lamp is high, the circle of maximum illumination will be further away from the post than if low, but more evenly distributed, while a larger area will be illuminated with the same minimum.

The chief points to remember are that the utmost care must be exercised in the arrangement of lights to suit conditions of working, and that no exact rules can be given; arc lamps should be used where occasional hissing is not of importance, and where a high illumination is needed; and the height of the lamps and their candle-power for a given minimum illumination is greater where fewer points are allowed, owing to restricted capital outlay, than where many points of low candle-power can be allowed.



## TESTING.

The testing of an installation is often carried out in a very careless manner, and frequently by unskilled persons.

There are many points which determine whether an installation will be a success, and it can be easily tested if the right steps are taken.

*Wiring.*—The insulation resistance of every installation should be taken periodically, and the results are then of great use. The insulation resistance should be taken with the maximum pressure possible to be between any conductor and earth, and not much more and no less. If on a 100 volt three-wire system the testing voltage should be 200, and if on a 200 volt three-wire circuit 400 volts, and if a private two-wire installation at 100 volts, the voltage for testing should be 100 or a little over. If the current is alternating the pressure should be the declared multiplied by 1.414, or about half as much again as the average. There is no good purpose served by testing with a higher pressure, as this is the greatest the insulation is required to stand. It must be remembered that a high insulation does not always mean good work or that a low one means bad work. The insulation is often very low if the house is damp, due perhaps to fresh plaster, &c.

The insulation should be taken between each conductor with all lamps out of the sockets and the switches on; this tests with all the wire in circuit. The insulation should again be taken between each conductor and earth with all the lamps out and switches off. This will approximately test the insulation of each conductor from earth. It may be well, perhaps, to note here that frequently the earth leakage is taken with the lamps in and the switches off. This is to be condemned, because if there happens to be a connection between a fitting and earth, or there is a leakage from a lamp-cap, it will show as if the wiring is defective when it is not. It is very desirable also, from the consumer's point of view at least, that all his lampholders and brackets should be earthed. This is desirable, because in case of any fault due to a wire becoming connected to a fitting or leakage from a lampholder, it is impossible that exposed metal can be charged, and a shock is impossible. Unfortunately, some supply companies do not see things in this light, and make regulations that all fittings and lampholders shall be effectively insulated from "earth," this with a view to preventing "earths" on their system even if a fault occurs. This is really a mistaken view of the matter, as it makes it possible to have a number of poor "earths" distributed over their systems without being able to detect and order the removal of any of them. If, however, the plant is a private one, it is better in every way to "earth" fittings as much as possible, and this will not be objected to.

Notice should be taken if the insulation of a building comes out low, to see if the braiding is touching the bare wire at the switches, ceiling roses, &c., and if this is so it may explain a low insulation to earth, as the braiding is not supposed to be an insulator. There is, however, no danger in low insulation through this cause.

A thorough examination should be made to ascertain that brass screws only have been used for the covers of the casing, and it should be seen that floor-boards under which the casing runs have been screwed down and that brass screws have been used, or iron ones well greased. If this is not the case, the screws may rust in the boards and any future lifting of the boards will be very difficult. Even in supposed first-class work it will be often found that the cover is nailed to the casing when under boards, &c., where not seen. It has come under my notice where wires have been bunched in casing, that the fillet has been almost entirely cut away to make room for a greater number of wires than the casing was intended to carry.

*Joints.*—Joints should be examined to see if they are properly soldered and insulated. There is no need to give examples of bad joints, as so many have already been described in the technical press. A good joint should be strong mechanically before the application of the solder; the soldering should be good, done without the use of any acid cleaning mixtures and fluxes, and only resin or other approved flux should be used. The braiding should be cut away, and the rubber insulation tape solutioned slightly and then bound over tightly with pure rubber tape. However many T's may be taken off at one place, each

wire should be bound separately and filled up with the rubber tape until a little larger than the original wire. It should be impossible for water to enter the joint without first penetrating the rubber strip. The waterproof tape should then be lapped on carefully. Rubber solution should be used sparingly inside the rubber joint, but plenty should be put on the surface and on the waterproof tape.

*Lamps.*—It is also advisable to roughly test the lamps used on an installation to ascertain the current taken by them. It is often pointed out that a test of current is useless, unless the actual candle-power is obtained. This is, in my opinion, a mistake, and for the following reasons:—The actual amount of light given by a lamp is of no interest to the user, provided that it is sufficient. If an 8 candle-power lamp is wanted in a certain position, it is no comfort to know that the nominal 8 candle-power lamps are giving 16 candle-power and that their efficiency is good. The point is that if, say, twenty 8 candle-power lamps are required, lamps shall be used which give a sufficient light which will not take more current than twenty 8 candle-power lamps should do.

From another point of view it is a check on the lamp-maker to test the current taken by a lamp. The temptation is to make lamps, especially 8 candle-power ones, of higher candle-power than that marked, because low candle-power lamps are difficult to make. If the lamp-maker does make lamps of higher candle-power than the 8 candle-power ones, say of 12 candle power, the current taken will be high, and if the watts (volts multiplied by amperes) per candle-power (declared) come out high, it is a sign that the lamps are either bad as regards watts per actual candle-power, or that they have been carelessly tested and marked. The one fault is as bad as the other.

## HELLENIC ARCHITECTURE.

IN a lecture on "The Culmination of Hellenic Architecture in Attica" at the Glasgow School of Art, Mr. W. J. Anderson said he would look away from the historical and social influences, which, though none the less real, were largely hidden from the view of the artist of the time, and endeavour to take the standpoint of the master confronted with a particular problem. Applying this treatment to the Propylæa, the object of the building was considered, the alignment which Mnesicles, its architect, decided upon in its relation to the Parthenon and to the Acropolis wall, the angle of which its axis bisected; its central position being also designed to give on each side halls of corresponding size within and without the gate. The various obstacles preventing the accomplishment of the scheme in so far as they can be read in the building itself were considered, while the fitness of the architecture and the beauty of its details and painted decoration were shown by many illustrations. The Erechtheum was treated similarly, and regarded as a megaron in honour of Erechtheus, a monument-museum of many cults rather than a temple of any one or two, and in addition to photographs of its present state, restorations of its exterior and interior and of its relation to the complete Acropolis were supplied. Additional examples of the culmination in Attica were illustrated in the Hall of Initiation into the Eleusinian mysteries and the Temple of Apollo at Bassæ, the latter on the ground that it was the work of an Athenian architect. The second part of the lecture was devoted to the Greek theatre and games—the theatre, stadion and palestra—and in this connection were shown and explained the plan and restorations of the huge assemblage of buildings at Olympia, the apotheosis of athletics.

## SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE members of this Society paid a visit on Saturday afternoon last to the new building of the Prudential Assurance Company, in Pinstone Street, by the arrangement of the architects, Messrs. Alfred Waterhouse & Sons. There was a considerable attendance, among whom were Messrs. T. H. Waterhouse, C. Castle, W. Parkin, A. H. Holland, E. Winder, jun., T. Winder, C. J. Innocent (hon. secretary), Joseph Smith, C. B. Flockton, J. R. Wigfull, W. J. Hale and C. F. Innocent. Mr. Haigh (the clerk of works), as the representative of the architects, conducted the party over the building, and explained the various arrangements and the materials employed. He answered a number of questions asked by some of the younger members during their examination of the building. On the motion of Mr. T. H. Waterhouse, seconded by Mr. W. Parkin, and supported by Mr. Joseph Smith and the hon. secretary (Mr. C. J. Innocent), a very hearty vote of thanks was accorded to the architects and to Mr. Haigh (the clerk of works), who suitably acknowledged the vote.



## MODERN HOUSE INTERIORS.\*

THE architect in bygone days conceived and regulated not only the building but the whole decorative scheme of the interior, and frequently designed the furniture and minor accessories, whilst in close collaboration with him were the painters, sculptors and craftsmen, on whom, by his experience of them, he could depend to interpret his ideas; so that, although the work was not accomplished without the aid of many hands, yet the true cohesion and value of the various parts was obtained because the result was the outcome of a preconceived scheme formulated by one ruling mind. Is it not reasonable to suppose that the man who plans the skeleton should best know how to clothe it in a fitting manner and advise as to its proper aids and accessories?

Why, then, does not the architect more fully evidence his capability not only to control and design the shell, but to control and direct the internal decoration thereof? Are we to assume that the architect is, as a matter of fact, able to do this, but that, being a very haughty and exclusive person, he only deals with bricks and mortar, and leaves the unimportant question of decoration to the man in the street? Or are we to be charitable, and assume that the architect is of such a delicate and sensitive nature that he shrinks with diffidence from offering his vast knowledge and experience to the public? I venture to think that neither of these assumptions will commend themselves to reason. The fact remains that the architect stands aloof in silence—anything but a dignified silence—and allows the trade to deal with matters which should be to him the most interesting and important duties of his profession. And, moreover, his silence is construed by the public into something approaching a tacit acknowledgment of ignorance of the subject. Further than this, the suspicions of the public with regard to the architect's incapacity are more than negative suspicions. They are frequently confirmed by the difficulties found by the trade in clothing the skeleton left by the architect, who has designed the same without the slightest regard to an ultimate coherent scheme of decoration or furnishing. In short, the public of to-day are not quite sure of the architect as a decorative artist. The comparatively few and notable members of our profession who have distinguished themselves in this branch of art only demonstrate the truth of the old saying, "Exceptions prove the rule."

The great question then becomes, Are we architects to be content with this, or are we to make every effort to remove what is certainly a stigma on the profession, and restore the confidence of the public in us as artists?—artists of large heart, large brain, keen sympathy with everything beautiful, and with the great power of bringing all these qualities to bear upon all things connected with our profession. It behoves the architect of to-day to cultivate his artistic instincts and equip himself with the special knowledge which these instincts direct him to search for. The public once satisfied that the profession is largely contained of well-read, well-equipped men, competent to deal with internal decoration—the public, I say, will be only too willing to employ them. This done, our art would be restored to the confidence enjoyed in former times, and would become more and more potent in the future.

Now, to do all this the architect must be competent to control the whole of the work from commencement to completion. Self-contained, and acting independently of extraneous assistance, he will be strong enough in his knowledge to show both the public and the trade that this question is better understood by him than by others. It is of vital necessity that they be convinced that internal decoration and furniture is an integral part of his business. When by incessant application his energies have accomplished control of these things, then, and not until then, will the public respond with confidence.

You may say, "Yes, this is all very well; no doubt the leisured and artistic section of the public will do so, but what of the practical and busy portion of the community who adopt what is called a business-like view of the matter? What time have they to give even a thought to artistic cohesion and the unities?" Well, they can at least bring a considerable amount of business ability to bear on the question.

The architect, in his character as artist, accepts the duty of demonstrating beauties and truths to and for others whose time and opportunities for the discovery of which are necessarily limited, and in doing so exercises his professional acumen and primarily proceeds to treat with them on a question where they are at least both in touch, namely, the financial question.

A busy client wishes to build a house and obtain it at the most reasonable cost. He, of course, instructs that plans, quantities and specifications be prepared for the structure of the house, obtains tenders, and ultimately gets his building at the lowest market price consistent with his plans and specifications. He compares the figures of the lowest tender with those

of the highest, sees that he is saving the difference, and what is of more importance to us, sees that the commission which he has paid to the architect for definite plans, specifications and quantities has been money well laid out. The question of interior decoration and furniture then confronts him. How in these things is he to spend his money to the best advantage? He is naturally concerned with considerations of fitness and cost.

What is his usual proceeding? Does he not take the decoration and furniture into his own hands, being determined to get at any rate as near an approach to competition as he can, obtain designs and estimates from various firms, and form his own judgment upon their respective artistic and monetary qualities? But is he not keen enough to see that this is not true competition, the estimates received not being based upon the same designs and specifications, and most probably bewildered by the patter of the various salesmen and the variety of their designs, and finding the task difficult and costly, does he not give it up in despair, place his order with one firm and instruct them not to exceed a stated amount, with, more often than not, doubtful results? We know, all of us, that this is the case.

Now, I say that even the practical, busy man will gladly employ an architect, with artistic instinct and judgment, to prepare definite designs and specifications, and invite true competitive tenders for internal decoration and furniture. If I may be allowed to quote my own experience, it is that the preparation of definite designs and specifications by the architect is not only of the utmost advantage to the client from a financial point of view, but is also welcomed by the several competing firms, who fully appreciate the fact that they are tendering upon a similar basis. Of this I have had most emphatic assurances from members of firms of the highest standing, one of whom in a recent work remarks, "If we could only be sure that our architects possess the necessary knowledge and discretion, nothing could be more desirable than that they should undertake this work."

Whether altering the interior of an existing house or building a new one, with a view to ultimate decoration by us, a psychological study of the client should be our first consideration. Every man has an inherited or acquired ideal of what the atmosphere of his home might be. In some cases this ideal has shaped itself so definitely as to enable the client to express his views in a manner intelligible to the architect. In other cases this ideal exists unconsciously in the client's mind, and it is here the architect's duty to probe for and discover his latent ideal of home atmosphere. I hold that a man's home should be, to a great extent, an expression of his own better self—an expression moulded and guided by the hand of an artist reverent of traditional beauties and truths. If this psychological study of the client be neglected, the probability is that we shall provide him with a house, but fail to give him what he asks from us, namely, a home.

The next consideration is the internal economy of the house, having regard to its calibre, the social and family life of the client, the proper relationship of each apartment to its neighbours, the working of all departments. We must, in imagination, pass in and out of every door, ascend and descend the staircases and pre-apprehend inconveniences that would inevitably come to light when passing through the test of actual occupation. In short, no detail of domestic economy is to be considered beneath the notice of the architect who intends to plan a house which shall be at once convenient in its arrangement and economic in its working. Our client's assurance of satisfaction with the plans will not relieve us from the future criticism consequent upon the ultimate occupation of the house by him—that searching and merciless criticism to which all planning is ultimately subjected. The test, undoubtedly, comes with occupation.

Having assured ourselves of the proper organisation of our plan, we can then proceed to consider each individual apartment, and for its ultimate success it is indispensable that the complete scheme, embracing the disposition of the furniture, decoration, fittings, hangings, carpets, pictures and accessories should be in our mind. We should have informed ourselves of the nature of all objects which the client may already have in his possession, even though valued for associations' sake alone, and which will have to be reckoned with in the evolution of the scheme.

The principal considerations which dominate us are colour and form. Let me briefly allude to each of these. We give precedence to that all-important subject, colour, that universal source of pleasure, that essential and all-powerful element of decorative art. This subject has of late years been investigated to such purpose as to reduce the study of its harmonies and discords to a scientific basis. Colour should be considered before form, in that the wall space is the largest area of the room, and it behoves the colourist, I need hardly say, to select such colouring as will adequately harmonise, complement or contrast with the subsequently placed pictures, fittings, furniture and draperies. The size of the apartment, its aspect and

\* From a paper by Mr. T. Butler Wilson, architect, read before the Leeds and Yorkshire Architectural Society.



use, will govern us as to its particular colour scheme. The colour of the draperies, when the windows are isolated, may complement the wall colour. When windows are grouped together the draperies may harmonise, and thus carry the wall colour round the room. In constructional work, should hard woods and marbles, which carry their own colour, be used, they may be selected to contrast rather than harmonise with the walls. Should the constructional work be open to colour treatment, a decided complement is desirable.

The same order is then followed with regard to form, and whenever any of the materials are already in existence—for instance, pictures, wall coverings, draperies or furniture—examples should at once be seen. In fact, see as much as possible of that which makes your complete room, and see it in juxtaposition. You may then proceed to settle the form of the remaining items, working through from scale to full-sized drawings and models.

The complete scheme, but as yet only the scheme, having been decided upon, we then prepare the specifications and arrive finally at the most practical part of our labours, and I am disposed to think the most difficult, namely, that of preserving our tenderly nurtured scheme from the rough handling of the unsympathetic workman, by placing its realisation in the hands of the craftsman having the knowledge and skill requisite to produce the feeling which we wish transferred from drawings or models to the actual work. Those of us who have attempted to obtain this have realised by many a bitter lesson the dearth of such sympathetic co-operation.

But we are led to hope that encouragement from this and kindred societies in the work of the schools which have been founded for the training of workers in the applied arts, may yet result in the production of men qualified to carry out our highest ideals.

In conclusion, I say that the remedy rests with the profession to fix the highest standard of craftsmanship, and see that it is reached.

As a well-known writer has remarked, "However mean or inconsiderable the act, there is something in the well doing of it which has fellowship with the noblest forms of manly virtue; and the truth, decision and temperance which we reverently regard as honourable conditions of the spiritual being, have a representative influence over the works of the hand, the movements of the frame and the action of the intellect."

## TESSERÆ.

### The Impannata.

IF the artists of some Transalpine schools may be accused of sometimes employing the effects of a confined light for scenes supposed to take place under the broad atmosphere, the Italian painters (for the practice was not confined to the Venetians) must be acknowledged to have as often adopted the opposite course, viz. that of representing scenes in interiors as if seen under a diffused light. They appear to have thought that objects so illumined are more intelligible in pictures requiring to be seen at a distance (as was the case with altar-pieces), and that such effects are in themselves more large and beautiful. The effects themselves, though derived from the observation of nature in the open air, were produced by various artifices in Italian painting-rooms. The most common (still in use) was that of employing oiled paper instead of, or before, the glass of the window. A Madonna of Raphael's takes its name (*dell' Impannata*) from the oiled paper window, probably that of the painter's studio, in the background. The *impannata* strictly means cloth, but the term is also applied to oiled paper. Most of these contrivances, although not without interest as connected with the Italian practice of art, are obviously fit only for a bright climate; but the observation of nature and the technical expedients which were then habitual to the artists had also relation to the due effect of works in vast localities. It was the more essential to preserve the general appearances of nature in colour and light and shade because the forms in votive altar-pieces were often individual. Leonardo da Vinci, who is careful to distinguish between *ombra* ("the diminution of light") and *tenebre* ("the privation of light"), frequently recommends attention to the effects above described, and speaks of the modes (probably then common) of producing them. He remarks that objects seen in a diffused light are more beautiful than when lighted from a confined source, and that when represented in pictures they are more intelligible at a distance.

### Giovanni Scalfarotto.

Among the first revivers of a purer style in Italy was Scalfarotto, who, in the beginning of the last century, designed at Venice the church of San Simeone Minore, the first church in Italy adorned by an imitation of a genuine Grecian temple for its façade. Its unbroken entablature and pediment enriched with sculpture are supported by six disengaged Corinthian

columns. It is true that much fault may be found with the minor details of this structure, and its cupola particularly is much too high, but it is a great merit in the designer to have been the first to point out the road to real excellence at the very time when his countrymen were deviating the most widely from it. This example was soon after followed by Tirali in the front which he added to Scamozzi's church of San Niccolò da Tolentini, also at Venice; but we believe that these, with the two churches at the entrance of the Corso at Rome, are the only modern churches in Italy with an open colonnade in front of them, which is surprising, with the two ancient examples in the Pantheon and the beautiful Corinthian façade of St. Maria della Minerva at Assisi to invite imitation. Temanza, another celebrated architect at Venice, was scholar to Scalfarotto, and built the elegant Ionic rotunda dedicated to the Magdalen.

### Viollet-le-Duc as Professor.

Viollet-le-Duc had a great admiration for Napoleon III. and still greater admiration for the Empress Eugénie. Admitted to Compiègne through the influence of Prosper Mérimée, he concentrated all his cares on a little theatre which was set up in a corner of the château. The address he showed in designing costumes and scenery was appreciated. The courtiers used to say that Viollet-le-Duc was the only architect who was endowed with imagination, and if it were not for the jealousy of the Institut he would have been long before a professor. They considered there was no man so qualified for a chair in the Ecole des Beaux-Arts as an architect who comprised Vitruvius and Bramante in himself. During the interval which had to elapse before Viollet-le-Duc was recognised as the new grand master of French architecture it was decided to open a credit of some millions of francs in his favour, and the old château of Pierrefonds was handed over to him for restoration. In this kind of work Viollet-le-Duc excelled. He was an expeditious designer and possessed wonderful science; his knowledge of the Gothic period possessed a certainty that was inappreciable. His restoration of the Sainte-Chapelle and of Notre Dame is excellent, but he does not appear to have penetrated into the spirit of antiquity, and his ideas concerning modern construction seemed mediocre. It was, therefore, a surprise to many when he was nominated professor at the Ecole des Beaux-Arts. Mérimée had used his great influence with the emperor, but this time with an unhappy result. The pupils of the Ecole des Beaux-Arts were discontented, and protested. No attention was paid to their objections, and Viollet-le-Duc was solemnly installed in his office by the superintendent, the Comte de Nieuwerkerke. The professor being unable to utter a word owing to the clamour, left the theatre, escorted by the superintendent and some friends, among whom was Théophile Gautier. The students impeded their progress in the Rue Bonaparte, on the Quai Malaquais and the Pont des Arts. The crowd followed singing. Some collected in the court. Gautier wished to harangue the mob, and compel them to listen to reason. The law, however, is always the strongest. The police stopped him, and then locked him up. After dispersing the people, the police saw their blunder, and released the unlucky Gautier, who had already related the story of "The Courier of Lyons" to them. The end of the affair was that Viollet-le-Duc did not attempt to teach students who refused to hear him. He was most eager to have an audience, for at a later time, after the fall of the Empire, we find him seeking election to the Municipal Council of Paris.

### Louis Quatorze Styles.

The play of light and shade in sudden and varied contrasts is so essential an element of the Louis Quatorze styles that they do not admit flat surfaces in any of their ornamental details; all are concave or convex, perfectly smooth, but never flat—even the anthemion in these styles becomes a hollow shell. They thus contrast very strongly with the Elizabethan, in which flat surfaces in the details abound, as in its infinite strapwork; even in the cartouches, or pierced and scrolled shields, the curved planes are flat. All such members in the Louis Quatorze styles would be enamelled or moulded. This constant varying of the surface gives every point of view its high lights and brilliant contrasts, and for this reason stucco super-seded decorations in the flat and gold colours in all Louis Quatorze designs. The Louis Quatorze is more general in its aim than any style whatever; thus its details, provided they generated sufficient contrasts of light and shade, were of no individual consequence. Accordingly we find, after a little time, that all detail is absolutely neglected, and with it all study, and in the absurd Rococo—the very natural result of this general neglect—we have designs made up of details so without meaning and individuality as to defy description. They are Rococo; we can come no nearer to them, and with this Rococo, the first term of existence, the last of the nine lives of ornamental art expires.



## NOTES AND COMMENTS.

THE London County Council intend to apply the provisions of the Building Act of 1894 in order to secure that temporary structures for sightseers which will be used on June 22 are of adequate strength. Section 82 says that where a builder is desirous of erecting a building or structure to which the general provisions of the Act are inapplicable or inappropriate, application is to be made to the Council, accompanied with plans and particulars. If satisfied, the Council shall signify approval and the special or temporary building may be constructed. But as all the people who intend to let seats may not be aware of the law on the subject, it is settled by the County Council that notices are to be left at each house and posted in prominent situations along the line of route outside the City of London, intimating that the erection of temporary structures is unlawful unless the Council's license is first obtained, and that balconies intended to be used on the occasion must be shored up to prevent risk of accident. The Act limits the extent of the Council's interference to temporary structures. But in order to avoid all risk of danger to life and limb, it will be wise for those who let seats to make sure of the safety of floors and roofs. If we may judge by the advertisements, it is proposed to pack spectators within limited spaces as closely as possible. The loads will not be distributed over a floor while the procession passes, but will be concentrated in one part. It is true that part will be near the exterior wall, but it is well to remember that the floors and roofs of ordinary houses were not designed with the intention of accommodating extraordinary loads, and in fact no provision of the kind was made. Many of the houses along the route are old, and some which are modern are constructed as flimsily as the Building Act would allow. There is unhappily much ignorance among the ordinary tenants of houses about the weights which floors can sustain, and in the advertisements which announce capacious accommodation we have not observed in one any certificate from an architect or builder that the premises have adequate strength. We do not wish to excite alarm, but hirers of seats will do well to consider whether they are paying for a safe position, and if they have any doubt on the subject they should insist on a guarantee from an expert.

Cook Street in Liverpool has become an important thoroughfare, for it contains many offices which are used by prominent men of business. But a stranger who sees it for the first time is generally disappointed by its appearance. In one part the street is barely 14 feet in width. The city engineer has proposed to widen and improve Cook Street at a cost of about 27,000*l*. The subject came before the Corporation on Wednesday, when an amendment was proposed which would introduce an arcade 10 feet wide on the south side, and rounded off so as to give a continuous footway. The estimate would in that way be increased to 30,000*l*. There was much opposition, but eventually the amendment was carried by fifty-five votes to thirty-one.

At the beginning of May, Professor H. G. SEELEY, F.R.S., will resume the direction of the London Geological Field Class, which has been indebted to him for services since 1886. The teaching is of a practical kind, and is given in the field during excursions on Saturday afternoons. Short lectures are delivered upon rock structures and fossils seen in quarries, as well as explanations of the contours of the hills, valleys and river channels. The excursions illustrate the principles of geology, by means of facts which appeal to the eye, in scenery which is easy of access. It is proposed this season to visit Sheppey, Upnor, Rochester, Snodland, Aylesford, Maidstone and Tunbridge Wells. There will also be visits to Coulsdon, Godstone, Bletchingley, Leith Hill and Sevenoaks. Mr. R. HERBERT BENTLEY, 43 Gloucester Road, Finsbury Park, is secretary.

An American review has endeavoured to ascertain the cost per superficial foot of buildings in New York. It is not easy to insure accuracy in a calculation of this kind, but if the amounts obtained are only approximations, they are interesting. Frame dwellings, of the cheap two-storey

class, average in cost 3·71 dols. per square foot of ground covered, or 1·85 dols. per square foot of floor space. Brick dwellings of three storeys average 3·65 dols. per square foot of floor, counting nothing for the cellar; five-storey houses cost exactly the same, and four-storey ones, averaging the few examples found, cost a trifle less. Flats of five and six storeys average only 2·03 dols. per square foot of floor; flats with stores underneath cost 2·83 dols.; "stores and lofts," that is, ordinary mercantile buildings, give 3·12 dols. per square foot of floor, where the building is not over six storeys high. A six-storey hotel cost 3·33 dols. per square foot of floor, and a twelve storey warehouse a little less than 3 dols. Office-buildings of the "sky-scraper" sort are much more expensive, one of nineteen storeys costing 11·682 dols., and one of twenty-one storeys 12·34 dols. per square foot of ground covered, or 6·14 dols. and 5·37 dols. respectively per foot of floor-space. The calculations appear to be based on returns given by the Building Department of New York.

It is expected that in the course of a few weeks the second volume of Mr. EDWIN O. SACHS's fine work, "Modern Opera Houses and Theatres," will be issued. Owing to the liberal support afforded by the number of subscribers the author has been enabled to materially extend his original programme. No less than 300 well-known playhouses will be dealt with. Sixty theatres of recent date, representing Austria, France, Germany, Great Britain, Greece, Holland, Italy, Roumania, Russia, Spain and Switzerland, are fully described on 200 large folio plates in the first two volumes, and there are nearly 1,000 views, sketches and diagrams distributed in the text. Among the early subscribers were:—The Science and Art Department, H.M. Patent Office and other public authorities at home and abroad, the Royal Academy of Prussia, the Royal Technical College of Vienna and many educational institutions and public libraries. The private subscribers are headed by Sir HENRY IRVING and Sir DAVID SALOMONS, Bart. Mr. B. T. BATSFORD, of High Holborn, is the publisher. The third volume of Mr. SACHS's work will be ready in next December.

OFFICERS of a fire brigade should have some acquaintance with building construction, and the Dublin Corporation acted wisely in compelling candidates for the appointment of assistant superintendent of their fire brigade to submit to a competitive examination. There were twenty questions, of which the following is a sample:—If 29 cubic feet of brickwork weigh a ton, what weight will the supports of a shop-front have to carry, exclusive of weight of roof, floors and contents, the wall being 18 feet in length, 36 feet high and 18 inches thick, making no allowance for window openings? One of the competitors obtained no less than eighty marks in the examination, but he had to succumb to another who was able to gain no more than twenty-eight, being the lowest but one on the list.

A FEW weeks ago Mr. JAMES NEALE, F.S.A., architect, obtained an interim injunction to restrain the proprietors of a periodical from printing, publishing, delivering, or otherwise disposing of any copies containing plates from "The Abbey Church of St. Alban," the costly work of which Mr. NEALE is author. The volume was fully described in *The Architect* at the time of its appearance, when reproductions of some of the plates were given. The case came again before Mr. Justice KEKEWICH on Saturday last. The interim order was made perpetual, and the defendants were condemned in damages and costs.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—SALISBURY: WEST DOOR—PRESBYTERY, ALTAR AND HEREDOS—VIEW IN LADY CHAPEL—CHAPTER HOUSE—THE NORTH PORCH.

STAFFORD HOUSE, ST. JAMES'S—BOUDOIR CEILING.

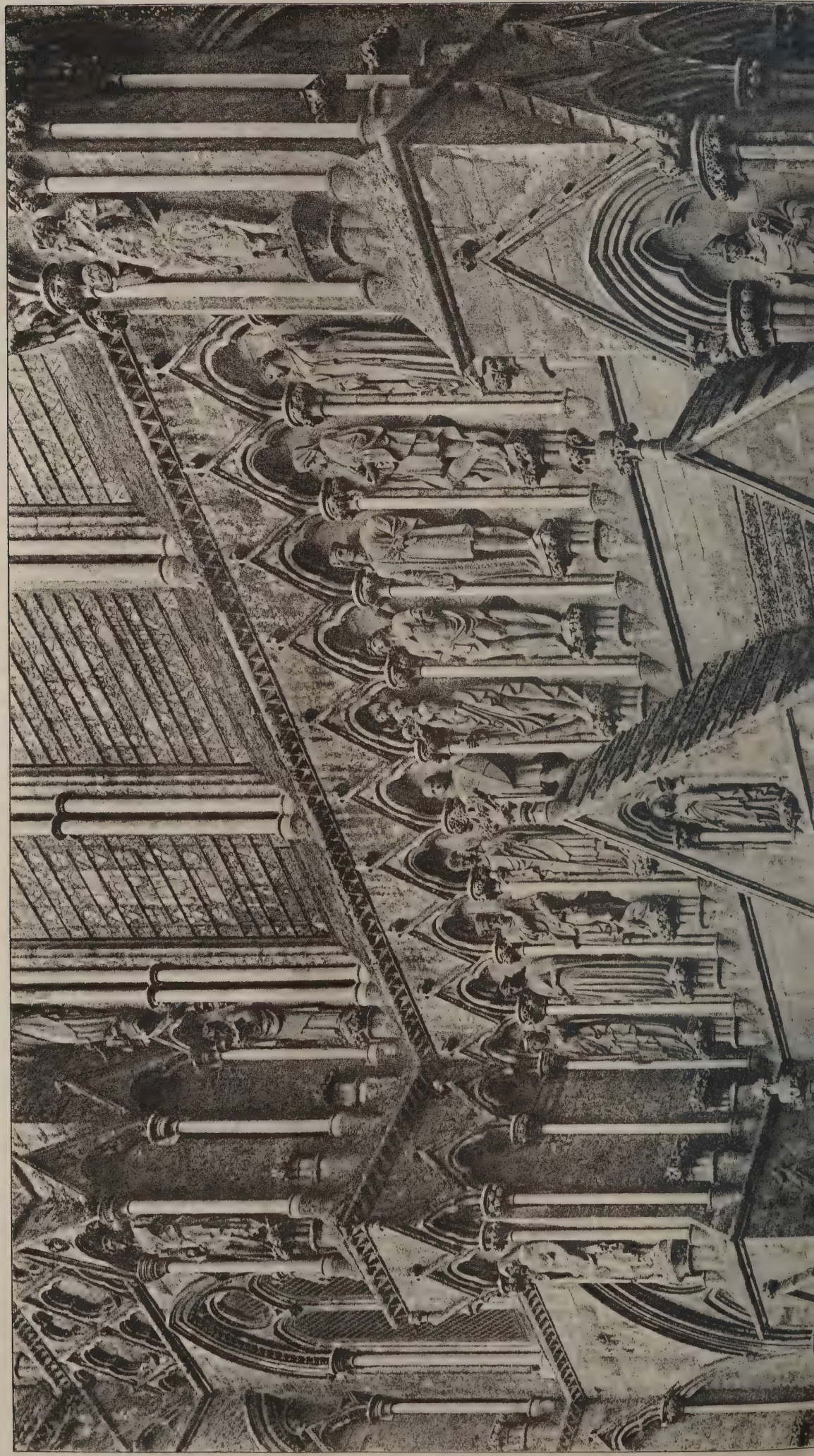
COOMBE CROFT, NORBITON.—NEW PORCH AND BOUDOIR BAY—MUSIC-ROOM BAY.



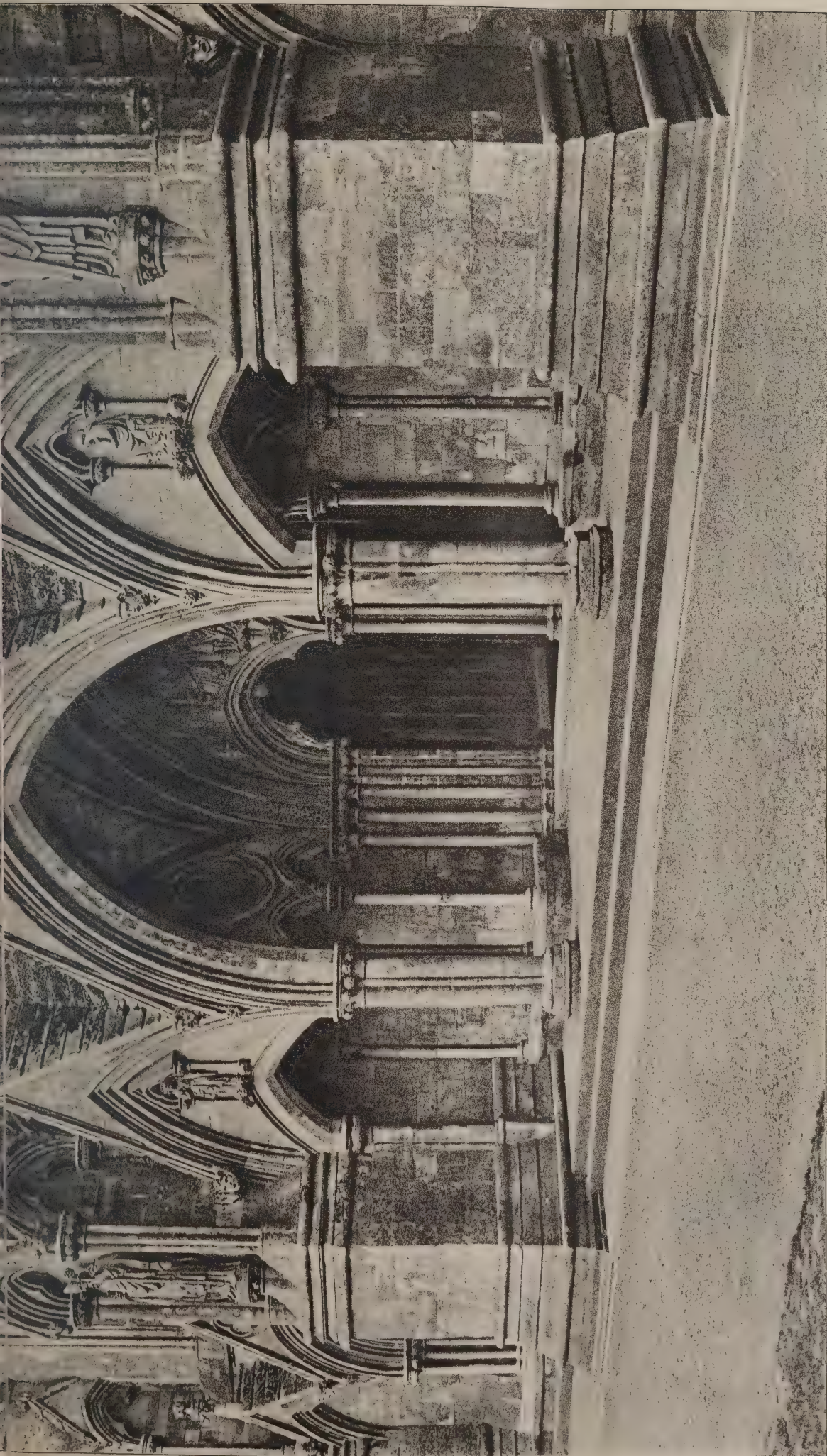




The Architect, Apr. 9<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

INK- PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 23.—SALISBURY: WEST DOOR.













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CATHEDRAL SERIES, No. 24.—SALISBURY: PRESBYTERY, ALTAR AND REREDOS.

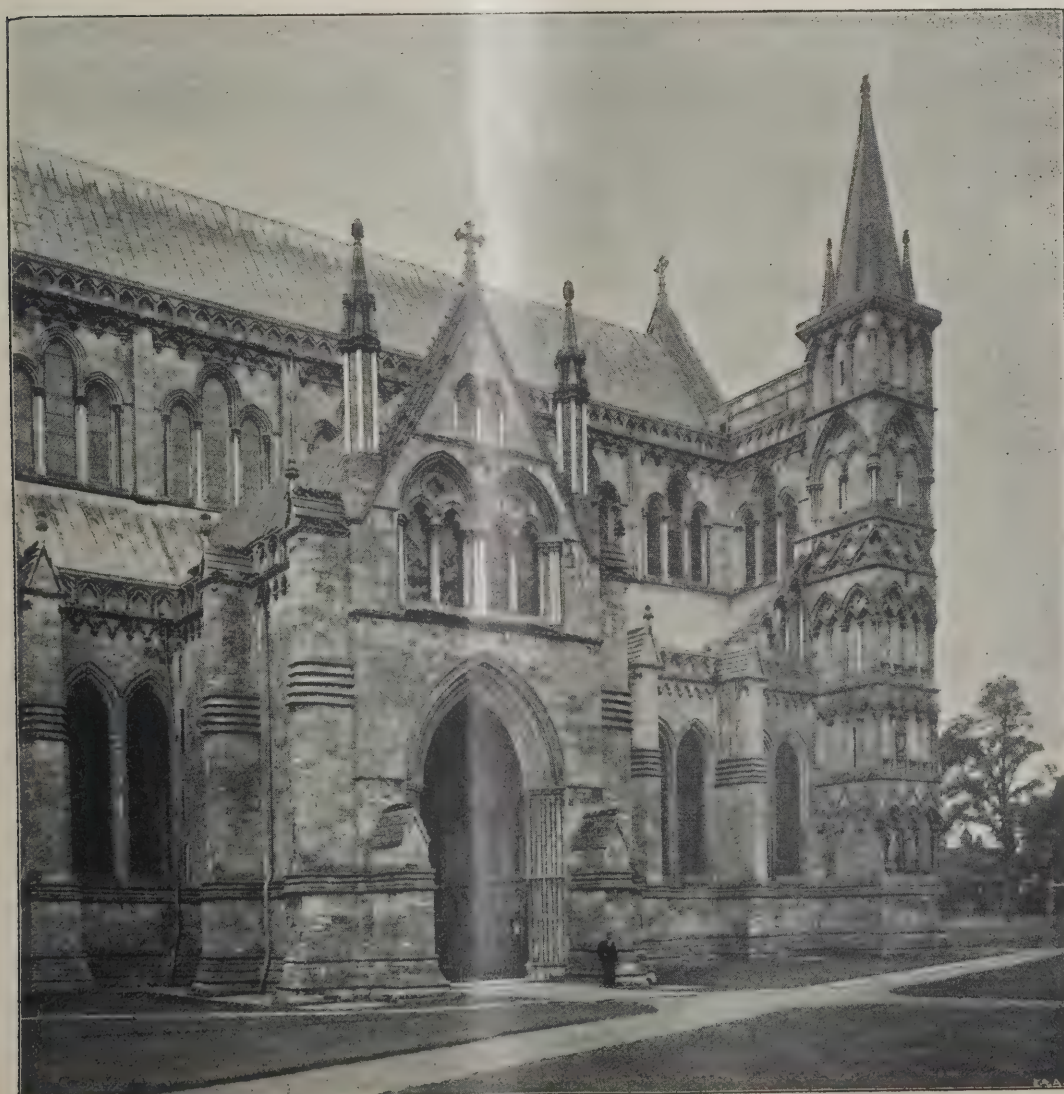






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CATHEDRAL SERIES, NO. 26. SALISBURY: CHAPTER HOUSE.



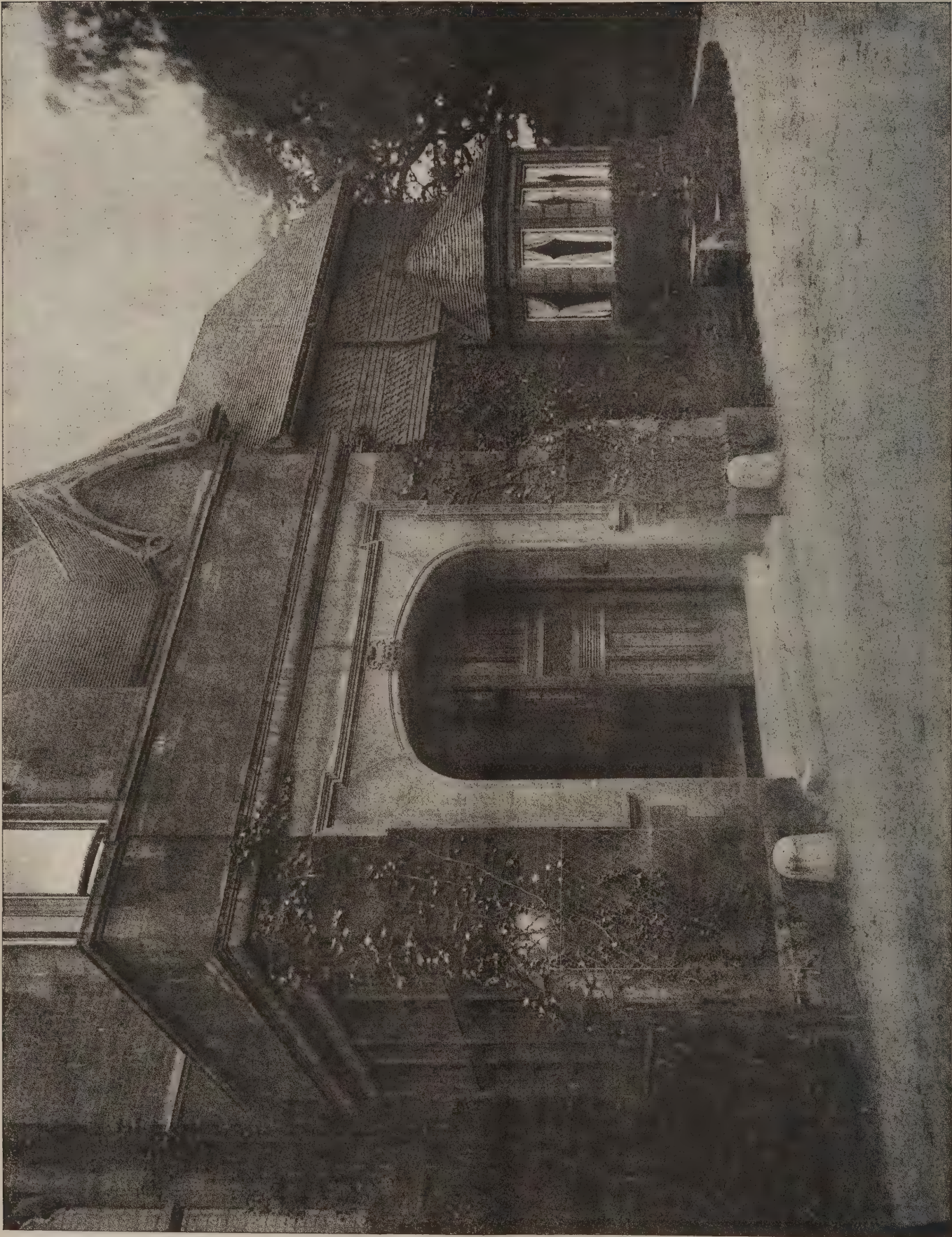












INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"COOMBE CROFT," NORBITON: NEW PORCH AND BOUDOIR BAY.  
ARNOLD MITCHELL, ESQ., ARCHT.



The Architect, Apr. 9<sup>th</sup> 1897



INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

"COOMBE CROFT," NORBITON: MUSIC ROOM BAY.  
ARNOLD MITCHELL, F.R.I.B.A., Architect.

















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SIR CHARLES BARRY, Architect.







## SALISBURY CATHEDRAL.—III.

THE Mediæval architects were not always strictly logical when designing the west front of a cathedral or church, for its relation to the building is not everywhere manifest. Too often the front is treated as an independent composition, which was to be judged by special rules. Salisbury is not one of the cases where architectural logic was dominant. That portion appears as if intended to serve as a sort of veil, and we cannot understand how an architect who in the rest of the building was so careful to express purpose, should in the west front have put together a number of parts which cannot be said to have any utility. But as among the Mediævalists there were occasionally builders who were negligent, so we must not be amazed if some of the designers considered the difficulties presented by the problem of a rational west front as insurmountable or not worth the trouble which a solution demanded. In many cases the opportunity was utilised of employing the front for the display of sculpture.

At Salisbury there were many niches formed for a series of single figures. The late Professor COCKERELL, R.A., calculated that there were 123 statues appearing in the west front. It was supposed that the whole formed an illustration of the Te Deum. It cannot now be stated with certainty in what order the figures stood, but after careful examination the following scheme was prepared for the purposes of restoration. In the gable is a colossal figure of the Saviour seated in Majesty. In the tier below figures of angels. In the second tier prophets and patriarchs. In the third apostles and evangelists. In the fourth and fifth saints, martyrs and founders. The remains of two figures of SS. PETER and PAUL proved that the arrangement must have corresponded with the order in which the figures originally stood. Among the founders Professor COCKERELL believed were figures of Archbishop LANGTON, Bishop POORE and WILLIAM LUNGESPÉE. The restoration of the west front was not confined to the statuary; before the late Sir GILBERT SCOTT took up the work every part stood in need of renovation or repair. The task was carried out with most scrupulous care, every portion of uninjured surface being preserved, and that which was destroyed being reproduced in strict conformity with the traces of ancient work.

There was another sort of restoration which could not be accomplished with as much satisfaction. We refer to the paintings of the roof. Salisbury Cathedral was not supposed to be pre-eminent as an exemplar of painting or sculpture, but there is no doubt that when perfect it contained works of both classes which were interesting. Mr. STREET once said on the subject:—

Almost all the earlier works which one visits in the Italian churches have (guide-books and cicerones notwithstanding) no claim to be called frescoes; they are nothing but tempera paintings. In England fresco was never used until quite lately. In the Middle Ages there was as great a passion for colour here as elsewhere, and our churches and public buildings were almost invariably decorated with it. It would astonish anyone not conversant with our old buildings to learn to what extent colour was applied. Generally it was a system of architectural colouring, with diapers and patterns, that prevailed; but the number of figure-subjects introduced was still something very extraordinary. In such works there was really a thorough combination of the work of the artist and the architect. The artist painted the angel or figure in the medallion; the architect directed the treatment of the decorative portion and arranged it so that it should aid, not spoil, his own handiwork.

The last words should be remembered by every critic of Salisbury Cathedral. The interior is supposed to be too severe as a whole, owing, among other causes, to the scarcity of sculptured decoration. But we cannot imagine all the compensatory effect which was produced by the coloured decoration that at one time appears to have covered the greater part of the interior. It was found necessary, in order to avoid giving too much surprise to a visitor, to employ colour in the western porch, the cloisters, and it may have been elsewhere on the exterior. Owing to the vandalism which was perpetrated in the interests of orthodoxy and the vandalism of a worse kind which was accepted as restoration, and the influence of time, which changes distemper into the lightest of dust, it is now impossible to make out the arrangement and subjects of the paintings on the vaulting without the help of guessing. In the last

century the remains of the paintings offended lovers of what was fitting and tidy, and, in consequence, buff colour was freely used to conceal their condition. But, as often happens, new washes cannot effectually hide the subjects which are beneath, for fragments are likely to survive. Some twenty years ago the old ornament and figures were sufficiently distinct to allow tracings to be taken from them, which, although containing blank intervals, were suggestive of the original character of the designs. According to a recognised practice there was a very large figure of Our Lord in a vesica in the centre of the nave, at the intersection of the small transepts with the choir. Important as was the painting it would be suggestive of spottiness if it were isolated. Accordingly, the parts of the nave and transepts near it were covered with large medallions of the evangelists, apostles, prophets, psalmists, &c., which were painted in a finer style than the parts more remote. On another part of the roof were medallions of the months, containing figures that were suggestive of common life. Apparently March was generally considered in England as the opening month of the year, but as the designer of the medallions begins with January, it is supposed he was either a Frenchman or followed the French or old Norman practice. The roof of the lady chapel was also painted. "Consecration crosses" of a more elaborate design than those found on modern churches are still to be seen over the western door and in the north and south transepts. Remains of painted arcading survive in the south transept, and some bold scroll patterns may be discerned elsewhere on the walls. Floriated ornament can be traced in the passage leading to the chapter-house. The evidence is therefore sufficient to prove that in the thirteenth century the interior of the cathedral, aided as it was with colour, and having, moreover, coloured windows, was no exception to the majority of the buildings of the time. In the thirteenth century there was no difficulty in finding artists who were competent mural painters. As Mr. KEYSER says:—"Many entries appear in the Court Rolls, &c. which mention the names of the painters employed, the subjects delineated by them, and the amount of remuneration received by them for their work. It is clear that at this time many foreigners were attracted to England, but the purely English character of most of the paintings of this date shows that this immigration served only to arouse a healthy competition on the part of the English painters, and to cause a marked improvement in the execution of the various works. It is generally supposed that many of the finest pictures were painted by travelling monks or other ecclesiastics, but even if this were the case, there is ample evidence to prove that both at this period, and still more in later times, abundant patronage was extended to professional artists, whose services were in constant request in the religious and secular edifices."

The restoration of the cathedral under Sir GILBERT SCOTT included many other works besides strengthening the tower. It was necessary to consolidate the foundations with concrete. The stonework in the lower part of the cathedral was repaired or renewed, and a channel coated with Portland cement was carried round the building. The earth which had accumulated against the walls to a height of nearly 3 feet was removed. The architectural effect was, of course, increased when the plinth and base mouldings were thus uncovered. The majority of the flying buttresses were in a dangerous condition. It was necessary to rebuild some of them. Finials, pinnacles, parapet coping and mullions throughout the building were generally dilapidated and decaying. They had to be made good. The decayed shafts, capitals and bases of the numerous windows had also to be restored. For that work Devonshire marble, which was supposed to be more durable and less costly, was substituted for Purbeck. In order to soften the contrast between the two varieties of marble, both were rubbed with oil until it was observed that the colours assimilated. The cathedral is, as a consequence of the expenditure of a large sum under Sir GILBERT SCOTT'S direction, likely to convince visitors for many years to come that Sir CHRISTOPHER WREN was correct when he said, amidst much which is condemnatory of Salisbury Cathedral:—"The incomprehensible sustainment of the various parts, although they have not any visible principle to account for their resistance to time and their own weight, yet shows the astonishing and consummate skill of the ancient architect."



### THE ARCHITECTURAL ASSOCIATION.

A MEETING of the above Association was held in the rooms of the Royal Institute of British Architects on Friday evening last, Mr. W. H. Seth-Smith, vice-president, in the chair.

Messrs. W. M. How and W. H. Purchase were elected members. A vote of thanks was passed to Mr. H. G. Montgomery for granting permission to the members to visit the Building Trades Exhibition at Islington.

The Chairman stated that the following house-list had been prepared:—President, Mr. H. W. Pratt; vice-presidents, Mr. Banister F. Fletcher and Mr. A. H. Hart; hon. secretaries, Mr. E. H. Sim and Mr. G. B. Carvill. Nominations for committee will be received till the next meeting, April 30.

Mr. T. G. Jackson, R.A., read his paper on

#### Architecture in Relation to the Handicrafts.

It used to be the fashion for any one writing or speaking on architecture to cite Vitruvius as the authority for what he said. The writings of Vitruvius are no longer regarded by everybody as the gospel of architecture, and, indeed, are now perhaps rarely read by architectural students. And yet on the present occasion I cannot do better than take as a text the opening passages of his treatise, which seem to apply very aptly to the subject for discussion to-night.

Vitruvius distinguishes at the outset between practice and theory in architecture, and goes on to point out that architects who are mere handicraftsmen without literary training are unable to give any reason for what they do, while those who trust only to theory and book learning without practical training seem to grasp at a shadow, and not reality.

An architect, he says, must be properly trained in both fields. He must be both ingenious and teachable, for neither will wit without training nor training without wit make the perfect artist. He must be a skilful draughtsman, a learned geometrician, not ignorant of optics, instructed in arithmetic, a good historian and a diligent student of philosophy. He must understand music, he must know something of medicine, he must be familiar with the decisions of the lawyers, he must understand astrology and astronomy. This is a formidable programme, and if one may without profanity speak disrespectfully of a writer who has hitherto been considered almost sacred, one would be tempted to say he was writing nonsense. The first part of his list is, no doubt, necessary enough, and as to the latter part, when we come to his explanations, we find that they do not make so much demand on the student as at first sight they seem to do. The usefulness of his historical lore is to enable the architect to explain the meaning of some of his ornaments, and to tell the inquirer that the figures of caryatids, which were used as columns, were derived from the matrons of Caryas, a Peloponnesian city, who were carried into slavery because their country had sided with the Persians against the Greeks. Philosophy is needful to him only in the same way that it is needful to everybody—to prevent him being arrogant and make him just, honest and temperate. As for music, he seems to require it principally for testing, by the note they give, the strain of the ropes of catapults and military engines. His knowledge of medicine should be sufficient to guide him to avoid unwholesome sites and bad water. As for his knowledge of law, Vitruvius seems to think he ought always to be an expert in questions of party walls, rights of drainage, and light and air. After this long enumeration of matters requisite for an architect, Vitruvius draws the line. Pythius, the architect of the Temple of Minerva at Priene, had said that an architect should be able to excel in all the arts, and in each to surpass those who made that art their especial study. Vitruvius thinks Pythius goes a great deal too far. An architect, he says, neither need be nor can be such a grammarian as Aristarchus, but he must not be unlettered; he need not be a musician like Aristoxenus, but he must not be without musical sense; nor need he be a painter like Apelles, but he must not be unskilled in drawing; nor need he be a sculptor like Myron or Polycletus, but he must not be ignorant of the plastic art; nor, finally, has he to be a doctor like Hippocrates, but he must not be without knowledge of the laws of health; nor in other studies need he excel as a specialist, but he must not be wholly unskilled in any of them.

To say that architects should excel in all these things is to demand an impossibility, because it is only now and then that a man can excel in one art even if he pursues no other. Pythius therefore is clearly wrong and has gone astray because he has not made a proper distinction between practice and theory. Therefore, says Vitruvius, he seems to have done quite enough in these several branches of study who has a fair knowledge of those parts and theories of them which are necessary to architecture, so that if he should be called upon to pass judgment upon or to approve these matters and arts he should not be found wanting.

Vitruvius, therefore, waters down, as he goes on, the somewhat strong dose which at first he seems determined to

administer to the student of architecture as a tonic necessary to his constitutional well being. A general theoretical knowledge of the various crafts which it will be his business to direct, sufficient familiarity with them all to prevent his passing indifferent work on the part of those who work under him, seem to be the measure of the practical acquirements necessary to an architect, according to the Roman authority.

On the other hand, we have the dictum of the Greek architect, Pythius, who says that the architect must not only have this general theoretical knowledge, but must be actually skilled in the practice of all the arts which he has to deal with, and not only that, but superior in each one of them to the specialist who follows only that single art.

Which of the two is to be our guide? Shall we be satisfied to be proficient in the theory of our art, learning it from books and lectures, and merely acquainting ourselves with practical work in a general way, enough to enable us to understand our specifications, and order the work properly, and detect flagrant instances of inferior workmanship and bad material; or are we with Pythius to put our hands to the work ourselves, and not only design but help to execute it; to train ourselves to be master craftsmen as well as superintendents and directors of other men's labour?

For many generations past the former of the two methods has been the order of the day. Most of us who have reached or passed middle age have been brought up under it, and if we have to any extent departed from it, it has been of our own initiation that we have done so.

That this plan was not that in vogue during the best periods of modern European art is well known. It was not in that way that the architects, or building artists of the Renaissance, in its earlier and more independent days, or those of the Middle Ages worked. They would have been at a loss how to go on if you had parted them from their building and their workmen, and shut them up with a drawing-board and a T square, and asked them to make their designs and convey their instructions by means solely of drawings. Their method was that of Pythius rather than that of Vitruvius, whose gospel, fortunately, had not in their day obtained currency, or been placed on the canon of inspired authorship.

I need not tell you that of late years there has been a revulsion against what I will call the Roman method of practising architecture in favour of the Greek. Many of us have been preaching against the strictly professional view of architecture, and urging that a man cannot be expected to produce good designs who seldom or never comes into contact with the materials out of which his designs have to be constructed. We have argued that it is from the handling of material that suggestions in design can most readily be gathered, that reading about processes in building, or any of the arts which go to make up a building, will never teach a man how to make the most of his opportunity, how to use his material to the best advantage, how to economise labour so as to avoid wasting it to no purpose, and how to design in accordance with the natural qualities of stone, iron or wood with which he has to deal. We have tried to impress on the student that an hour spent in the workshop or on the scaffolding will often teach him more than a week spent in a library. We have gone still further, and tried to persuade students not only to go and see how things are done, but actually to put their own hands to the work, and to become handicraftsmen in one or more of the many arts with which, as architects, it is incumbent on them to be familiar, and of which it is necessary the technicalities should be understood by anyone who undertakes to design for them.

These proposals, however revolutionary they appear to the advocates of the old-established professional system, according to which architecture has so long been practised among us, are still, it is clear, very far from bringing us again to the methods of the architects of 400 or 500 years ago, to say nothing of those of the Greek architect whose demands seemed to Vitruvius so extravagant. The contracts which bishops and chapters and others who intended building on an important scale made with their architects bound them down rigidly to a much more constant and intimate association with their work than a modern architect would submit to. The architect bound himself to come with his family and live in the place where he was to build, to engage workmen, and see that they did all that was necessary to be done, to work with his own hands, both in building and in sculpturing, as befitted a good sculptor and a master of the art of stone-cutting. He was also to go to the quarries as often as was necessary and arrange for the quarrying of the stone. Furthermore, he was bound for the term of so many years, during which the building was to be constructed, not to undertake any other work without the special leave of his employers, or a majority of them, or if he were engaged on some other building in the same or a neighbouring place, the time he should devote to each was strictly specified. Finally, he bound himself to supervise as chief master builder and superintendent all the labourers, builders, master workmen and handicraftsmen employed on the building, and to supply them



with such dimensions, orders and methods as would be required during the progress of the works. For all this he was to receive a fixed annual salary, to which was sometimes added a gown or two gowns in the year, and perhaps a house was provided for him to live in with his family.

The architect of those days, therefore, was a superior clerk of works, as we should call him, with this radical difference, that he had no master over him, sitting most of his time in an office perhaps 100 miles away, directing him by the penny post what to do, and sending him drawings to show him how to do it. Imagine a modern clerk of works to have had the training of an architect as well as that of a tradesman in one of the handicrafts—that is to say, to have the skill to design the work he directs; or, what is the same thing, imagine a modern architect to have learned one or more of the manual trades and to choose to go and superintend one of his own buildings as his own clerk of works, and you have the nearest approach to the architect who designed and raised the mighty structures of the past, which it is our aim to rival and our despair to surpass. He would necessarily be a mason to begin with, for masonry is the king of all the trades, the one which all the rest follow and the one which, blending itself, as it does, imperceptibly with sculpture—which is but a refinement of masonry—passes without any visible or marked transition into the higher region of fine art. In olden time sculptors and architects were the same persons, or at least, though there were sculptors who were not architects, there were probably no architects who were not sculptors capable of designing the carved work of their buildings, and of executing the most important parts of it, notably the figure-work, with their own hands.

Let us for a few minutes try to realise in our own persons what it would be like to practise architecture after this fashion. Let us shut our eyes to the present and try to open them again in the days of, say, Henry VI. or Lorenzo de' Medici. The dingy office in a London street vanishes from our sight. Away go the high stools, the drawing-boards, the dusty piles and rolls of paper, for—oh! blessed release—there will be no more working drawings to make and little drawing of any kind whatever. The office bell will no longer send a shock through our nerves, announcing the coming of a visitor to interrupt us at the most critical period of a design. The approach of post-time will no longer drive us into a frenzy to get off arrears of correspondence that cannot be postponed any longer, for we shall have little reason to write to anyone. Our employers will be on the spot with ourselves, and an occasional conference on the building itself will make much letter writing unnecessary. Away, too, goes all that tedious necessity of long railway journeys which dissipate our time, and exhaust perhaps four hours in travelling for every hour we have to spend on the work at the end of it. Our work will now be all under our eyes or near at hand, and the hours wasted in the railway carriage will be employed to good purpose on our growing building. Away, too, go the long specifications, the contracts with builders, the lynx-like supervision required to keep their performance up to their engagements, for we shall either be our own contractors or else have workmen under us employed and paid directly by the (our own) employer.

Relieved of all these official and commercial occupations, in which I venture to say most of us—do what we will—find half, and more than half, our time spent, we shall pass our working days clad in a workman's blouse, setting out our work on the ground, drawing such simple diagrams as will give the workman the proportions and dimensions of the several parts, marking out the mason's moulds, perhaps taking the mallet and chisel out of his hand to show him practically how we want certain parts finished, trying on the building itself as we can nowhere else the scale and proper character of our sculptured ornament, without doubt doing so much of it ourselves as will give the clue to the subordinate carvers, and probably finishing some of the most important parts with our own hands. Conceive the sureness and confidence with which we should work. There would be none of that experimental and hesitating anxiety which makes us doubt after drawing out a design whether it will come out as we intend in actual execution. No! there is the building itself on which to try experiments. When the thing is going wrong we can stop it at once and correct our original device and substitute something better, and there will be no contractor to worry us for an "extra," on the inevitable plea that the new way is more expensive than that for which he contracted. And so our building will rise, and as it nears completion and the scaffolding comes down, and we stand with hands behind us and head thrown back to see our creation as it emerges in its maiden whiteness from the enveloping veil of poles and planks, we shall feel that it is indeed our creation, the work of our own brain and in a measure of our own hands, in a way that no architect can quite feel now about any of his creations, however much pains he may have devoted to them.

This, gentlemen, I venture to think, will appear in the eyes of many of you—certainly to the younger men among you in whose bosoms the stirrings of art have all their youthful fresh-

ness—an attractive picture. Can we realise it at the present day? Or, if that is impossible, how can we get to it?

Can we get back to it? Well, of course, we cannot do it in a hurry. But can we expect ever to get back to the old system at all? I think not. It would be putting the hands of time back too far. Changes of system do not come about without some reason in the natures of things and of men, and to neglect the conditions of modern life in art while we admit their supreme influence in other fields would be not only unpractical but unphilosophical. Take, for instance, the matter of working drawings. The drawings used in olden time were of the slightest and most conventional kind. Even in Wren's time working drawings such as we make for every detail were not found necessary when competent workmen were employed. When sending his small scale plans and directions for the library at Trinity College, Cambridge, Wren adds, "I suppose you have good masons; however, I would willingly take a further pains to give all the mouldings in great; we are scrupulous in small matters, and you must pardon us, the architects are as great pedants as critics and heralds." In his day there were trained schools of masons and joiners who had traditions of their own and could be trusted to apply them. The architect gave them the size of the door, the scale and amount of ornament he wished to use in the doorcase, and the workman had sufficient skill to fill up the details of the sketch and to realise the architect's intentions as he would have them. So with the masons: to give them the moulding in great would, Wren seems to imply, be unnecessary if the men were good craftsmen. But where are the workmen nowadays who could be trusted to do this? It is easy to imagine the result if we tried the experiment. There are very many architects who do try the experiment of dispensing with working drawings, not from any desire to return to the older system of work as being better, but simply from the wish to save themselves trouble, or else in order to save their time for more lucrative occupations which have little or nothing to do with architecture. Some of them employ a ghost, and the ghost naturally takes little interest in a work which is neither his entirely, nor anybody's entirely, and the details come off badly. Others dispense with the ghost and leave all the details to a contractor. One builder told me that when he applied to an architect for details of a certain work the only answer he got was, "Take it and do it, and don't bother me about it." In another case the builder told me the only full-size details furnished him by the architect of a building which cost 6,000*l.* were those of a cellar door and a coal-shoot, and that he—the builder—himself made all the other working drawings, and did not even go through the form of showing them to the architect. Now I need not tell you that, whatever may have been the case in the days of Sir Christopher Wren, there is no school of workmen nowadays capable of filling in the details on a general design given them by an architect. Nor need I tell you that it is on the details of a design that its success depends for its ultimate appreciation no less than on the general conception, for no grandeur of idea or originality of scheme will make a good building if it is badly carried out in its details. An amateur may and often does have good conceptions in the mass, but it is only the artist who can carry them into execution successfully, because he alone is capable of contriving the parts out of which the whole general idea is built up. It may be imagined therefore what kind of architecture results from the method I have described, when the nominal architect gives only the rough idea of the building and leaves the details to men who have had no artistic training whatever. Indeed, there is no need for imagination in the case, for the streets of London are lined with buildings erected on this system, expensive and costly buildings very commonly, for the worst modern architecture is the most gorgeously decorated, and lavish expenditure on ornament is the last resource of an incompetent designer.

But if neither builder nor workman can be trusted to supply proper details for the carrying out of an architectural design, what conclusion is left to us but that they must be done by the architect? How is he to supply them? Of course he might, like the old men, go and live on the work, and give the details to the workmen by word of mouth, or by example, or by setting out the moulds and dimensions with his own hands. I do not know how many of you are prepared to follow your craft in this way. You would only be able to look after one, or at the most two or three buildings at a time, and though you would save the expense of an office, I fear 5 per cent. would not enable you to earn much more than a bare livelihood. Drawings, I fear, are, and must remain, a necessity if an architect is to have his designs carried out as he intends, and if he wishes to have full justice done to them.

Again, there are many buildings in modern times involving intricacies of plan which must be carefully plotted on paper, and could be contrived in no other way. Old buildings were very simple, and in their plans there was very little variety. One manor-house was arranged very much like another manor-house, and one cathedral or church on much the same general lines as another. Those buildings of our own day which retain



this simplicity of plan could be built without drawings just as the old ones were. It would be easy enough to build a great church from foundations to cap-stone of spire without a single drawing, or only such rough diagrams as the designer would need to enable him to put the parts of his building together. But when we come to such elaborate buildings as the modern town halls, or technical schools, or boarding-houses of our public schools, or theatres, or when we have to deal with confined and scantily lit sites, as in the streets of London, careful and elaborate plans are a necessity, and the drawing office indispensable. There is no prospect whatever of our being able to build in the future without drawings, and we may dismiss as impracticable all hope of superseding them by supervision and direction on the spot, and of being able to shut up our offices and take to the building sheds and the scaffolding.

But admitting all this—acknowledging, as I fear we must, that the necessities of modern system are too strong for us, and that we must in the main go on as we are now doing—is there nothing we can do to place ourselves more in touch with the handicrafts? If we cannot go the whole way, may we not go part of the way to meet those workmen on a common footing with whom, whether indirectly or directly, we cannot help co-operating in the carrying out of our designs? If we cannot, as Pythius would have us, excel in all the arts, so as to surpass in each one of them the skilled workman who has followed that one alone, and made himself master of it, surely we may, without being unreasonable, demand of our architects that they shall at least not design things without knowing how they are to be made. Nor if it is unreasonable to ask us to be better masons, better joiners and carpenters, better smiths and better plasterers than the men who follow those callings and do nothing else, is it unreasonable to demand that every architect should so far familiarise himself, by actual observation and inquiry, with every one of these trades, that he may know how to make designs suitable to the material employed and the way of employing it. And yet we are all our lives designing things without knowing how they are made. How is it possible we should not, in our ignorance, give a world of unnecessary trouble to the workman, cause a deal of needless expense to our employer, and miss altogether that propriety in design which arises from proper use of material, because the proper use of it is unknown to us? Take, for instance, the case of wrought-iron work. Every architect is called upon constantly to design such simple things as railings, grills, balustrades, in that material. He draws, probably, something after good examples that he has seen; perhaps he tries to improve on them and design something new, and if he knows nothing of smiths' work except from books and drawings and such sketches as he has made of his own, the alterations he makes very likely make what was very easy into something very difficult, if not impossible; and even if the workman gets over the difficulty by some troublesome device of his own, the labour involved is thrown away and might have been saved by a little knowledge on the part of the designer. Those who have only designed ironwork on paper and never seen it made, would be astounded to find how very differently it was done from what might have been imagined, and how very much more simply their design might have been done by altering it a little. I wonder how many in this room have any idea how so simple a thing as the ordinary forked baluster is made, with one foot to be let into the stone for each pair of balusters. I confess I did not know till the other day, when I wished to vary the form of the thing so as to give it a little more character, but began to doubt as I went on whether the smith could make it. So I went to the forge and had some experiments made, and found that the usual process was quite unlike what I had imagined. Another advantage of the visit was that I was able to suggest to the smith other ways of doing it, and before we finished we had made a forked baluster in four different ways, and found out what was the easiest and cheapest. This seemed to me an instance of the way in which designer and workman can help one another—the designer, from habit, seeing his way to fresh possibilities, while the workman, from habit, had not thought of doing anything but what he was used to.

Let it be a rule, therefore, with every architect never to design anything without knowing whether his design is practicable, and practicable according to the received traditions of the craft concerned.

But may we go no further than this? May we not require that he should be able to put his own hand to the work as a handicraftsman in one or more of the trades over which he has to exercise control in the ordinary discharge of his duties?

There are some trades of which it is obvious such knowledge as an architect can derive from observation is enough. Going through the trades in the specification according to their order we begin with excavator. It is, I think, obvious that he would not improve himself in architecture by going to work in the trenches with pick, shovel and wheelbarrow.

Next comes bricklayer and waller. I once built a brick wall, but I do not know that I learned much from it, except that

bricklaying was not so easy as it looked, and that if it was hard to keep a true upright it was still harder to keep a true level. The bricklayer to whom I showed my wall when it was done could only say that he thought it strong but very ugly. I do not know that I should advise any of you to follow my example.

Carpentry and joinery are more within the reach of every one, and a course of training at the bench may safely be recommended to all who have to do with building as supremely useful.

I need not go through all the trades, but masonry brings us near to the very centre of architecture. To be a practical mason would not in my opinion be so useful an accomplishment for an architect as skill in joiner's work. The ordinary problems of stonecutting can, I think, be understood without actually handling the chisel and mallet. But masonry, as I have said, melts insensibly into sculpture, and it is not always easy to say where masonry ends and sculpture begins. What will you do when you come to the carving of your building, as, of course, come you must in a building of any importance? If you only care for quantity and not for quality, you can, of course, leave it, as many do, to the carver, and simply get an estimate and leave him to do his best, which in that case may be also his worst. But you will not, I am sure, if you are in earnest, be content with so perfunctory and vicarious a way of bestowing on your work its principal adornment. You will have your own notions of the scale, the character and the finish of your carved work; you will feel that the outline of your sculptured capitals is as important as the profile of your mouldings; that the play of light and shade in your foliated string-course or your enriched frieze was an important element in your design; you will desire for your sculpture an historical character, illustrating the purpose and circumstances of your building; and above all you will feel that the same feeling which you have impressed on the purely architectural part of your design must be carried into the sculptured decoration, or the unity of the effect will be marred. You must impress yourself on that as you have done on the rest.

How are you to do this? You may spend hours standing over the sculptor or watching him model what is afterwards to be carved, and tire both him and yourself by suggestions and counter-suggestions which perhaps end in mere mediocrity and dulness, because though both of you want something different you do not want the same thing and are unable to explain your meaning to one another. But if you were able to finger the clay yourself you could realise to yourself your own intention and explain it to him perfectly, and in this way you would succeed in getting what you want as you can in no other.

Every architectural student, therefore, ought to learn to model. He will find it of the greatest service to him in his future career, not only in enabling him to explain his meaning to those artists who will collaborate with him, but also in fixing and correcting his own loose ideas of sculptured decoration and helping him to secure for it that character which will correspond to his intention. If he goes on to carve, so much the better; for my part I should like to see the callings of sculptor and architect rolled into one.

As to the other crafts, time forbids me to speak more at length. Every man, be he artist or not, should, as with the ancient Jews, be taught some handicraft; and to us architects such an accomplishment would naturally be doubly useful. We cannot expect that an architect should have actual manual experience of them all; still less can we require, with the Greek writer, that he should have mastered them all. But we have a right to demand that he shall by actual observation acquaint himself with the methods and difficulties of them all, not from books but from the workmen, not in the library but in the workshop. Let him never make a design without knowing how it will be carried out, and if in doubt let him go with it to the workshop, the building shed, or the forge; let him consult the men who are to make it, and then correct or alter his design to suit the difficulties of material and workmanship. In this way we may expect to infuse a new life into our architecture and to awake it from its torpor. The knowledge you will acquire in this way will not be of a kind to be tested by examination, or to enable you to win prizes and scholarships, but you may feel assured it will be the means of making you better artists individually, and of advancing the art of your country as a whole.

Mr. Owen Fleming, who proposed a vote of thanks, said he had listened with great interest to Mr. Jackson's thoughtful investigations of the difficulties and obstacles which beset architects in their practice. Regarding a knowledge of the intricacies of the crafts a few architects had been self-sacrificing enough to learn to understand them, but this was a task many others did not care to undertake, although, undoubtedly, the work of those who had thus schooled themselves would compare favourably with the work of men who neglected crafts. After speaking at some length on the *régime* of the Association in the past, Mr. Fleming said that one of the means to become successful in the examinations was by the aid of the knowledge



of the arts and crafts, and in furtherance of this workshops should be incorporated in their new building.

Mr. Hampden W. Pratt seconded the vote. He was thankful for what had been explained in the paper so clearly and moderately. Although it had been suggested that architects should be trained in every art, yet Mr. Jackson urged that if this was not possible architects ought at least to be taught one handicraft. Students who had taken up masonry and carpentry would fulfil all that was expected of them. It would often do a man a great deal of good to follow one craft, whereas if he followed more than one the divided knowledge would have bad results. Their modelling class was very good, and it showed a start had been made in the right direction, and everyone was in favour of being intimately acquainted with the handicrafts, as we have no competent workmen nowadays who could design the details; the only thing is for the architect to make the drawings.

Mr. C. H. Brodie thought architectural students would know more of their work if they were forced to visit buildings whilst in course of erection, the same as engineers were bound to inspect great works whilst they were in operation. Architects should therefore go out on the building when the different trades were working and get explanations to any question they might raise. For an architect to do his duty he must visit workshops.

Mr. Banister Fletcher also spoke, and the Chairman summarised the discussion and put the vote of thanks.

It was announced that Mr. Hugh Stannus would read a paper at the next meeting on the "Classic Cornice."

## RATING OF ENGINEERING UNDERTAKINGS.\*

THE question of the assessment for rating purposes of our great engineering undertakings, such as railways, canals, gas and water works, is necessarily one of vital interest to all engineers connected, either directly or indirectly, with the management of such concerns and the importance to them of some knowledge, however limited, of the method in which undertakings under their control are assessed, has suggested to the author that a paper upon the subject—which will, it is hoped, give scope for an interesting discussion—may not be entirely without interest.

It is common knowledge that no town of any importance is without its railway system and its gas and water supply, but the extent to which these undertakings contribute to local taxation is comparatively little known; and still less, that in some rural parishes, through which the trunk line of a large railway company passes, it sometimes happens that the proprietors of the railway pay as much to the parochial authorities as the total of the other ratepayers combined. This, on the face of it, appears to be an injustice, and more especially so when one considers that the acreage of land in the parish occupied by the company is infinitesimal compared with that occupied by the other contributors to the rates. Primarily, however, it must be borne in mind that the fundamental principle upon which every hereditament is rated, whatever that hereditament may be, is its rental value, the last definition of the term "gross value" by statute being "The annual rent which a tenant might reasonably be expected, taking one year with another, to pay for a hereditament if the tenant undertook to pay all usual tenant's rates and taxes and tithe commutation rent-charge (if any), and if the landlord undertook to bear the cost of the repairs, insurance and other expenses (if any) necessary to maintain the property in a state to command that rent." At the first glance it would appear to be inequitable that the railway company should contribute out of all proportion, as regards the area of its property, to the other ratepayers, and that one piece of land adjacent to another should vary so largely in value for assessment purposes; and one might almost be led to hastily conclude that the hard-and-fast rule that trade profits should not be rated had been broken. Upon consideration, however, this will be proved to be an erroneous conclusion, and it will be seen that the old axiom of a property being worth what it will fetch may be well applied here, for in the event of the railway company not possessing the fee-simple in the land, they would be willing to give a large rent, and it is upon this hypothesis their assessment is fixed.

The method of ascertaining the hypothetical rental value is one of great moment to every parishioner, for, theoretically, as the total rateable value of a parish increases, the rate in the £ diminishes; and consequently the small ratepayer possesses an obvious advantage in a company occupying land in the same parish in which his own property is situated. At the same time, it must not be lost sight of that the law is framed with the prime object of equality, and although a company is, perhaps, better able to pay more than its just share of the local burdens

as compared with an individual occupier of property, it was not the intention of the Legislature that it should be called upon to do so, and any policy initiated by the local authorities tending in that direction cannot be too vehemently denounced. On the other hand, a wealthy company has a decided advantage over a poor parish, in so far as it has greater facilities for legal proceedings, and in many cases the dividends to its shareholders are held in higher esteem than the obligatory duty which it is under to each ratepayer in every parish in which it is a taxpayer. This, however, is somewhat a digression as regards the direct subject of this paper; but the excuse must be the importance of the point, which could not be altogether overlooked.

The facts, firstly, that trade profits are not rateable, and secondly, that the rateable value of such undertakings as canal or railway companies is calculated upon their receipts and expenses as going concerns, is to the casual observer irreconcilable; but upon carefully studying the matter, the equity and fairness of both of these rating rules are fully demonstrated.

When the assessment of any hereditament is being considered (such hereditament being occupied by the owners) the object, as has been previously stated, is to find the rent which a hypothetical tenant could afford to pay a hypothetical landlord for a similar occupancy, and the first question which must arise is as to how much of the property would belong to the landlord and how much to the tenant—for it must not be forgotten that, with the exception of a few incorporeal hereditaments, it is the land itself which is liable to the rate, and its value *quod* land only is increased by the uses to which it is put. In the case of a large company (whose system extends possibly from the south to the north of England), when the published accounts are submitted for the purpose of making a valuation of a small isolated parish, say, for instance, in Yorkshire—for these accounts are practically the only data upon which an equitable assessment can be determined—the situation can be appreciated when we remember that only this one portion of the whole undertaking is to be assessed, and that for this purpose it has to be assumed that it is possible for a tenant to enter into possession of it, consequently the rent which he could afford to pay for this part alone has to be estimated from the accounts.

Now, it would be a comparatively easy task for a properly constituted body to determine the rental value of the whole system of the London and North-Western Railway, for example, and then to apportion the rateable value to the several parishes claiming a share, according to the length of line in each parish. But such a principle of assessment has been set aside by the courts, and justly so, as it must be patent that an occupier of property in some rural parish should not have the advantage of a contribution to the common fund of another ratepayer, owing to the fact of such ratepayer being a company which has property extending through many parishes, and that the average rateable value per mile of the whole of their system allows a higher assessment to be placed upon the property in this rural parish than would otherwise be the case. The same injustice is suffered in those parishes where, through this equalisation, the company's assessment was not as high as it should be. One illustration will make this point clear. Take a mile of railway at Paddington and another at Penzance. Obviously, a landlord could command a higher rent at Paddington than at Penzance. This being the case, why should the ratepayers of Paddington pay more, because one of their number pays to Penzance taxes which are justly payable to Paddington? The principle, then, to be borne in mind when assessing these extensive undertakings is that they shall be assessed in each parish according to the value of the occupation in that parish.

The method of arriving at the rateable value of a hereditament on the receipts and expenses principle is briefly as follows:—The gross receipts have first of all to be obtained, and from these have to be deducted:—

1. The working expenses. 2. Management expenses.
3. Government charges (if any). 4. Rates and taxes. 5. Rental value of dead works.

The result obtained is the profit accruing from the undertaking. The hypothetical tenant who has, it is assumed, sunk capital in the concern would then require a return by way of interest, &c., for his money, and a sum to represent this amount has now to be deducted from the gross profits to satisfy his claims, the residue being the amount he could afford and would be willing to pay the hypothetical landlord for his occupation—in other words, the gross value of the property. From this sum the usual statutable deductions are made, viz. those for maintenance, &c., and the result will be the rateable value, upon which basis most of the taxes are paid.

This, then, is the principle which is adopted when assessing railways, canals, gas and water companies, &c., and its application, although varying in some slight details as the character of the particular hereditament varies, may be taken to be practically similar in every case.

Dealing more particularly with railway companies, the question of parochial receipts and the working and management

\* A paper by Mr. P. Michael Faraday, read at the meeting of the Society of Engineers on April 5, 1897.



expenses may be passed over, as they chiefly resolve themselves into a matter of book-keeping; although it is not for one moment suggested that a keen appreciation of the purpose for which these amounts are taken from the accounts should be lacking in any one whose duty it is to compile them. The result, if this knowledge be wanting, would probably be useless; but time will not permit of the author going thoroughly into the details of the various sums which would be included under these headings.

Perhaps the most important item in the valuation of a railway company is the hypothetical tenant's capital. It may not be widely known that, as a general principle underlying railway legislation, a railway company has not exclusive use of the right of way over its railroad, and that any private individual has the privilege of running his own engine and carriages over the line of way constructed by the company on payment of tolls, in the same way that a barge-owner is allowed to carry freight over a canal by paying to the canal company certain tolls for the usage thereof. It follows, therefore, that in dealing with these enormous undertakings it has to be assumed that there are two capitals employed, one belonging to the hypothetical landlord and the other to the hypothetical tenant. As for the engines, carriages, &c., rent is not paid—land only being rateable; it is clear that the hypothetical rent or gross value is paid only for the privilege of using the line of way. The land occupied by the running lines, therefore, constitutes the hypothetical landlord's property, and the return which he is assumed to receive for his capital sunk in this property is the gross value, or, as it is sometimes termed, the landlord's share. Consequently, we have to deal only with the interest, &c., derived from the hypothetical landlord's capital, and have no occasion to ascertain the capitalised amount of this interest.

With the tenant's capital the situation is different. Although, as has already been pointed out, a hypothetical tenant is assumed to exist, the capital which he would require cannot be assumed; this figure has to be worked out upon the basis of the occupation—that is to say, each hereditament has to be dealt with as it exists at the time the valuation is made, the uses to which it is then put, and no other considerations whatever must enter into the calculation. The constituents of a tenant's capital of a railway company would consist chiefly of the rolling stock, conveyances at the various termini, horses, &c., tenant's stores, furniture and fittings at the stations, all non-rateable machinery and tools; in addition to which he would require a certain sum of money as working capital. The task of ascertaining the tenant's capital for a railway of any importance is necessarily one of great difficulty, and a question might arise as to whether the various items should be taken at their prime or first cost, or if they are to be estimated at their present value. The answer to this point is that they are to be taken at their actual value, above or below their cost when first purchased by the company; because an incoming tenant would say, "What rent can I afford to pay upon taking over this property? It is obvious that the amount I can pay as rent must depend upon the deductions to be made from the gross earnings in respect of profits, interest, &c., due upon my capital invested therein, and I must, therefore, calculate these profits on the amount of capital actually required to be expended on the stock; not on what may have been the value of stock at another time, or in other hands." The present cost, therefore, is what has to be ascertained, and when this amount has been fixed, the percentage to be allowed the hypothetical tenant, as his share of the profits, &c., of the undertaking, must be determined. Upon this point probably more cases are contested than upon any others which arise in connection with a rating appeal.

There are three distinct sums to which he is entitled:—

- (1) Interest on his capital. (2) Trade profits from the concern.
- (3) A sum to be set aside for risks and casualties.

Custom, to a large extent, is responsible for certain amounts, and there is nothing more difficult to set aside than an unwritten law which is more or less universally adopted. Five per cent. is usually allowed for interest, 10 per cent. for trade profits, and 2 and 1½ per cent. for risks and casualties.

With regard to the amount for interest, it is a well-known fact that nothing like 5 per cent. can be obtained at the present day for money invested in trust funds, and, undoubtedly, the rate of interest for money in the market should influence the rate of interest to be allowed a hypothetical tenant who, having invested his capital, is allowed, by law, a certain sum in the form of interest, putting aside altogether the question of trade profits which he also derives from the concern. The interest allowed on the tenant's capital, therefore, is, as a rule, 17½ per cent., but a lower rate is sometimes contended for.

The stations, sidings, &c., of a railway company (and these are termed "dead works") are assessed upon a different principle to that of the running lines, and, when making a valuation of the line, a deduction should be made from the gross receipts to allow for the rent which a tenant would have to pay for the use of the stations over the whole of the system. Of course, the gross value of the stations is the rent which the railway company would be willing to pay for them under the

statutory terms. The amount of money taken at a station does not affect the rateable value of it, for stations are largely for the convenience of the company to facilitate the collecting of their tolls, the money being earned over the whole route by which the passengers and goods are conveyed. To estimate the rental value of a station it is necessary to ascertain its cost of construction; and by taking a percentage upon this and adding a percentage upon the value of the site a figure representing the gross value is arrived at. Signals and sidings are included in the valuation of the station, as, theoretically speaking, if a train ran from one terminus to another and there were no intermediate stations, no signals would be required. They are only erected because of the stoppages which take place and the many stations situated on the route of a great trunk line. The case, however, with regard to signals at a junction is different, as these are included in the valuation of the line.

The foregoing deductions having been made from the gross receipts, the gross value of the undertaking is arrived at, and from this has to be deducted a sum to allow for the maintenance and renewal of the permanent way. It would be very difficult to determine the sum of money necessary for the maintenance of any one mile of railway. Cases could be cited without number, but we should be no nearer fixing an amount which might be laid down as an invariable rule. A railway company could probably give the actual expenses incurred on any particular section, as the method they have of keeping their accounts would allow of this, but the sum for renewal is so involved with that of maintenance that it would be almost impossible to separate the two; indeed, no one could say from an examination of the accounts where maintenance left off and where renewal began. Repair and renewal, in point of fact, go on simultaneously, and when making a valuation of a railway company an inclusive figure to cover both items is very often estimated. In ascertaining this amount it must be borne in mind that, although the parochial system is to be adopted, there are certain expenses connected with the maintenance of tunnels and viaducts, and notwithstanding that they are incurred in the parish for which the valuation is made, they must not be charged wholly to that parish, as the tunnel or viaduct, as the case may be, is contributing to the earnings everywhere, and without either or both the traffic on each side of the particular parish could have no existence. It must be apparent that the figure (unless given by the railway company) is an estimate, and consequently the amount of train mileage must have considerable bearing upon the question, as where the traffic is heavy the expenses will be greater than where it is light, although not necessarily by any means in the same proportion.

This deduction having been made, the rateable value in the parish is arrived at, but it must be obvious that in a great number of cases it will be found impossible to adopt this principle, for it is a *sine quâ non* that to arrive at a successful result the amount of parochial receipts must exceed the amount of the deductions, or otherwise there would be no rateable value. On the other hand, every branch of a railway company's line must of necessity have some value to the railway company, for if this were not the case an application would be made for permission to close such part. Consequently we have the following position:—On the system of most of our large railway companies there is usually to be found one main or trunk line with several branches; many of these branches are worked at a loss, but they are the means of bringing traffic to the main line as feeders, and as such they are material sources of wealth to the company. In the event of the whole system of the railway company being contained in one parish, the difficulty of the assessment of such would be easily surmounted, but the parochial principle having to be adopted, owing to its running through many parishes, the local receipts and expenses are those only which can be taken into account. It follows, therefore, that in certain parishes railway companies may be in the possession of property which contributes nothing to the local rates, for although there is undoubted value to the present occupier, the question which really determines the assessment is, What is the value of this property *per se* to a tenant if it were to let? The answer to this of course must be nil, for it would be impossible to find a tenant for a property of a trading concern the expenses of which exceeded its receipts. The railway company, however, does not gain from this cause, as it has to pay additional rates elsewhere. Should it so happen that in one parish there are two portions of line, one making a profit and the other working at a loss, the profits made upon the one line must first of all be devoted to paying off the deficit upon the other, after which the apportionment for the rateable value should be made.

With regard to the rating of canals, great similarity exists between this class of property and that last dealt with. They have both the same common object, although the business of carrying passengers by canal has largely diminished since the introduction of railways. Formerly land over which a canal passed was rated as if it were not applied to the purposes of a canal, but as if it had remained in the hands of individual owners and was used for ordinary agricultural purposes. Canals



are now rated upon the principle of their receipts and expenses, this principle having previously been explained in the case of railway companies, but the buildings and reservoirs necessary for the proper working are assessed upon a percentage of their structural cost, these corresponding to the stations of a railway company.

When making a valuation of a gas or a water company the same principle is adopted, but there is one difficulty less to contend with than in the case of a railway, for with regard to the live mains the parochial principle is only applied to a gas or water undertaking as far as the receipts are concerned. A valuation in these cases is made of the whole concern, and after the division is made between the dead works and the live works the rateable value is apportioned to the several parishes in which the hereditament is situated, in the same proportion as the rateable value of the whole bears to the gross receipts of the entire undertaking.

The great point of attack and the difficulties of defence in these cases, as in all others where the principle of receipts and expenses is adopted, is the tenant's capital. Now a water company has a great advantage over a gas company; it has statutory rights to collect its rates in advance, and it generally avails itself of this privilege. Obviously, therefore, an incoming tenant of a water company would require less capital than an incoming tenant of a gas company, for a gas company must manufacture its gas and deliver it to the consumer before it receives any revenue, with the small exception of that derived from the sale of the residual products; whilst, on the other hand, a water company receives its income prior to delivering its water to the consumer. This must have a considerable bearing upon the question of the capital necessary to carry on the undertaking.

The question of the dead mains or live mains is one of considerable importance, both to the parochial authorities and to the company whose assessment is under consideration. A gas or water company may have its works situated some distance away from where its produce is consumed, and the carrying mains are very often situated in parishes in which there are no receipts. Again, in other parishes there are mains which are directly tapped for the convenience of ratepayers and others which are only carrying gas or water, as the case may be, to some distant point of the district which they supply. The division between these two classes of mains must be accurately made, for whilst the directly productive mains are assessed upon the receipts and expenses principle, the unproductive or carrying mains are assessed upon a percentage of their structural cost. It would be impossible to lay down a rule that would be applicable in every case (indeed probably every case would vary according to the size of the district supplied by the company), but it may be interesting and useful to note that in the appeal of the Gas Light and Coke Company in so many parishes against the quinquennial valuation of 1890, the system adopted by the court was that of treating all mains of 24 inches and upward as being unproductive or dead mains.

The gasholders and retorts necessary for the carrying on of a gas undertaking and the reservoirs and pumping stations of a water company are rateable at their rental value, and this value is derived from their structural cost. It has been sought to exempt gasholders and retorts as coming under the category of tenant's tools, but the fallacy of this contention was at once pointed out by the court.

In conclusion, the author may appropriately quote the words of one of our well-known judges, who aptly said, "It is impossible to be mathematically accurate, but it is my effort only to lay down a general rule, and the applying of it must be left, not only to the experience and acuteness, but also to the good sense, good faith and candour of the parties concerned, whose interest will be found in the end to be best consulted by this mode of dealing."

### NEW EMPIRE THEATRE, GLASGOW.

THE new theatre which has been built by the Glasgow Empire Palace Company, to take the place of the old Gaiety Theatre, is now open to the public. It is situated in Sauchiehall Street and West Nile Street, the company, of which Mr. H. E. Moss is managing director, having acquired and demolished the old theatre and adjoining property to make room for the new structure, which consists of a large block of buildings forming a very striking feature in that part of the city. The plans were prepared by the well-known theatrical architect, Mr. Frank Matcham, who has succeeded in producing a palace of varieties which in point of elegance will compare very favourably with any similar place of entertainment in the kingdom. The elevations are of bold Classic design, faced with Dumfriesshire freestone of a light red colour. The front to Sauchiehall Street contains four handsome shops, with show-rooms above, and in the centre are the entrances to the principal parts of the theatre. Over these entrances is a large bay window, filled in with coloured glass, and the elevation is

continued up with pilaster mouldings and carved figures, surmounted by a large panel containing the words "Empire Palace Theatre," with art panels over. The whole is flanked by projecting bays continued up to the roof and finishing with minarets. Over the centre façade is a large domed roof, and in front a gas flambeau, which gives a brilliant light at night. In front of the theatre is erected a handsome glass and iron shelter, finished in cream and gold. At each side of the principal entrance are the early door entrances to the pit stalls, circles, &c. Four shops are contained in the West Nile Street front, with the entrance to the pit in the centre of the block. This is a fine lofty entrance, with a circular, richly decorated ceiling, the walls being covered with tiles. An ingenious arrangement for the pay office is here carried out without barriers, each person being conducted singly to the pay office by means of doors hung to open and close automatically, the exit doors being always left clear in case of need. The same pay office takes the money for the gallery, the entrance to which is in Sauchiehall Lane, and a similar arrangement is carried out to that described for the pit. The building is admirably arranged as regards exits, there being two separate exits from each floor of the house, and in some cases more. The galleries are constructed on the cantilever principle, and are set back considerably over one another, giving a fine view of the house from all parts. The ground floor consists of six rows of gold plush, richly upholstered arm-chairs, with a similarly finished settee dividing these fauteuils from the pit, which is comfortably seated and upholstered with velvet, the floors being covered with linoleum. There is a wide gangway at the rear of these seats, and behind is a raised promenade, from which an excellent view of the stage can be obtained. The grand circle contains six rows of tip-up chairs similar to the stalls, and there is a railed-off gangway with a raised foyer in the rear, this containing columns and pilasters of faience work beautifully decorated and furnished with lounge and chairs, and covered with rich Wilton carpet. French casement windows open from the centre on an outer smoking balcony overlooking West Nile Street, which, fitted up with ferns and plants, will make a very comfortable smoking lounge during the summer evenings. The balcony over the grand circle is comfortably seated, and furnished with a promenade and raised refreshment saloon at the back. At the sides of the grand circle are four private boxes, so arranged that an excellent view of the stage is obtained. There are also four proscenium boxes, with entrance to the fauteuils. The gallery is a particularly good one, every seat affording a clear view of the stage. An innovation is introduced in the arrangement of the sliding roof. In other theatres this is placed over the centre of the auditorium ceiling, but in this case Mr. Matcham has altered the position and placed it over the gallery. The result is that the ventilation is improved, and the impure air is instantly carried away by the opening of the roof, which is worked with the greatest ease from the stage. The gallery is provided with refreshment-rooms situated on a level with the centre seats, and easily accessible from all parts. The pit saloon is in the basement, and is a large apartment with two wide staircases, the walls of which, like those of the pit, are lined with encaustic tiles. The floor of the grand vestibule, which is entered from Sauchiehall Street, is in mosaics, and the walls are covered with faience-work. The inner vestibule containing the pay office is a very handsome apartment, the walls being painted a warm green shade, and the ceilings richly decorated with raised plaster-work. All the woodwork in these parts is of polished walnut. To the left is the gentlemen's cloak-room, and at the side a wide stone staircase leads to the crush-room, and thence into the upper circle. On the right the vestibule doors lead to the grand marble staircase, from which is the entrance to one side of the walls, a subway under the front of the stage conducting the visitor to the opposite side of the stalls, and thus avoiding the inconvenience of having to pass those seated. The grand staircase leads to a very luxurious lounge, with a rich coved ceiling, in the centre of which is a large opening surrounded by an open balcony. This lounge is continued up to the entrance to the grand circle lobby, and is lighted by a large glass roof light, and well ventilated, the whole forming a fine smoking promenade. To the left of this lounge is the large saloon, which has a handsome domed ceiling, and is elegantly fitted up and decorated. The decorations of the auditorium have been artistically carried out from Mr. Matcham's designs in Louis Quinze; but special treatment has been bestowed on this work by the architect not only in the raised work, but also in the painting, and the whole theatre decorations represent Dresden china. The ceiling is not of the usual disc shape, but is formed of curves with three centre panels artistically painted. The proscenium is circular-headed, and is filled in with open scrollwork. In the centre is a full-size figure raising aloft a harp, and the effect is very artistic. The front of the galleries is treated to correspond, and special treatment has been given to the entrance for the private boxes and stalls. Over the artists' entry on each side of the proscenium are groups of figures



representing music and dancing, and above these are large standards in imitation china, containing electric lights. The box and tableau curtains are of a light gold colour, and the whole interior, when illuminated by the electric light, presents a brilliant appearance. The stage is a large one, and is fitted up with all the latest and most improved machinery. Large dressing-rooms are placed in conjunction, heated by hot water and lighted by electricity. Retiring-rooms are provided, and the comfort of the artists has been studied in every way. The building will accommodate altogether 2,158 persons, divided in the following manner:—Stalls, 156; pit, 655; dress circle, 220; upper circle, 327; gallery, 750; private boxes, 50. The total expenditure on the reconstruction of the theatre will be about 30,000*l*.

#### ARCHITECTURAL ASSOCIATION OF IRELAND.

THE first annual conversazione of the Architectural Association of Ireland has been held in the Royal Hibernian Academy House, Lower Abbey Street. As a social reunion the conversazione was a great success, and should be regarded as a promising augury for the future of the Association, which is only of recent formation, but is already thriving to a remarkable degree considering its infancy. The handsome halls of the Royal Hibernian Academy were placed by the council of that body at the disposal of the Architectural Association. The guests were received by Mr. R. C. Orpen, president, and the committee of the Association. All the visitors were thoughtfully provided by the Association with catalogues of the exhibition, which enabled them to enjoy the excellent collection of pictures with advantage.

#### LEEDS NEW MEAT MARKET.

A CONSIDERABLE portion of a cleared insanitary area in the city has (says the *Leeds Mercury*) been devoted as a site for a market, abattoir, &c., and there is now being completed on the ground perhaps the finest structure of the kind in the country. The old meat market had an area of 607 square yards; the new one covers 12,243 square yards. The architectural features of the new structure are handsome. The style is a modification of the Spanish Renaissance. From the wholesale yard inclined planes lead to the cattle lairs. In this way space has been economised. The wholesale slaughter-houses, over which the lairs are situated, afford accommodation for twenty wholesale butchers. Two men will be able to work in each division, and there is additional space for the slaughter of sheep and calves. The wholesale meat market, having Bradford Street on the one side and Cheapside on the other, is 365 feet long and 88 feet wide. Its ground floor forms one apartment, with a single span roof 64 feet from floor to ridge. The windows and eaves are so arranged that abundance of light is secured, whilst the direct rays of the sun are excluded. The whole of the building is provided with electric lighting, the engines and dynamos being located in a portion of the basement. Another portion of the basement is fitted up as a cold store, with chilled and freezing-rooms. Access to the basement is obtained by subways, broad enough to admit carts. The meat market has eighty "stances," or butchers' stalls. Lifts and overhead travelling gear facilitate the conveyance of the meat to and from the cold store. Two slaughtering halls are provided for the retail butchers. That for beasts and sheep is 240 feet long; the other for pigs 96 feet long. The lairs for the beasts and sheep occupy the upper storey; those for pigs are on the ground floor, pigs having an objection to going upstairs. Ample supplies of cold and hot water are provided, and operations in the pig hall will be facilitated by travelling gear, scalding tanks, &c. Twenty-six beasts, besides sheep, may be killed at a time, and even double the number should occasion require it. Close to these halls are pens for the animals about to be slaughtered. The charge for slaughtering is so much per animal. In another part of the building is a hide, skin, and fat house, and near this are the slaughter-men's mess-rooms. Overhead are the triperies. There is likewise accommodation for the slaughtering of condemned animals, including special lairs and provision for destroying the carcasses by fire. A tower, rising to a height of 100 feet, contains five large tanks, so that, independent of the ordinary supply, water may always be at command. The rain-water from the roofs is also collected for the cleansing of the yards and like purposes. Carts will be loaded and unloaded under cover, so that the traffic in the thoroughfares outside may not be obstructed. Internal operations will be materially expedited by a system of small trucks running on tram-lines. The blood from the slaughtering-halls will be collected and sold, and when the albumen has been extracted from it the remains will go for manure.

The structure, the total cost of which, including the site, is estimated at 90,000*l*., also includes a two-storey range of offices,

and in a short time the trade will be in possession of one of the most extensive and commodious markets of the kind in the provinces.

#### GLASGOW MASONIC HALL.

THE Masonic temple which has been built at 100 West Regent Street to accommodate the Glasgow brethren of the craft stands on the north side of the thoroughfare. Two buildings have been erected, the one fronting the street, and the other on the back portion of the ground. The former has been almost entirely arranged in suites of offices, the rents of which will furnish a considerable annual revenue. The other one is devoted entirely to Masonic purposes. The designs were prepared by Mr. J. L. Cowan, who has adopted a free treatment of the English Renaissance style of architecture. The building is four storeys in height. The basement is occupied by reception, cloak and ladies' rooms, with a purveyor's kitchen, as well as a machinery room containing the appliances for mechanical heating and ventilation. On the street level a commodious hall has been constructed, 64 feet long by 38 feet wide. There is a dado panelled in stained-wood 9 feet high, and above the walls are treated somewhat elaborately, with capitals between the windows, which run round three sides. The lights are semicircular headed, and are filled with stained-glass on which are displayed the arms of Grand Lodge, the Provincial Grand Lodge, the arms of the city and various masonic symbols. The hall is comfortably seated for 400 persons, and there is a pneumatic organ. On the next floor there is a commodious lodge-room, 45 feet by 26 feet, and a large adjacent room, with committee, smoking and other rooms. The lodge-room is treated simply and severely in the old Greek style. There is a lesser lodge-room above, 30 feet by 24 feet, and there are a storeroom and caretaker's house of three apartments on the top floor. The cost of the buildings was 11,500*l*., which together with 4,000*l*. paid for the site and the money spent on decoration, brings the total expenditure up to about 16,000*l*.



#### The Building Trades Exhibition.

SIR,—We beg to tender you our sincere thanks for your notice of our stand at the Building Trades Exhibition in your issue of March 26; but we notice that you have divided your description of our exhibits, the first portion being under the heading "Sutton & Co." and the second part "Green & Co.," whilst between them has been put a notice of Messrs. Outram & Co.'s exhibits. We have nothing to do with Messrs. Outram & Co., but the goods described under the heading "Green & Co." being shown on our stand and manufactured by us for the patentee (Mr. Green), we thought it well to call attention to this.—Yours faithfully,

SUTTON & CO.

#### GENERAL.

Mr. H. Wilde, president of the Manchester Literary and Philosophical Society, has given 5,500*l*. to the French Academy of Sciences in order to found an annual prize of 4,000 francs, which is to be given to the author of a discovery in astronomy, physics, chemistry, mineralogy or mechanics, or a book on those subjects, as an expression of the donor's gratitude to French science.

M. Gérôme, the French painter, is to exhibit another experiment in sculpture at this year's Salon, viz. an equestrian figure of General Bonaparte in an Egyptian costume.

Two Paintings were stolen a week ago from the National Gallery, Budapest. One is Murillo's *St. Joseph*, the other Van der Neer's *Riverside Town*. Copies of the pictures, carefully prepared, were substituted by the thieves.

The Drama Section of the Victorian Era Exhibition will contain a room devoted to theatre architecture, in which drawings will be hung to show the development of theatre-building during the last sixty years, including such technical improvements as refer to iron construction, lighting, ventilation and stage appliances. Mr. Edwin O. Sachs has undertaken the arrangement of the room, and most of the theatre architects, who have been invited by him to send loans, have promised to help with working drawings, perspectives, or photographs of their work.



# The Architect.

## THE WEEK.

THE judgment which Mr. Justice NORTH delivered in *COLERIDGE v. LESLIE & Co., Limited*, on Tuesday must give occasion for much anxiety to many builders and manufacturers in London. The plaintiff owns a house in Roland Gardens, a terrace which branches off the Old Brompton Road. That part of the Metropolis was, until a comparatively late period, occupied as market gardens or as fields. There could be no objection raised when a firm of builders a quarter of a century ago opened works on ground that stood near the site afterwards selected for the plaintiff's house. The usual machinery was employed until 1894, when the works became the property of the defendants. During the eight years' occupancy of his house the plaintiff never complained of any excessive noise or vibration to the defendants' predecessors in title. In 1896 the defendants set up a gas engine to work saws and planes, and it was alleged by the plaintiff that the noise and vibration began daily at 6.30 A.M., and continued, practically without cessation, till 5.30 P.M. and sometimes until 8 P.M., and were distinctly heard and felt in every part of the plaintiff's house, and that they constituted a serious nuisance to the plaintiff and his family. On account of the noise and vibration, the ordinary and reasonable comfort of the plaintiff and his family, as occupiers of his house, had been wholly destroyed, and he and the members of his family, and particularly his wife, had in consequence suffered seriously in health. The plaintiff alleged also that the continuance of the nuisance caused by the noise and vibration would render his house unfit for use as a private residence, and that its value would be seriously depreciated. The plaintiff claimed an injunction to restrain the defendants, their servants, &c. from working their gas-engines at their works, and from otherwise carrying on their business in such a manner as by the noise and vibration occasioned thereby to cause a nuisance to the plaintiff. It was the defendants' contention that the continuous user gave them a right to use their premises in the same way as was exercised since 1871. Mr. Justice NORTH, however, granted the injunction on the ground that the plaintiff had established there was a nuisance. The importance of the case is manifest. There was no doubt an introduction of a new engine in 1896, but it is inevitable that machinery will wear out and must be replaced. It is always difficult to compare the relative effects of old and new engines on the ears of people who live in the neighbourhood, but more effective machinery apparently brings the risk of an injunction.

SOME of the county archæological societies have arranged for photographic illustrations as records of objects which have interest on various accounts. A proposal to establish a national photographic record collection has been brought before the trustees of the British Museum by Sir BENJAMIN STONE, M.P., who has offered a series of a hundred platinotype views of Westminster Abbey as a commencement. He has been informed that the trustees are in full agreement that such a record survey collection, if carefully and systematically brought together, cannot fail to be of the greatest value and interest both to the present and to future generations, and they are most willing to take charge of the photographs which from time to time may be deposited with them. The scheme, however, it is said, can only be satisfactorily carried out under the immediate direction of an organising committee, that would serve as a centre of reference for societies and persons willing to contribute photographs, and at the same time be in correspondence with the officers of the Museum. The trustees hope that the formation of such a committee will be arranged at an early date, and so confident are they of a general recognition of the value of the proposal that they have no doubt that a very representative body of gentlemen may without much difficulty be found ready to undertake the immediate direction of the work. The trustees will be happy to render through their officers all the assistance in their power. It is proposed to form a preliminary committee to organise

the work and to invite to act upon it representatives of the Royal Society, the Society of Antiquaries, the Royal Photographic Society, the Royal Institute of British Architects, the Royal Archæological Institute, the Royal Geographical Society, the Trustees of the British Museum and others. The council of the Warwickshire Photographic Survey have promised a first contribution of 100 pictures of that county.

MR. JAMES DREDGE, the Honorary Executive Commissioner of the British section of the Brussels International Exhibition, writes to us to say that he is in a position to state positively what are the actual prospects of success in the section. Commencing with a court of 30,000 square feet, the applications from manufacturers have rendered it necessary, on several occasions, to obtain more space from the exhibition authorities, until to-day the commercial courts of the British section occupy no less than 70,000 square feet, besides some thousands of feet in the machinery hall, and a series of fine arts courts, which it is confidently anticipated will be in all respects worthily representative of British contemporary art. It may therefore now be stated that, as regards its extent, the British section at the Brussels Exhibition will leave little to be desired. It will be much smaller than the French section, which has had the advantage of a very large Government grant; on the other hand, it will be far more extensive than that of any other foreign country. The Industrial Courts may not contain exhibits of a very novel or monumental character, but they will be filled with contributions from exhibitors of high standing, and distinctly representative in their various branches of industry. Therefore, as regards quality of exhibits, as well as extent of space occupied, this country will be well represented. This result could not have been obtained without united and continuous efforts on the part of the British Commission, and its president, Sir ALBERT KAYE ROLLIT, and especially of the executive committee; while the undoubted success of the Fine Arts Section is due to Sir EDWARD POYNTER and the members of his sub-committee, who have laboured under very difficult and discouraging conditions.

A MEETING of the Society of Antiquaries of Scotland was held on Monday, when Mr. J. BALFOUR PAUL, Lyon King-of-Arms, read some notes on old Scottish measures, based chiefly on the Acts and the notices in the "Regium Majestatem," with special reference to the Inverkeithing standard ellwand, which was exhibited by permission of the magistrates and Town Council of Inverkeithing. The subject of Scottish weights and measures still waits a competent exponent who will take the trouble to follow out an obscure and somewhat abstruse inquiry. The earliest measures mentioned as having been in use in Britain were computed by natural standards, as thumbs, palms or hands, feet, &c. In England the thumb had disappeared as a measure before the reign of ÆTHELSTAN, and the barleycorn had taken its place. The palm or hand survives to our own day as a standard measurement for the height of horses. The nail is still a cloth measure, though the earliest standard of cloth measurement, when cloth or wadmal was a currency instead of coinage in the North of Europe, was the ell, from which came our yard. In an assyse of King DAVID I. of Scotland, as noted in the "Regium Majestatem," we are told that the Scottish ell "aught to conteyn" in length 37 inches." By the same authority the inch was to be computed on the average of the thumbs of three men—a big man, a little man and a man of middle stature, or else by the total length of three barleycorns "but the tails." From the fourteenth century downwards many statutes were enacted by the Scottish Parliament for the regulation of the weights and measures of the country, and in 1503 all the burghs were ordered to send to Edinburgh and get a sealed standard of all the weights and measures. The Inverkeithing standard ellwand is a thin bar of brass or bell-metal, clamped between two rods of iron by rivets, and having a portion cut out of one side of the brass bar exactly 37 inches in length. On the brass bar at one end is the inscription in black letter, "Willelmus Carmichel," and the date 1500. Another standard ellwand of wood, also from Inverkeithing, with the initials "W. N." and "D. G.," for Dean of Guild, was exhibited.



## THE EASTERN CRISIS AND ARCHÆOLOGY.

THE majority of newspaper readers are bored by the apparently uneventful course of the broil between Turkey and Greece. But there are two classes of people who would be eager to see it going on as slowly for an unlimited time. They are the dealers in antiquities and those who purchase from them. Both have numerous representatives. In Turkey as well as Greece the unauthorised disposal of ancient remains is a serious crime. A farmer or landowner is not allowed to begin explorations on his property for the purpose of finding the smallest object unless he has obtained the sanction of the representative of Government in his district. To make sure that not a particle of marble, bronze, or terra-cotta escapes official notice, a duly appointed overseer is to be present during all the operations, who makes a record of everything that turns up. In practice, however, so many formalities are only observed in excavations on an immense scale, which could not by any ingenuity be concealed. Foreigners alone respect them. The ordinary Greek, whether in his own country or in a part of the Turkish Empire, contrives to make many archæological experiments without giving the least trouble to a Government officer. His illicit operations are not always calculated to produce results which are entirely satisfactory to archæologists. In his haste there may be much destruction committed. Statues are often broken in the course of the clumsy operations; nay, they are sometimes broken purposely in order to facilitate removal. If a work happens to be in fragments a part only is withdrawn, for a head or an arm, when finely modelled, can always command a price. The beautiful Tanagra figurines, which were accepted as a revelation of a variety of Greek art that was more interesting to the general public than figures of heroic mould, afford examples of what can be done in defiance of law. The ancient necropolis was almost entirely looted before the authorities of Bœotia became aware of the discovery. It is true a great many officials may have witnessed such an outbreak of industry, but as DICKENS'S Commissioner PORTAGE said on an occasion when delays could not be tolerated:—"There has been no written correspondence, no documents have passed, no memoranda have been made, no minutes have been made, no entries and counter-entries appear in the official muniments." When the preliminaries were regularly gone through, and Government could intervene in a majestic manner, the ground presented only countless small fragments which testified to the expedition employed, while many European museums and private collections were enriched by several most charming additions. The gain was counterbalanced by the difficulty of comprehending under what conditions the figurines were discovered. The treasure-hunters were too busy to trouble themselves with making any records of the character of the tombs, and as a consequence, although the world is enriched by many beautiful objects, there is not much gain to archæology. We cannot tell when the terra-cotta figures were produced, or why so many of them should be representative of youth. If the explorations had been conducted by skilled archæologists—and on such an occasion all the civilised world should have a share in the work—we should then become better acquainted with ancient life than we are ever likely to be. There would also have been less destruction, for through the greed of the diggers probably as many objects were destroyed as were rescued. The Tanagra case is an example on a large scale of the weakness of Greek law to control efforts by which gain is likely to arise. If the authorities failed on that occasion in grappling with a crowd of people, how can they be expected to deal with operations which are carried out by one or two individuals in darkness and at a longer distance from a military post? The power to control the people is, moreover, not likely to be increased during such a crisis as is now being evolved.

Greece is a poor country, and we cannot expect that the market value could be paid by the Government for any treasure trove which it is considered desirable to keep in the country. Suppose a farmer is fortunate enough when ploughing to knock against a work of art of the importance of the *Venus* found in the Isle of Melos, and that, respecting the law, he announces his discovery. A Government

officer or one of the archæological societies will then assess its value. The amount is sure to be no more than a fractional part of the sum which one of the numerous dealers who have foreign clients is willing to give. If, however, the finder is tempted by the larger sum and declines the national offer, he will have to surrender to the Treasury one half of the money he receives. He is therefore prompted by his own interest to be silent about his good fortune. As he knows that the statue will be confiscated if his negotiations with outsiders are discovered he is the more anxious to be secretive. The dealers will, of course, save him from every kind of vexation if he will allow them to manage the business. In consequence, no department of the Greek Government can speak with certainty about the extent of the researches after ancient examples, and at a time like the present there is a likelihood the operations will become more general.

It may be doubted whether new operations are necessary. If next week it were announced that the performers in the "Concert of Europe" were prepared to purchase at a liberal price all examples of ancient sculpture which were brought under notice within a period not exceeding a month, the world would be amazed with the expedition with which supply corresponded with demand. There would be no time to produce fabrications. All the works would be genuine examples, and the cause of the promptitude of their appearance is that they were already discovered but were again concealed in the earth awaiting a favourable opportunity. The main difficulty which prevents a stock of antique sculpture from coming into the market is one of transport. The roads in Greece are not favourable to expeditious transport, and in the tedious journey between an inland farm and a seaport there is always a chance that contraband exports will be discovered and seized. If the restrictions were removed London, Paris and New York would be glutted with antiquity. By law every Greek is supposed to furnish the authorities with an inventory of all examples of ancient art which he possesses in order that from time to time his collection can be tested. But that regulation has become a dead letter, for it is observed by no more than a few people, and it is certainly unknown to those country folks who unearth and rebury works of art.

The dealers, who cannot entirely escape scrutiny, also contrive to delude the official inspectors. There are few, if any, experts belonging to the great museums of Europe or America who would accept a dealer's account of the discovery of a work in marble, bronze or terra-cotta. In order to escape detection, works which are found in a particular district are said to have come from places which are remote from it. To be truthful would often lead to the knowledge of many a fertile field, which would not be advantageous to the initiated. One result is that the works of various schools are confounded, and thus it happens that the worst places for the training of specialists are the shops of Greek dealers. In no department of art is ordinary connoisseurship of so little use as in that which is concerned with Greek archæology.

It is not a good sign in any country when a large number of the inhabitants are in a sort of tacit conspiracy against the law. Disloyalty easily spreads. At present the Greeks who respect the edicts against the exportation of antiques are those who have never known what it is to be tempted. Some would believe in the use of obstacles to free trade in sculpture if they found that the retention of ancient examples in any way helped to make the country more prosperous. But every shrewd Greek knows that he has gained more sympathy from the world from the Parthenon marbles finding a refuge in Bloomsbury than if they were left on the Acropolis of Athens. As long as he finds he can profit by the reputation of the ancient sculptors he does not care to incur expense to preserve their works. He would like to have numerous examples of sculpture because he knows they can always be exchanged for money, but he prefers to allow to strangers the privilege of erecting any buildings which are necessary to keep them from mouldering. The scandalous neglect of the *Hermes* of PRAXITELES, which was allowed to remain lying on the damp ground after its discovery, is by itself sufficient evidence of the peculiar way in which the Greeks show their reverence for master-



pieces. If it had been carried off to Berlin, every Greek could pose as a martyr for ever, and from a business point of view that enjoyment would be preferable to the possession of an imperfect figure.

If, therefore, during the present year a larger number of examples of sculpture should be derived from Greece we hope we shall not have to witness such fictitious revolts as were popular among sentimental people when the reliefs of the Parthenon were rescued by Lord ELGIN. Experience has shown that he was a friend of Greece in saving that country from the possibility of committing acts of vandalism. The country is also exposed to dangers from without, and it is as well that works of art which have ceased to inspire the Greeks with any desire of imitation should be kept in safety in Paris, Berlin, or London, or at least until the time arrives when there is a possibility of a new era for art in Greece.

What we have said about the Greeks is more applicable to the Turks. They cannot claim to have any interest in the works of the ancient Greeks or the neighbouring people. Excellent as the Turkish notion of a civilised state may be, for its realisation, there is no need of enclosing statuary in a museum which is to be hermetically closed. The Ottoman can be happy enough although he does not gaze on cold marble. But his pride will not allow him to dispense with objects for which he can have no use. We grant it is more satisfactory to know that a statue is in the museum of Constantinople than if it were on its way to a limekiln. But the proper place for a work of art is wherever it is likely to find most admirers, and that is not within the region where the SULTAN rules.

#### SALISBURY CATHEDRAL.—IV.

AT the close of the article on Salisbury Cathedral in last week's number we referred to the restoration which was directed by the late Sir GILBERT SCOTT. His work recalls the very different sort of "restoration" which was perpetrated by JAMES WYATT. There can be no question about the destruction of ancient work, and WYATT appears for once to have considered that restoration and removal were equivalent words. His fame has been sullied by the constant recalling of the operations he performed at Salisbury, and we suppose he is never likely to be considered as more than a vandal. If judged by a later standard of the limits of restoration he was undoubtedly a wrong-doer, for he deprived the world of many objects which may have merited preservation. But is it equitable to judge any man by a higher standard than what was recognised by his contemporaries? If we observe the wise rule of putting ourselves in WYATT's place and consider what was becoming by the help of eighteenth-century beliefs, we may find that his conduct, however lamentable in its results, was not quite so wicked as it is declared to be by lovers of Mediæval architecture.

In the first place, we should remember that WYATT belonged, like all the architects of his time, to the Classic school. He had studied Greek and Roman temples, and from them had, like other men, derived a theory of architecture which he believed was the only one which was based on true principles. In our time a sort of comprehensive view is taken of the numerous varieties of architecture. We see the Time-spirit adopting one form, and then, as if grown tired of its repetition, substituting another. But in WYATT's days people could not attain that sort of belief, or if it arose it was set aside as dangerous because it led to a variety of latitudinarianism, of which the effects could not be measured, they were so far-reaching. WYATT was in reality less narrow-minded in his beliefs than most of the architects of the time, for he considered it was his duty to have drawings prepared of several Gothic buildings at great expense, in order to discover if the style were based on principles which could be defined, and that concession signified much. His own attempts to design Gothic buildings were in consequence less absurd than many in that age. But drawings, however numerous, could not convince him that it was unnecessary for an architectural work to have unity. That was the foundation of his artistic creed.

At Salisbury WYATT saw a building which allowed him to infer that in its original condition it came nearer to a Classic temple in unity than any other Mediæval church

in England. It had been added to and otherwise altered, but he perceived that if the excrescences could be removed the primitive unity would be restored. Moreover, some of the additions had weakened the cathedral. The much-lamented Hungerford chantry was an instance, for in order to find space for it one of the buttresses had to be removed, and the main building was thereby endangered. The very numerous monuments were mainly of insignificant people whose reputation had not got beyond the county boundary, and WYATT was, we imagine, obeying not only the orders of the Dean and Chapter but the wishes of the public when he removed them from positions where they were too prominent. The majority of visitors generally believe it would have been an advantage if WYATT had carried off some more of those which have survived.

There is another aspect under which we should consider WYATT's restoration. Was it not likely to have been dictated by the cathedral authorities on doctrinal or devotional grounds, and, as a faithful son of the Church, was not the architect bound to obey? Twenty years ago the Bishop of CARLISLE, who was an able and broad-minded man of science as well as a churchman, was not afraid to declare that the sacrifice of antiquity was occasionally demanded out of respect for orthodoxy. In a sermon before the church building society of his diocese he said:—"I think we are bound to remember that we are Christians and churchmen first, and everything else afterwards. Our primary question concerning any church must be, Is this building adapted to the worship of the Church of England as I find it set forth in the Book of Common Prayer? Can I worship in it suitably and fully as a member of the Church of England? And if the church in question be so constructed or so deformed that this worship be not possible, then I think that conservatism is out of place. I cannot look upon churches as mere monuments of the dead. They are this, but they are much more, they are places of worship for living souls."

Now at Salisbury, among the trophies of "restoration" were not only monuments of the dead but temples of the dead. What, for example, was the Hungerford Chapel but a building dedicated to the remains of one family, and for which one of the walls of the lady chapel was destroyed? A sketch which has survived shows that the ornamentation was vulgar but ostentatious. The Beauchamp Chapel was a similar tribute to family pride, and women used at one time to assemble in it carrying torches, a practice that was not prescribed by any law of the Church. The chapels were useless except as curiosities, and they helped to make a sort of museum of the cathedral. It should also be remembered that the representatives of the BEAUCHAMP and HUNGERFORD families consented to the alteration. The effort to bring Salisbury Cathedral into keeping with reformed ritual was not commenced by the Dean under whose instructions WYATT acted. Bishop JEWEL long before had endeavoured to get rid of the stained-glass windows which contained subjects of which he could not approve, and from time to time it was considered necessary to offer similar sacrifices to reform. When WYATT was called in it had been decided to make a more thorough clearance. He was inspired by a love of architecture; the cathedral clergy wished to show affection to the reformed doctrines: both were therefore enemies of the excrescences which were introduced after ELIAS OF Dereham's time.

The removal of the screen which is charged to WYATT alone is likely to have been dictated by the authorities. By that act the lady chapel was shortened. But what purpose can a lady chapel serve in a modern cathedral? In a few places it may be used as a morning chapel, but generally it appears as a sort of store-room in which benches are piled until they are required for extraordinary purposes. We know of one estimable clergyman's wife who holds the theory that the lady chapel was constructed for the conferences of dames in her position, with a Mrs. PROUDIE as president, and neither her husband nor her friends have been able to convince her that it was intended for any other function. It is commonly said that the change, which practically amounted to a suppression of the lady chapel, was inspired by WYATT alone, who was eager to have the full length of the cathedral opened out to the first glance of a visitor, but it is more likely the clergy wished to demonstrate that the days for lady chapels and mortuary chapels had



passed away. We do not approve of the transforming process as it was practised at Salisbury, but we believe that the whole responsibility for it should not rest on JAMES WYATT, for the clergy would never have handed over the cathedral to him for his operations or with the object of making it a more perfect example of architecture. There were other causes at work which were due to their influence, and of which the alterations were the results.

In whatever proportion we may measure out blame for the restoration, we cannot deny it was sweeping. The detached bell-tower, if not unique in England, was at least sufficiently uncommon to be worth preservation. The structure is supposed to have been demolished in order to allow of a view of the cathedral, to which it was an obstacle, but that theory is inadequate. Its rarity was likely to have been its chief defect in the eyes of the arbiters of taste at that time. It was also a rival to the fine tower of the cathedral, the uselessness of which as a belfry was suggested by it. But some of WYATT'S removals were less to be deplored. JOHN CARTER, for example, becomes sentimental over the withdrawal of a large number of iron bars which, in the chapter-house, stretched from the central cluster of columns to every angle. He had to admit they were a deformity, for their dark lines obstructed the curvature of the groins; but as they had existed for a century he would have them preserved. WYATT said they were of no constructive advantage, and could be removed with safety, and his judgment is confirmed by the stability of the chapter-house. But there are enthusiasts who would hold such obstructions as sacred things, although the only use of them was as evidence of the ignorance of the people who set up the bars, and who evidently could not understand how a vaulted roof was able to stand for three centuries without the aid of a smith. The anecdote should be enough to suggest that WYATT was not always at fault. The removal of the bars was an undoubted improvement, and it is not unlikely that the architect introduced many others. CARTER was, however, confident that there could be no defects in work so long as it was not executed in his own time. Because Sir CHRISTOPHER WREN and PRICE, the cathedral surveyor, alluded to some shortcomings in parts, "Give me the man," he exclaimed, "who, if he dare avow his predilection for an object, an object like this of Sarum's sacred walls, let him adhere to the cause he is disposed to maintain, without having the fear of being thought of a superstitious turn, or that his bias for the 'heathen school' modes of science is whispered to be wavering." According to that theory a building that is once admired must be always admired. There is to be no opportunity for the exercise of a more matured judgment on works of art, and the changes of opinion which are allowable in considering most things are to be suppressed when the subject is a Mediæval building. CARTER'S views were adopted by PUGIN, and it is mainly to the passionate attacks of the two that people came to consider JAMES WYATT as the destroyer of a building which strangers somehow consider to be the most perfect in England.

### LEAD WORK.\*

MY having been invited to read a paper on lead working is, I suppose, a consequence of my having some years ago made a little book on the subject, which I have to mention because the notes which follow will be very much in the nature of an appendix to it. A kind and very friendly reviewer remarked that the essay in question had apparently been put together from material in my hands at the time of writing. This was penetratingly true, and I confess I look on the present as an opportunity of stringing together the few further facts (not for the most part purposely sought for) which have come in my way, or have been noted in my reading.

The account of ancient lead working could be much amplified, but I only propose to refer to the Roman coffins of this material to inquire how far they were of English lead and made in this country. These Roman coffins, I believe, fall into two main groups—the first and earliest (I think) found in south-east England and north-west France, and the other in Syria. The chief characteristic of the English examples seemed to be the use of the scallop shell in their decoration.

In an article in volume ix. of the Kent Archæological

Society, several Roman coffins found at Bexhill are described. One of these was ornamented with little Medusa heads and pairs of lions *affronté*. The absence of the scallop shell is remarked upon, and I cannot see anything which divides these off from the northern French examples, so that I am now inclined to look on all these as of English make.

I pointed out a small square vessel in the museum at Lewes as being of Saxon workmanship, but thought that it might be a font. I now find from its resemblance to another box found at Folkestone that it is more probably a relic casket. That found at Folkestone was ornamented with a network of lines formed of little beads. A portion of another lead relic casket has been found at Lyminge. A book cover in lead, with an inscription from *Elfric's Homilies* in runes, is another pretty example of Saxon workmanship.

As I have suggested was the case in the Roman Age, so also in the early Middle Ages the art of working in lead was an especially English industry. When about 1090 the roofs of Coutances Cathedral in Normandy had been destroyed by lightning, Geoffrey, the bishop, sent to England and called Brisenetus the plumber to make afresh the leadwork of the roofs and tower, and to replace a gilt weather-cock. (*Memoires de la Société des Antiquaires de la Normandie*, 1824, p. 155.)

There are in England about thirty fonts, or rather font basins, of lead; they are mostly of cylindrical shape, are beautifully ornamented, and in the main belong to the end of the twelfth and the thirteenth centuries. The question of French or English crops up again with regard to the fonts. The beautiful font at Brookland, in Romney Marsh, is, I have come to the conclusion, of French work, as it is in many respects identical with a font at St. Evroult, between Le Mans and Falaise.

In regard to the English examples, I have been informed that the font at Clewer, which is usually given in the list of lead fonts, is not of that material. That at Wansford, in Northamptonshire, is also said to be of stone. According to the *Antiquary*, there is a font at Oxenhall, Gloucestershire. In the Gloucester Museum there is, I am told, a lead font, and also a small vessel ornamented with reliefs of the instruments of the Passion. The font at Ashover, in Derbyshire (described sometimes—by myself amongst the number—as of stone with lead figures) has the basin entirely of lead; it is surrounded by twenty figures of apostles. All the figures were repetitions of two models, such was the economy of means by which these old works of art were produced.

De Caumont has described several French fonts of lead of the twelfth century. In the *Abécédaire* he gives some figures of the font of St. Evroult de Montford (Orne). Between four figures (which although repeats of the same model stand for the four Evangelists) are placed a double row of little arcaded panels occupied by the labours of the months, each being surmounted by one of the signs of the Zodiac. They are not placed in order, and are repeated three or even four times. "The matrices which made the mould each carried two months." De Caumont remarks on the panels being evidently a set of stock patterns to be used for different purposes, and notices the resemblance to the Brookland font, which must have been made in the same shop.

In the fourteenth century and later, lead fonts continued to be made in France. De Caumont illustrates a fine octagonal example at Mesnil-Mauger. In the Museum at Rouen one of three examples is as late as Francis I., another is of fifteenth-century work with a long inscription in three lines running all round it, the third is of the twelfth century. In the same museum is a beautiful abbey lavatory of lead similar to if not the same as that illustrated by Viollet le Duc as of bronze, also some fine finials.

The lead font of Maintz is probably the largest and most carefully wrought lead font existing; it is in the form of a melon-shaped cup, ornamented with figure subjects of Christ, the Virgin, St. Martin and the Apostles. It was cast 1328, and must be 5 or 6 feet in diameter. This is a cathedral font, all the others belong to small village churches.

Methods of water-supply were much more advanced in the Middle Ages than we are likely to suppose. "Water leaders" seem to have been separate from plumbers, as we find both mentioned amongst the York crafts who took part in the mystery plays. A water-leader was at work at the Palace of Westminster early in the reign of Henry III., and a conduit (doubtless the well-known canopied fountain in New Palace Yard) is mentioned in connection with the work. These fountains or conduits are the typical feature of Mediæval water-supply. Four such fountains are shown in the elaborate plans for laying on the water to Christ Church, Canterbury, shown in the twelfth-century plan. Here basins in one or two stages stand under lead-covered roofs supported on pillars, just like those which to-day may be found in the courts of the Greek monasteries of Mount Athos. Such central fountains in the courts, with here and there a draw off to a lavatory or kitchen, must have been the general method of distributing water in monasteries and the great houses. The water was first col-

\* A paper read by Mr. W. R. Lethaby in the Applied Art Section of the Society of Arts on March 30.



lected into a basin or reservoir, and then carried to one of these conduits in lead pipes." The streets of London were extensively supplied with such fountains at the end of the thirteenth century, and notices of the several conduits may be found in the pages of Stow. The canopied fountain in Trinity Quad, Cambridge, follows this traditional form, and probably now best represents some of these old conduits; others were solid erections.

Some interesting facts in regard to the water-supply of Hampton Court may be found in Law's history of the palace. At Nonsuch a large water tower formed part of the palace; it contained an immense cistern of lead, from which pipes supplied the whole house with water. In the gardens were several fountains, but these were principally of marble.

At Windsor, in the middle of the sixteenth century, but before the Gothic tradition had entirely lapsed, a great fountain, mostly of lead, was erected in 1555, when water was conveyed to the Castle from Blackmore Park, five miles away. The accounts of this work exist, from which we see that John Puncherdon, "Plummer," had charge of the work. A pipe was brought to the centre of the great upper court, "and there the water plentifully did rise 13 foot high." A reservoir was formed from which water was distributed to every part of the building, and a fountain "of curious workmanship" was made in the court. It consisted of a great basin with a canopy "gorgeously decorated with heraldic ornaments, coloured and gilt." In the centre a great Tudor dragon spouted the water into the basin.

In the accounts we have such items as these:—

Plumbers working the cistern and laying pipes. Carpenters making the great mould in the plumbry. Carvers carving the carthowages (cartouches) and scouchions for the fountain in wood and stone. Founders casting patterns in metal to garnish the cistern and top of the fountain. Carvers carving scouchions in wainscott to make patterns for the moulds of the scouchions, and badges to garnish the cistern and top of the fountain. Plumbers soldering arms about the fountain, and leading the lavatory about it. For carving six Beasts Royal, viz. an eagle, 6 feet long; a lion, 5 feet 11 inches; the antelope, 5 feet 6 inches; greyhound, 5 feet 5 inches; the griffith, 5 feet 4 inches; the dragon with his base, 13 feet 4 inches. (The Royal beasts were the Tudor badges.) To John Puncherdon, sergeant plumber, and Henry Deacon for finishing the garnishing of the fountain in great as was agreed between the Lord Treasurer and them, 60*l*. [For workmanship only.] To Nicholas Lyzard, sergeant painter, for painting and gilding the great vane with the king's and queen's arms, with a great crown. Also for painting, priming, stopping, gilding and varnishing a great lion and eagle holding up the said vane, first primed with soden oil, secondly with red lead and soden oil, then stopped with oils and red lead, then primed twice and wrought three times in colours, and so gilt with fine gold in oil, and so varnished. Also for painting in the same way the beasts, arms, freezes and cornices, 57*l*.

Lead cisterns in the kitchens of the palace at Westminster are mentioned as early as 1250. I know of none of Gothic workmanship still in existence. One of the finest of the later ones is at Nottingham Castle; it is ornamented with coats-of-arms. In the court off the south side of the cloister at Lincoln Cathedral there is a nicely decorated circular tub receiving the water from a down pipe, probably seventeenth-century work.

Old lead was cast for use on the spot by the plumbers. Accounts run "for founding and laying" so many fother of lead. The price for this in London in the thirteenth century for workmanship only (casting and laying) was 5*s*. a fother.

There are several interesting points about the laying of lead on plain roofs. At Exeter, for instance, the sheets do not run up the slope parallel to the gable ends, but incline to them at an angle. At Beauvais the sheets are laid horizontally about 10 feet long, the rolls being that distance apart, and intermediate support being given by clips. The early lead roofs I have examined have been laid on oak battens very thin and light, say 5 inches wide by half an inch, with a space of 2 inches or so between them. The rolls were always formed without wooden cores. These roofs of cathedrals were sometimes decorated by painted patterns. At Troyes, I am told, the roof was diapered over with golden flames.

How general and gorgeous was this decoration of leadwork in France may be judged from the fact that Rabelais makes the slated roof of the Abbey of Thelema to have a broad band of lead at the ridge with little gilt figures and animals, the down pipes being painted in diagonal stripes of gold and azure. Tinning was the favourite method of surface decoration for lead in France. There are not many existing instances of this work in England. At Hatfield some of the pipeheads have patterns of tinning which, the plumber there told me, showed evidence in some cases of being applied through a cut pattern like a stencil. Tinning also occurs, I believe, on the Knole pipeheads. Pierced work is best cut with mallet and chisels.

The *flèches*, or wood lead-covered spires which so often surmounted the roofs of French cathedrals, were usually so splendid with gilding and bright colours that they must have looked like large pieces of enamelled goldsmith's work. On the east end of the roof of Rheims stands the Angel *flèche* (remade about 1500); it is a lead-covered turret, about 60 feet

high. Round its supports stand eight images of lead, all gilt, and traces of painting and gilding are visible all over the lead-work. The rolls were gilt, and the surfaces chevroned in red and another colour. On its apex stands the angel which gives the *flèche* its name; it is of copper and turns to the wind. On the apex of the south transept gable is an ancient figure of a Sagittarius of gilt lead, which seems to discharge an arrow towards the court of the archbishop's palace, where a bronze fawn used to mark the point of its aim.

In the East lead-covered domes are frequently found entirely gilded all over. Travellers in Persia frequently mention the gilded domes at Koum and Ispahan. Early travellers' accounts make it clear that the dome over the Sacred Rock at Jerusalem was gilt, but the material was here, I believe, copper.

Tavernier writes that at Delhi there was a mosque, "the dome of which was entirely covered with lead, and so thoroughly well gilt that some indeed believe the whole is of massive gold." In Russia the domes of the churches all over the country are gilt or brightly painted.

It appears from a paper printed by the late Dr. Sparrow Simpson that when it was proposed to cover the dome of St. Paul's with copper, it was argued that copper "would soon be black and look ugly, so that the people would by no means be pleased with it." It was urged in reply that the "looks" of lead should not be set against the "duration" of copper, which also would be 600 tons lighter; lead, however, was chosen. John Roberts (plumber) estimated for lead 2,500*l*. Davis & Co. (coppersmiths) for copper 3,050*l*. It is interesting to note that copper even then went black, as it still does to our frequent disappointment. This blackness appears sometimes only an intermediate stage to the turning to the desired green, but sometimes I fancy the green never comes, at least in London.

The quantity of leadwork made use of in the Middle Ages in England was enormous; there seems to have been nothing like lead. I have before spoken of the typical London spire as being covered with lead. We find in inventories of St. Paul's how much it was used for small objects like holy-water basins, and even candlesticks. At the end of the Gothic period it was also greatly used in domestic and semi-domestic buildings, especially in London. Under Bread Street Ward, Stow describes "the most beautiful frame of fair houses and shops that be within the walls of London, or elsewhere in England, commonly called Goldsmith's Row . . . built by Thomas Wood, goldsmith, one of the sheriffs of London, in 1491. It containeth ten fair dwelling-houses and fourteen shops built four stories high; beautified towards the street with the goldsmiths' arms and the likeness of woodmen (in memory of his name) riding on monstrous beasts, all of which are richly painted over and gilt. The said front was again new painted and gilt over in the year 1594." This gaily illuminated leadwork was especially made use of in the fantastic tabernacle roofs which surmounted the octagonal turrets and bays so much in vogue in the Tudor period. We have only one or two little turret roofs left at Hampton Court to represent what were often tall and ornate structures painted and gilt like the houses just described or the great fountain at Windsor. From the prints of Richmond, Greenwich, Hampton Court and Nonsuch Palaces we are given some idea of the fantastic beauty of this work if we paint and gilt it in our imaginations. The descriptions of Nonsuch speak of it as "battlemented," with frames of wood covered with lead and supported with strong bars of iron, "which battlements are a great grace and special ornament to the building."

Numerous big houses in London would follow the same fashion, and almost every hall had one or two of those turret *louvres* of which that on Barnard's Inn Hall is the best existing specimen. In 1481, William Hariot, draper, gave 40*l*. to the making of the two "*louvres*" of the Guildhall. Stow also tells us that Sir Thomas Lovell, who built the gateway of Lincoln's Inn, "caused the Lacy's arms to be cast and wrought in lead on the *louvre* of the hall."

The spire of Old St. Paul's was burnt, as is well known, in the reign of Elizabeth, a hundred years before the great fire. Dugdale gives a view of the cathedral, showing a tall Renaissance steeple, which he appears to think was the original, for after describing that he adds, "A perfect representation of all which as it then stood I have here exhibited." The meaning of the Renaissance spire seems to be explained by a large drawing now in the possession of the Society of Antiquaries, when taken together with what Stow relates. It appears that the old spire was burnt in June 1561. Stow says:—"After this mischance the queen directed letters to the mayor willing him to take order for the speedy repairing of the same (the roofs and spire). The work was put in hand the same year, and the roofs completed before 1566. Concerning the steeple (continues Stow), divers models were devised and made, but little else was done, through whose default God knoweth. It was said that the money appointed for the new building of the steeple was collected."

The drawing at the Antiquaries is a large and very carefully detailed design, lettered, "New spire for St. Paul's in place



of that destroyed by lightning." On the design of the structure itself appears the date 1562. The engraving in Dugdale is a most careful rendering of this design put into perspective, and must represent one of the models prepared for the spire after the fire; the Antiquaries' drawing either being the original design or a copy of the same model.

The isolated belfry at Salisbury was an extremely beautiful erection contemporary with the cathedral, and standing to the north of it, where its position is yet marked on the grass in dry summers. From some prints the great beauty of this structure may be judged: a broad stone tower was surmounted by the belfry proper of wood covered with lead.

At Worcester there was a similar isolated belfry called the clochium or leaden steeple. This also is said to have been built in the time of Henry III. The tower was octagonal, 61 feet in diameter and only 60 feet high. It was surmounted by a wooden spire 150 feet high, which was thus  $2\frac{1}{2}$  times as tall as the tower it stood on—an abnormal proportion to our eyes. "Being considered of no use it was taken down in 1647."

At Westminster Abbey another isolated belfry was built about 1245-50. This stood in the Little Sanctuary. Stow describes it as "a strong clochard of stone and timber covered with lead," containing the great bells rung at coronations, triumphs and funerals. Other lead spires in London beside those I have before mentioned were St. Michael's, Cornhill, St. Dunstan's in the East and St. Laurence Pountney.

The corner pinnacles of the great early fourteenth-century leaden spires at Lincoln still exist. Seen from the tops of the towers they appear large works in themselves. When at Lincoln about a year ago I was grieved to find that most of the unique lead parapet to the choir, of thirteenth-century work, had been renewed. In the stonemason's yard I found and measured a portion of the oak planks over which the lead had been dressed; the thickness was 4 inches, the height 1 foot 10 $\frac{1}{2}$  inches, made up of two planks doweled together. The six-foil figures were 1 foot 6 inches diameter and roughly cut into the planks.

Of smaller gutters and pipeheads there are said to be pieces of late Gothic gutter in Tennant Street, Derby; and a very pretty piece of Elizabethan gutter with a pipehead is in a back street at Winchester.

A portion of the fourteenth-century ridge of Exeter Cathedral may be seen in a case on the top floor of the Architectural Museum. Old prints of Holyrood show a beautiful ridge which used to surmount the hall or chapel. At intervals large crowned roses and thistles (I think, for I speak from memory) stood up along the sky-line; these, of course, were painted and gilded.

A very pretty old *flèche* still surmounts King's College Chapel, Old Aberdeen, decorated with patterns cast with the sheets, such as shields bearing pots of lilies, the initials C.R., crowns, thistles, &c. A cast statue surmounting a town pump and other leadwork in the city have been brought to my notice by Mr. Watt.

The account of the Windsor fountain gives earlier instances of the casting of large figures in lead than any I knew before. I could give a considerable list of late garden figures and vases, but I wish merely to refer to one or two. A pair have lately been added to the South Kensington Museum from a garden near Shrewsbury. At Powis Castle, in Wales, there is a large Pegasus which formed a fountain, and at Naworth Castle, I am told, there are several figures. I know of one in a London shop, and there is said to be another down an area. One of the latest instances of the use of lead for statues known to me is a figure of Napoleon I. set up on the Arc de Triomphe in 1809.

One of the most curious uses of the material has been brought to my notice by a friend travelling in Germany. The floor of a room in a castle had lead inlaid in the wood to form a pattern. It is described to me as like a central sun, with waving rays filling up the rest of the space, the work probably of the seventeenth century.

Of inscriptions, the prettiest I have found noticed are two round plates about 12 inches in diameter, found engraved with the epitaphs of two twelfth-century bishops at Mont St. Michel. These were engraved with patterns and inscriptions, and were placed in the coffins beneath the heads of the bishops, like nimbuses. In one of the cases in the chapter-house at Westminster is a plaster duplicate of a cast lead inscription in beautiful "black letter," found on the coffin of Henry VII. The extremely minute relief on the Wolfe monument at the Abbey is by Cunningham, said to be of "lead bronzed over," the work of Capizzoldi.

Over the entrance to the Master's Court in the Charterhouse is a lead panel having the arms of Sutton and dated 1611.

It is almost useless trying to put interesting workmanship into dull and poor materials. It must be allowed that modern sheet lead has a poor, mean, crushed millboard look, and its wretched colour puts it quite out of court as anything but a mere makeshift. Cast lead, on the contrary, has a beautiful surface; it is cast with the greatest ease with the most simple of appliances and does not blacken by exposure to the air as

milled lead does. I had been told that the beautiful whiteness of old leadwork was owing to the silver left in the old metal; but this is not the case, or only in a small degree. Modern cast lead does not blacken like the milled sheets. For gutters and flats cast lead alone should be used, if for practical reasons alone. For purposes like hot-water sinks (for which milled lead is almost useless) cast lead will be found to answer. It is said that milled lead was introduced into England about 1670. The plumbers of the time opposed its use, and said it could not be durable. The Milling Company replied by offering to keep milled lead of 7 lbs. a foot in repair for forty years for an insurance of  $\frac{1}{4}$  per cent. That, to me, seems saying very little for the material; it would have said little in the Middle Ages at least—then the forty years' view of things had not been invented.

When, some months since, some practical classes were instituted by the Technical Education Board of the County Council in Regent Street, I was allowed to get my friend Mr. Troup, who has devoted much personal practice to working in lead, to supervise a class for experimenting in casting and ornamenting lead. A small casting table was set up, and I must confess that I there saw the casting of lead for the first time. The same course has also demonstrated the extreme ease with which this beautiful material is bossed up and otherwise manipulated. I find to-day that practical plumbers will explain that the great objection to cast lead is the comparative difficulty with which it can be beaten up. If they would only try they would find how mistaken this view is.

#### EDINBURGH ARCHITECTURAL SOCIETY.

At a meeting of the Society held on the 9th inst., the president, Mr. J. A. Williamson, in the chair, Mr. W. J. Anderson, lecturer on architecture in the School of Art, Glasgow, delivered a lecture on "The Origin of Greek Architecture." Mr. Anderson, who opened his lecture with a very interesting historical sketch of Greece, described the influence of wood construction on the architectural works of the Mycenaean Age. The lecture was illustrated by a large number of limelight views. Mr. Anderson was accorded a hearty vote of thanks.

#### TESSERÆ.

##### Record Offices in London.

IN 1578 an office for keeping papers and records concerning matters of State and Council was established, and Dr. Thomas Wilson (who was then Master of Requests and afterwards became one of the secretaries of State) was appointed the keeper and registrar. Before this establishment was formed it is not surprising that numerous papers of great importance should have been entirely lost and others have fallen into the possession of private persons. Sir Robert Cotton, in the reign of James I., and Sir Joseph Williamson, in that of Charles II., were most assiduous and successful collectors of those scattered papers. The collections of the former now form a portion of the library of the British Museum. Sir Joseph Williamson placed his collections in the State Paper Office. Another mass of papers, consisting principally of letters addressed to Cardinal Wolsey and to Cromwell, Earl of Essex, remained in the custody of the crown; but, instead of being deposited in the proper place, found its way into the chapter-house at Westminster. The three great receptacles, therefore, of State papers, antecedent to the year 1540, and partially down to the year 1578, were the State Paper Office, the chapter-house and the Cottonian Library. In the reign of James I. considerable attention appears to have been paid to the office. At this period the papers, which had been hitherto kept in chests, were reduced into the form of a library, and the king assigned certain apartments in his palace of Whitehall for their reception. Wilson seems to have experienced difficulty in getting possession of some of those apartments, and has left a curious memorandum of the presents and douceurs which he deemed it prudent to give to the lord chamberlain and Lord Worcester and their servants, to obtain one room, which had been the larder of the lord privy seal. The part of the palace finally appropriated to this purpose was the tower over the gateway which connected the eastern and western parts of the edifice standing across the street now known by the name of Whitehall. The apartments are described by Tucker as consisting of two rooms, three closets and three turrets. Of these Wilson did not get entire possession till 1618. This tower fortunately escaped the conflagration which destroyed a great part of the palace on June 12, 1619. During the civil war the office suffered spoliation and afterwards was neglected. In 1705 a committee of the House of Lords was appointed to inquire into the method of keeping records and public papers.



in offices. In consequence of a report from that committee, compiled from a return made by Tucker, an address was presented to Queen Anne, in which it was stated that with the exception of the papers of three secretaries of State, viz. Sir Edward Nicholas, the Earl of Arlington and Sir Joseph Williamson, and those left by Sir Leoline Jenkins, few papers had been delivered into the office since the year 1670, and even those so delivered were not perfect and many deficiencies are particularised. The address observed also upon the deficiency of space and the inconvenience arising from many papers being kept in bundles, and recommended the repair and enlargement of the office, and that the papers should be sorted and digested and bound in volumes. After a reference to Sir Christopher Wren, it was determined that the upper floor of the lord chamberlain's lodgings at the Cockpit should be fitted up and appropriated to the State Paper Office. This work was accordingly done, and an apartment 80 feet long and 25 feet wide, which was known by the name of the Middle Treasury Gallery, was then added to the office. In this state it remained until the old gateway was pulled down, about 1750, when the contents were found to have greatly suffered from vermin and wet. The papers contained in the gallery, which was left standing, remained there; but the contents of the rest of the office were removed to an old house in Scotland Yard, where they remained and suffered still further injury from wet till 1819, when it became necessary to pull down the last-named house, and the papers were again removed to another old house in Great George Street.

### Sixteenth-Century Architects in England.

Amidst the stars of lesser magnitude that beamed among the contemporaries and immediate predecessors of Inigo Jones were Girolamo da Treviso, who, like Holbein, practised both painting and architecture—the latter as an artist and not as a builder; Richard Lea, an Englishman, somewhat later; and another, named John Thynne, who built Somerset House in the Strand in 1567, in a mixed style of Italian and Gothic architecture. John Shute, an English painter and architect, who flourished in the reign of Queen Elizabeth, was sent by the Duke of Northumberland, his noble patron, to study the art under the best masters in Italy. He published in 1563 a folio volume of the principles of architecture, as developed in the most celebrated monuments of antiquity. Milizia, in his lives of architects, mentions an Englishman of the name of Stickle, who flourished about 1596, as an excellent architect. Robert Adams, who practised architecture and engineering, was superintendent of the royal buildings to Queen Elizabeth, and wrote a description of the river Thames and of the best method of fortifying it against an enemy. In the same period flourished Theodore Havens, an architect, sculptor and painter, who affected grandeur on a small scale and was rich in Italian conceits. He designed Caius College, Cambridge, a fair specimen of the architecture of the age—pedantic, eccentric, affected and trifling. This college was founded by Dr. Caius, physician to Queens Mary and Elizabeth; and three of its gates are of curious, if not of elegant, designs, being amongst the first constructed after the Italian manner in England. The first is inscribed "Humilitas," and, as the Gate of Humility, is of low proportions; the second, which is loftier and embellished with a portico and emblematical figure, is dedicated to Virtue, and is inscribed "Virtutis. Io. Caius posuit Sapientiae," and conducts to Caius Court and the public schools; and the third, which is inscribed "Honoris," and is called the Gate of Honour, is of still larger dimensions, and decorated with the various orders of Roman architecture, overlaid with ornaments, in the style of the ecclesiastical monuments of the period. About the same time, Rodolph Simmons built Emanuel and Sidney-Sussex Colleges, Cambridge, and rebuilt the greater part of Trinity College in the same University.

### Figures in Landscapes.

The earliest landscape-painters sought to give their pictures interest by placing a group of persons in the foreground engaged in some suggestive occupation. Thus Claude filled up his pastorals with shepherds and with dances under trees, while Salvator Rosa peopled the gloomy caverns and dark chestnut woods he loved to paint with bandits and soldiers. Rubens, in the celebrated landscape of the Pitti Gallery at Florence, has painted the story of Ulysses landing after his shipwreck on the shores of Phæacia beneath the palaces and gardens of Alcinoüs. The storm is broken overhead; vast rain clouds rolling off remind us of the tempest that is gone. The figure of Ulysses on the shore suggests the fury of the sea from which he has escaped, while Nausicaa and her maidens seem to welcome him to fresh sunlight and repose. The correspondence between returning calm in nature and the escape of the hero from his perils on the sea produce a unity of conception that makes this picture a fine poem. Many of Turner's greatest works might be taken as examples of the same sympathy between the scene in nature and the fortunes of

some hero or historic personage. But the landscape-painter need not depend so immediately as in the cases we have cited upon human interest. He may indicate it even in a more subordinate degree. Perhaps the most generally attractive of Turner's pictures is *The Fighting Téméraire*. This painting teems with objects and associations that provoke the warmest sympathy, and yet the human life there represented is entirely in the background. The sun is setting over the sea, while the crescent moon stands cold and clear to eastward. Between the sunset and the moonlight a black steamer-tug is drawing an old ship of war to her last resting-place. The sun is going down and night is coming on, but the red beams of the evening fall upon the steamer, while the white rigging and gigantic hull of the veteran ship look spectral in the pale light of the moon. The pathos of this picture depends upon the sympathy which it excites in us for the vast, helpless man-of-war. Men have always felt a personal attachment to their ships. Argo was respected as a kind of goddess, and Catullus wrote a sonnet to his favourite skiff. Equally in modern times are battleships regarded as actual personalities by the men who fight in them.

### Influence of Architecture.

When the soul of the artist has entered into his work, he has made of it a work of art, and he speaks to the souls of others. Perhaps it is in architecture that we see most clearly the growth of the arts into art. Architecture stands between "the arts" and "art," and partakes of both. Practical utility is its first aim, but beauty is its second. The true architect thinks not only of the purpose of his work, but of its influence on the minds of those who see it. He makes it express not only a presiding purpose, but an inspiring thought. The difference between King's Cross railway station and Westminster Hall is just the difference between architecture as the art of building and architecture as art. In the one the architect has been only a builder, in the other he has been an artist. The one has thought only of his useful purpose—the other has lavished love, and therefore beauty, on his work. The one has built a most convenient place for passengers to come to and go from—the other has built a place for men and women to gather in. The one has made a roof that lets in the light and keeps out the rain—the other has made one into which thought can soar and where imagination is at home. And that is the true test of a building as a work of art. It does not obtrude its purpose. The Manchester Assize Courts do not remind you of judge and jury. The splendid halls at Liverpool and Leeds do not call up irresistible associations either of municipal politics or of music. Our Gothic cathedrals do not merely remind us of sacraments or of sermons. It is characteristic of all good buildings that, whatever your mood of mind, you feel at home in them. A sense of peace and satisfaction descends on you. An elevating influence enters into you. The outside world falls away to a distance, you are lifted above it sometimes even out of yourself. The spell of art is on you, and you linger in the place unwilling to break the charm. It is with a plunge you find yourself again among the bustle of the street; you seem to have awakened from a pleasing dream, and you would fain close your eyes and dream the dream again, and dream it always. You have had something of that enjoyment which beautiful natural scenery gives, but with the additional mysterious charm which the human element in it imparts to art. That human element is the especial characteristic of art. It is that in it which "finds us," as Coleridge says. The Great Soul which speaks through nature speaks only to an elect few—the human soul in art speaks home to all. And it is that human element which is the distinct addition that, in all its departments, art can make to nature.

### St. Ambrogio, Milan.

St. Ambrogio is the finest example of the early basilica type in northern Italy, the region where, after the fall of the Empire, sacred architecture first acquired a complete and intelligently organised style, partaking both of the Roman and Byzantine, whilst in certain features differing from both—the style which, in fact, continued dominant in the West from the fifth to the eleventh century, coextensively with the Latin church. St. Ambrogio shows that, up to this period at least, sacred architecture continued true to its high and proper aim, that seeks to embody in the material building a type of the spiritual Church, her discipline and mysteries, without which the essential character proper to the Christian temple is lost. The system of symbolism in early art, developed under the Longobards, and henceforth obtaining more and more in the sacred edifice, is presented in a very curious series among the outer details at St. Ambrogio (the portal and columns of the atrium), and here we see, besides the figures familiar in such mystic acceptance, birds and animals, also Adam and Eve, the centaur, emblematic either of the lower passions or the swift course of man's life; the syren, of sin and its dangers; also the pomegranate (perhaps its first appearance in a symbolic sense), to imply by its numerous seeds the abundant charity of the saints.



## NOTES AND COMMENTS.

THE next international congress on technical education will be opened in London on June 15, when the Duke of DEVONSHIRE, K.G., will deliver an address. The subjects discussed will relate to technical and commercial education. Each branch will be divided into two sections, viz. advanced instruction and secondary instruction. The elementary stages will not be considered. All papers will have to be sent to the Secretary of the Society of Arts not later than May 29. They may be written in French, German, or English. The congress will be held at the invitation of the Society of Arts and the Companies of Drapers, Fishmongers, Goldsmiths, Merchant Taylors, and Clothworkers.

ACCORDING to the report of the Berks Archæological Society, there has been progress during the past year in historical research and architectural study. Delegates of the Society attended the Annual Congress of Archæological Societies at Burlington House, when the following subjects were discussed:—(1) Parish Registers; (2) The Preservation of Ancient Monuments; (3) County Museums; (4) Catalogues of Portraits in the Possession of County Families; (5) The Study of Ground Plans of Churches; (6) County Bibliography. Some steps have been taken with regard to the photographic survey of the county of Berks. A camera club having been recently formed in connection with the University Extension College, the Secretary gave an address upon the subject, and it was unanimously agreed that a survey should be undertaken by the camera club and commenced during the forthcoming season. It was announced that Mr. W. RAVENSCROFT had presented the Society with a series of brass rubbings from Shottesbrooke Church, and that Dr. HURRY was preparing a plan of Reading Abbey for the Society, which would comprise an architectural description, with the correct dimensions of the various buildings, and an historical description of the chief events connected with them. The officers of the Society were re-elected at the annual meeting.

A SOCIETY has been founded for the purpose of reproducing by modern facsimile processes the works of ALBERT DÜRER and his school. It proposes to issue in the first instance a series of faithful copies of the engravings, woodcuts and drawings of these artists, and to include such paintings as have not been published in a satisfactory form, or are from some other reason inaccessible. A number of plates will also be devoted to illustrating the relations of German with Italian art during the fifteenth and sixteenth centuries. A portfolio will be issued annually containing from fifteen to twenty-five subjects, accompanied by text. The method of reproduction will in each case be that best adapted to render the special qualities of the original. It has been decided to limit the number of members to 250 subscribers of one guinea each. Mr. F. WHELEN is hon. treasurer.

THE Corporation of London have agreed to provide increased accommodation for students at the Guildhall School of Music. The principal (Mr. W. H. CUMMINGS) had informed the committee that additional class room had become an imperative necessity, and that if such provision were not made the growth and progress of the school would undoubtedly be seriously checked. Intending students could not be accepted either because the rooms were already occupied at the particular times they could make it convenient to attend for their lessons, or because they wished to join the class of some particular professor who was quite willing to give more time to the school, but for whom it was impossible to find a vacant teaching room. A large practice-room was absolutely indispensable for the practice of the choir and orchestra combined, which at present was impossible, for the practice of the full orchestra and for the operatic and dramatic classes. The plans for the expansion of the school on vacant land at the rear of the present building, belonging to the Corporation, make provision for a commodious orchestral saloon capable of seating 650 persons and the addition of twenty-seven new classrooms. The site to be occupied measures 72 feet by 51 feet, or an area of about 3,700 square feet, and the cost will be 20,500*l*. The Corporation will advance this amount

as a loan out of the City's cash at a moderate rate of interest; to be repaid in equal annual instalments in fifty years. The liability which will thus be incurred by the school, including the ground-rent of the new building (460*l*.) and additional expenses of staff, will amount to 1,500*l*. a year. To meet this increased liability the entrance fees and tuition fees will have to be increased.

THE following buildings have been visited on the past five Saturday afternoons by the students attending Professor GOURLAY'S classes in architecture and building construction at the Glasgow and West of Scotland Technical College. A new brick kiln of the Hoffman type at Seedhill, near Paisley; Mr. R. W. FORSYTH'S new warehouse, Renfield Street, Glasgow (Messrs. JOHN BURNET, SON & CAMPBELL, architects); Miss CRANSTON'S new restaurant, Buchanan Street (Mr. GEORGE WASHINGTON-BROWNE, architect, Edinburgh); Langside Road United Presbyterian Church (Mr. JOHN B. WILSON, architect); the new Art Galleries and Museum, Kelvingrove Park (Messrs. SIMPSON & MILNER-ALLEN, architects, London). There was a good attendance at all the visits.

IN Paris the Municipal Council appear to be always on the look out for new means of levying imposts. The last discovery is ingenious. It is proposed to subject the metal plaques which the insurance companies place on façades as evidence of protection to a duty. The theory adopted is that the plaques are projections, although only to an infinitesimal extent, and must, therefore, be made liable to extra payment. It was not anticipated there would be any resistance to the proposal. The companies, however, have adopted a very efficacious means of escape. They have removed the plaques, and by that simple stroke the Municipal Council are rendered powerless and left to discover another subject which will be less portable.

A CORRESPONDENT, who feels aggrieved by the election of a fire brigade officer in Dublin, writes as follows:—"I note your remarks in last week's issue anent the appointment of assistant superintendent of the fire brigade at Dublin. You say the Corporation acted wisely in compelling candidates to submit to a competitive examination. This is manifestly correct; but did they maintain their wisdom when, after the results of the examination, they balloted for the men (apparently indifferent to all qualifications), so that the lowest but one in the examination was voted for the berth? If the other candidates who showed better results in the test were unqualified in physique or other merits, could not their defects have been discovered earlier, and thus have spared them the gall of being passed over by inferior competitors, and, otherwise, where is the sense or humanity of these City Fathers stored to waste the time and brain power of the candidates? This instance, I think, is almost a fulfilment on earth of the scriptural saying that 'the last shall be first,' though perhaps not in the way intended when uttered." Our correspondent may not be able to discover the sense or humanity of the arrangements made by the Corporation, but he should remember that it is not sense or humanity which is paramount in Ireland, but fun; and if the Dublin Councillors have enjoyed themselves over the wasted labours of the candidates he ought to be pleased in having contributed his share of the amusement.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—SALISBURY: EAST END OF CHOIR.

STAFFORD HOUSE, ST. JAMES'S.—GARDEN FRONT.

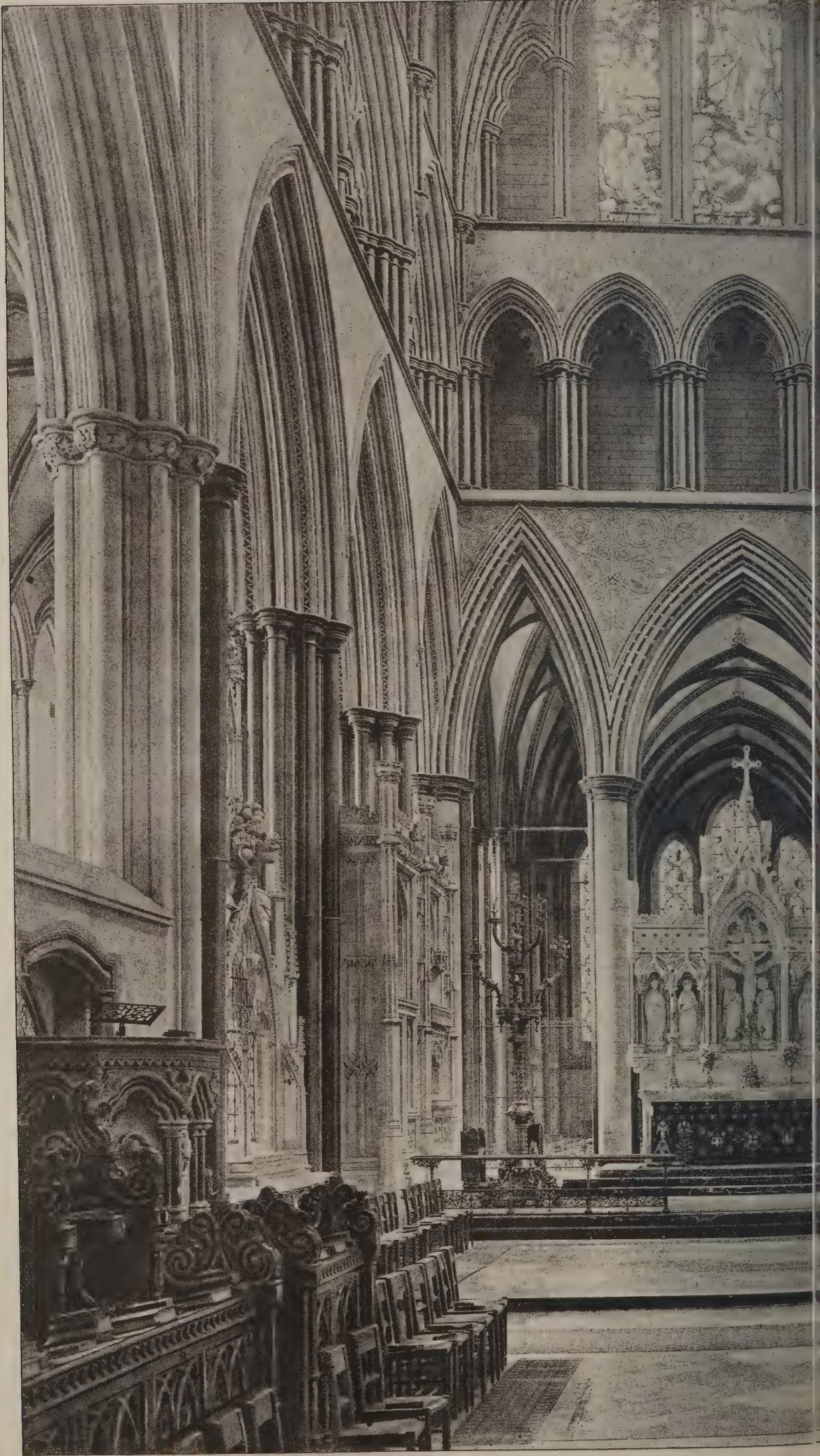
FOTA, NEAR CORK.—GARDEN HOUSE—ENTRANCE GATE.

THE Right Hon. A. H. SMITH-BARRY, M.P., has recently made considerable improvements in the gardens of Fota, near Queenstown, co. Cork. The gates standing in the middle of an old yew hedge, and the garden-house, which we illustrate this week, form part of the scheme. The grounds contain some remarkably fine specimens of foreign trees planted close on a century since. Many species rare in the United Kingdom are here flourishing in the greatest beauty. The architect is Mr. ARTHUR HILL, B.E., F.R.I.B.A.









PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.



Apr 16<sup>th</sup> 1897



INK- PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET FETTER LANE E.C.

SALISBURY: EAST END OF CHOIR.











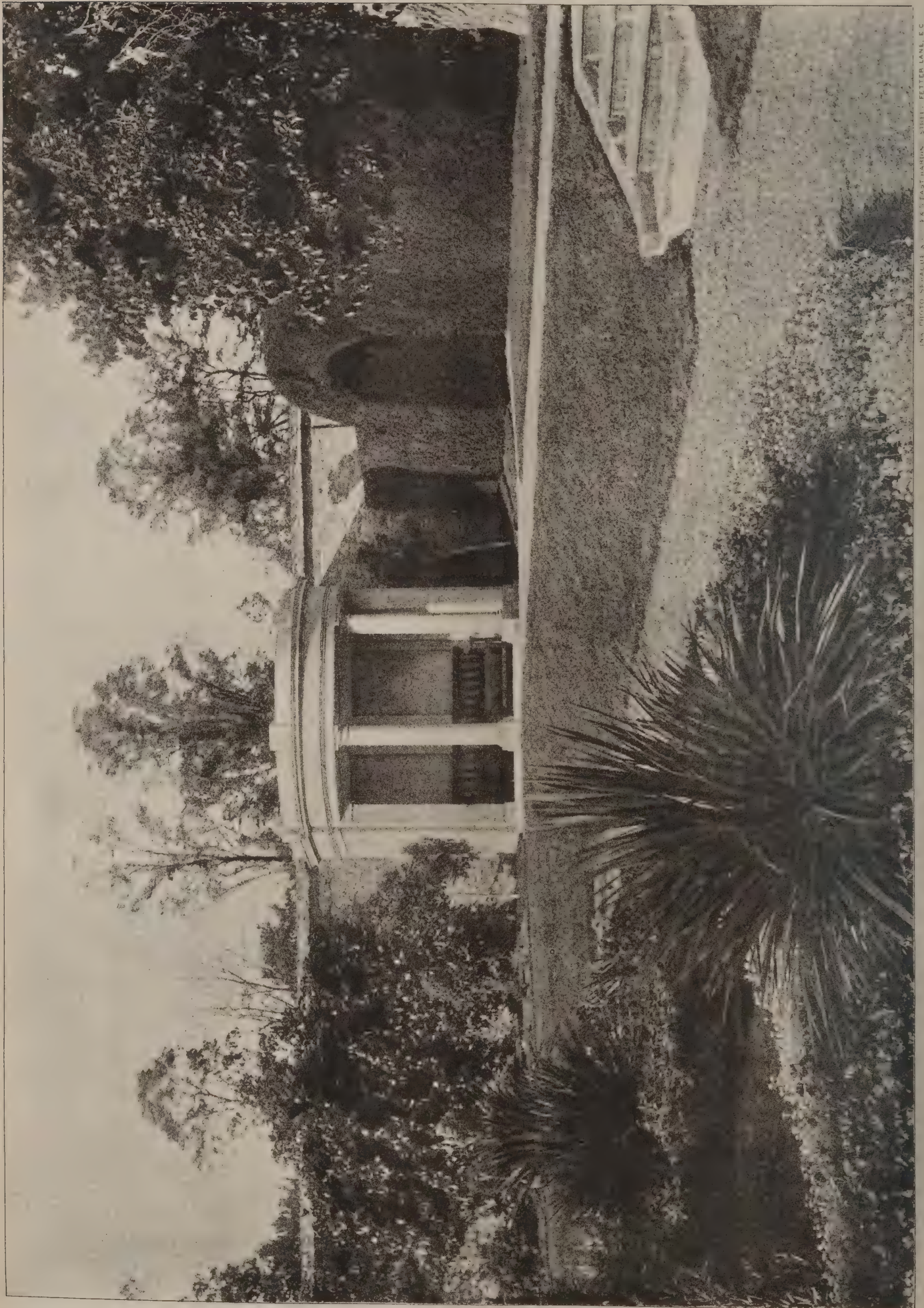


PHOTO BY MR. A. H. SMITH-BARRY, M.P.

GARDEN HOUSE, FOTA, NEAR CORK.  
FOR MR. A. H. SMITH-BARRY, M.P.  
ARTHUR HILL, F.R.I.B.A., Architect.





NO. PHOTO. SEHAGUE. N. 100. 1/2 S. DART HALLING STREET. FETTER LANE. 1.

ENTRANCE GATE, FOTA, NEAR CORK.  
FOR MR. A. H. SMITH-BARRY, M.P.  
ARTHUR HILL, F.R.I.B.A., Architect.

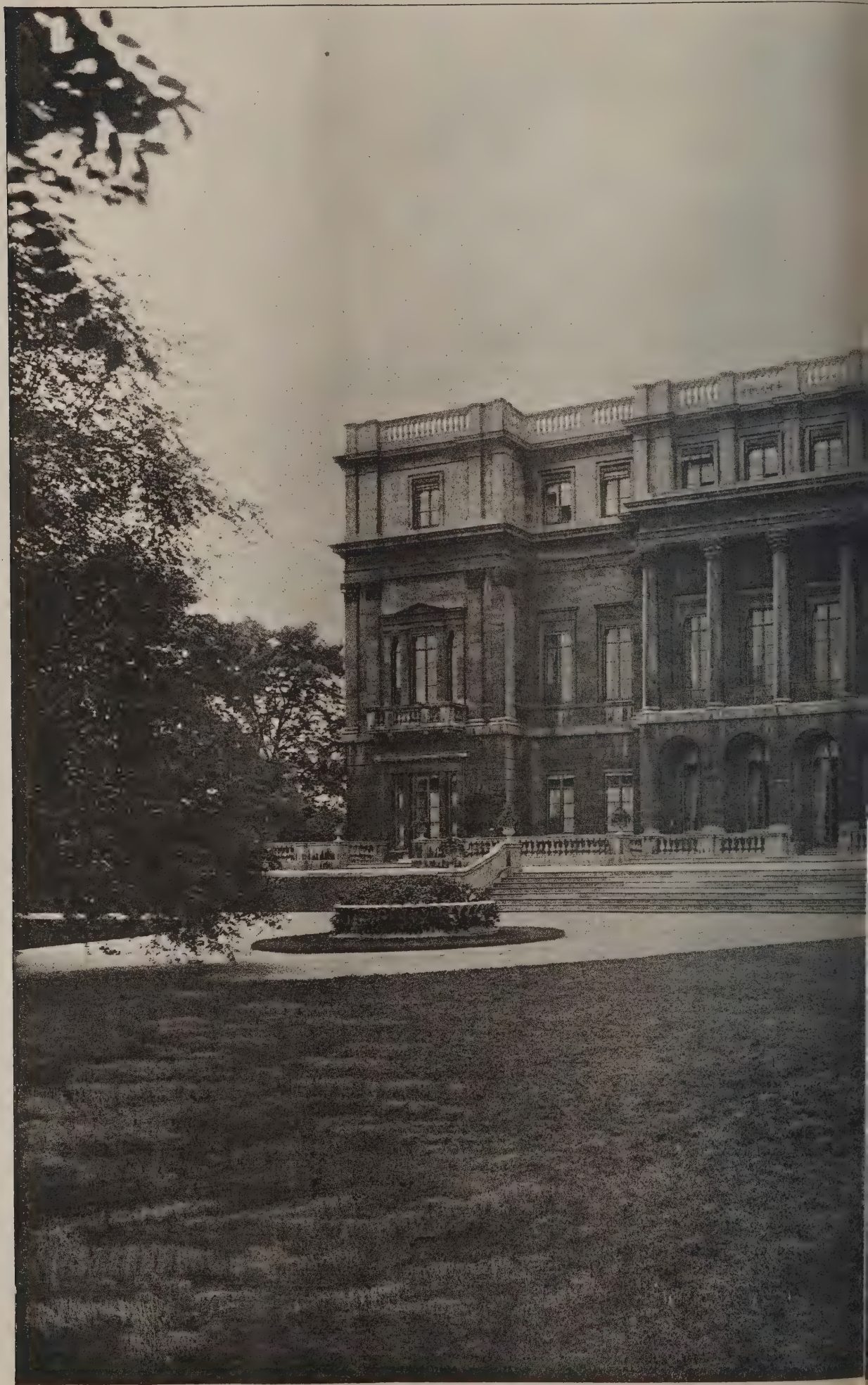












PHOTOGRAPHED BY BEDFORD LEMERE & CO

GARDEN FRONT: STAFFORD  
MANSION OF THE DUK  
SIR CHARLES



16<sup>th</sup> 1897



INK-PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

HOUSE, ST. JAMES'S.  
SUTHERLAND, K.G.  
Architect.







## LIGHTHOUSES.

By ALFRED J. GLASSPOOL.

THE English race is pre-eminently the lover and master of the sea; upon this pre-eminence depends our life, nationally and physically. We are what we are, at home and abroad, because we are able to guard from foes the "silver streak" surrounding our little island. The Vikings' blood still flows in our veins, and although commercial greed has done much to make a sailor's life disliked, we still do and must continue to "rule the waves."

Pessimists who are continually croaking out their dirges on England's downfall have only to ascertain facts to discover that our commerce is yet the envy of the world. English ships are in every port, and ships of every nation turn their heads to our iron-bound coast. It is, then, our first duty to do all that is possible to protect our vessels and those of strangers who come to do trade in our harbours. We cannot command the storms either to arise or to cease; we may throw oil on the troubled waters, but they will still be agitated by the stormy winds; but we can place such signals in the track of the sailor as will help to keep him off hidden rocks and treacherous sands.

Perhaps one of the most interesting parts of English enterprise is to be found in these undertakings.

A delightful voyage on one of the excellent fleet of the British and Irish Steam Packet Company's from the London Docks to the port of Dublin has revealed to the writer the necessity of a variety of seamarks to protect vessels nearing our coast, and the study of these, as shown in the map forming the frontispiece of Mr. E. Price Edwards's instructive little book, "Our Seamarks," will show how well our coast is protected.

Even to indicate the numerous lights which attract our attention even on so short a journey would occupy far too much of our space. We have hardly got out of the river when we find ourselves looking at the Swim Middle light-vessel, having a white light and revolving at half-minute intervals; this is followed by the Maplin Sands light, red in colour, occulting with white sectors also at half-minute intervals; the North Foreland; the South Foreland, with its two electric white lights, the higher one visible twenty-six miles away, the lower at least twenty; then follows Dungeness, having two lights, high, white and fixed; we now become deeply interested in the light of St. Catherine's, Isle of Wight; then those of the Needles, where we see red and green sectors; then quickly in succession Portland Bill, Plymouth Breakwater, the Eddystone, the Lizard, the Wolf Rock, St. Agnes, Scilly, the Bishop Rock, Scilly, and the Longships Rock, Land's End.

Then making our way across St. George's Channel, we steam by the Irish Sea, and see on our right the Bardsey, the South Slack, the Holyhead Breakwater and the Skerries; on our left the Hook Tower, the Waterford, the Tuskar Rock, the Arklow, the Wicklow Head and the Howth Bailly; in all at least fifty lighthouses and lightships, all efficiently maintained at great cost to protect this portion of our coast.

To the landsman, pent up in a close office all the year round, and passing only to and from home to business, the wide open sea, the exhilarating breezes, the frowning coast line, the strong forms of the lighthouses, bidding defiance to the storm, and the tender, almost motherly, light flashing forth in the darkness, awaken thoughts and stir emotions quite impossible to express, and convince the beholder that it is more than ever true that those who do business on the waters behold great wonders.

But it was not always so. Just as the lighting of a great city has been the growth of years, just as now we can venture out at any time of the night and find every street and alley of a well-lighted city protected by its gas lamps or its electric light, whereas our forefathers had to carry torches or lamps to find their way amid darkness and filth and thieves, so the guiding lights of the sea have only been achieved after much labour, loss and disappointment.

The necessity for some indication to guide ships, both by day and night, was always evident to the most thoughtless observer; but now that geology has accomplished such great strides, and the bed of the sea is becoming known as thoroughly as the land routes of a great continent, the importance of indicating the sea lanes, the high roads and turning points of the sea becomes more and more evident.

Frost, heat, rains, floods, currents, all have a share in placing dangers in the way of the mariner. The suspended matter brought down by rivers—shingle, sand, mud—are deposited in various parts at the mouths of rivers; these are subjected to movement by the action of the waves. The waves beating upon the coast break off great masses of land; these are carried away and help to form barriers to the progress of our ships.

Volcanic action in remote ages has caused mountain ranges to sink so that their tops now at times just peep up above the waters, or are covered by the waves, and thus present a continual menace to those who are obliged to make their journey in their midst.

If civilisation and firm government have rid the sea of rovers

and pirates, there remain still more treacherous enemies waiting to embrace the sailor in their grasp.

As a protection against such deadly foes the lighthouse stands as a smiling friend—by day a landmark indicating to the sailor his position, by night sending forth its cheering beams guiding him on his way, as it warns him against sandbanks, shoals and rocks.

We know that the ancients had the germ of our present lighthouse system when they erected the Pharos at Alexandria, the Colossus at Rhodes, and the well-known Caesar's altar at Dover. The beacon fires, though imperfect and often delusive, yet indicated a desire to help those who hugged the shore and "feared to launch away."

Our sailors, up to the time of Henry VIII. and his illustrious daughter Queen Elizabeth, depended very much upon the natural formation of the coast, the steeples of churches, and other indications to guide them over the sea. When the commerce of England began to expand, larger ships being built and much trade being carried on especially between England and Antwerp, it became essential that some means should be adopted by which our ships should be protected.

It was in 1536 that a maritime society known as the Trinity House, Newcastle-upon-Tyne, obtained a charter from Henry VIII. They had the privilege to "build, make and frame of stone, lime and sand, two towers, one on the northern part of Shelys (Shields), at the entrance to that part of the said town, and the other upon a hill there fit and convenient for signals, &c.," to carry out this work they were to levy certain tolls on shipping.

In the records of the Corporation of London there are several references to the towers thus erected, and a correspondence is referred to which took place between the Lords of the Council and the Lord Mayor with regard to the raising of tolls at the Port of London to maintain such towers. Ships were not allowed to enter a port till the dues for the lights had been paid. In 1581 a Bill was brought into the House of Commons "for maintaining a light upon Winterton Steeple, Lincolnshire, for the more safety of such ships as pass by that coast."

It is an interesting fact that in 1585 Sir Thomas Graye, in his own name, and in the name of the masters of Her Majesty's navy, and also on behalf of the seamen of Norfolk, petitioned the Lords of the Council for the maintenance of a watch light on the steeple at Winterton, thus showing how the steeples of churches were utilised to indicate the coast line.

James I. granted a patent to Sir John Meldrum for erecting lighthouses on the coast, a charge upon coals and a penny a ton upon all shipping to supply the necessary funds. This roused the opposition of the Trinity House, who petitioned against it, March 22, 1621. The record tells us that a great debate took place in the House of Commons on the matter, the result being that the patents for Winterton and Dungeness were condemned, April 18, 1621. It is obvious that the lighthouses first erected were only for local use. They guided the fishing craft into harbours, but were of little or no use to ships passing along the highway of the sea at a distance.

It was early in the seventeenth century that several simple massive towers were built on prominent headlands; on them were kept burning great fires of coal and wood. Such fire-towers had been in use in the Mediterranean for many years at the entrance to ports and harbours; they were now intended to serve a wider purpose.

It can be easily conceived that such a method of illumination must necessarily be very inefficient, and could ill serve its purpose. The great blaze of one moment or the red glow was succeeded, when new fuel was applied, by great clouds of smoke, hiding for a time all appearance of the landmark. Being open to the atmosphere such a light was exposed to all kinds of weather; wind, rain and snow played great havoc, and it was only with great difficulty that the fire was not entirely extinguished.

Another great evil consisted in the fact that the greater part of the light was sent up into the sky instead of over the waters to the ship who needed its warning blaze. Improvements were seen when the fire was enclosed in a kind of grate, showing its red embers to the sea, its black back to the land, while a further development placed a flat plate of brass at the back to act as a reflector.

The chandelier came afterwards, being placed in an enclosed lantern. The visitor to Plymouth Hoe may see the very chandelier which was placed in Smeaton's masterpiece, the old Eddystone, in which burned twenty-two candles, "whereof five make two pounds."

The number of lighthouses in modern days has greatly increased, there being over 500 on the coast of the United Kingdom.

In constructing a lighthouse, consideration has to be given first to the dangers of the coast, and afterwards to the comfort of the men who will have to spend their time within its boundary; so that, in selecting a spot for a lighthouse, all other things being equal, that spot is chosen where cottages



can be erected in which the men, with their wives and families, can reside. Thus we sometimes see the lighthouse surrounded with a cluster of whitewashed cottages glistening in the sunlight and forming a very pretty foreground to the wild scenery behind; at times the lighthouse and its surroundings are placed in out-of-the-way situations—at Spurn Point, for example, on the north shore of the Humber, there are two lighthouses and a coastguard station, altogether making quite a little community, many miles from the nearest village. On the Scotch and Irish coasts the lighthouses are often placed in such inaccessible spots that the children are unable to attend school, nor is there any place of worship within reachable distance; others are placed in very pleasant spots, and, like the North and South Foreland, are near fashionable watering-places. They have constantly many visitors, who are received most cordially and who can but come away much instructed by the information given, and the spotless cleanliness of the whole structure.

*(To be concluded.)*

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, the president, Professor Aitchison, A.R.A., in the chair.

The minutes of the last meeting were taken as read.

Mr. H. H. Statham read his paper on

### The New Government Office Scheme.

In that room, he said, they were bound to consider the treatment of Government offices from an architectural point of view, both in regard to the most effective treatment of the buildings themselves, as an important element in our national architecture, and to those questions of alignment of streets which came under the general head of what were called "public improvements." The subject was one of national importance. In order to appreciate the present position it would be well to look back a little. It was obviously important both for architectural effect and convenience of communication that Government offices should be concentrated, and should be rebuilt from time to time in accordance with a definite scheme to which each new building would be a contribution. Such a scheme, on the grandest scale, had been drawn out by Sir Charles Barry in 1857, not only for the concentration of the Government offices, but for the improved laying out of the whole Westminster and Whitehall district. The greater part of that scheme was now rendered impossible by what had been done in a piecemeal way since; it was melancholy now to look at that plan and think what splendid possibilities had been lost, but he wished to draw attention to it and to include it in the Institute Journal, partly because it was well at least to have before our eyes a great ideal and also because, as he would show, one or two points in it were still capable of realisation. In 1856 took place the great competition, open to the world, for a plan for the concentration of the Government offices and for special designs for War Office and Foreign Office buildings, as the result of which the War Office, though there was the most urgent need for it, was abandoned, and Sir Gilbert Scott received the commission for the Foreign Office. It had been attempted to show that the Foreign Office was a complete failure, and a proof of the mistake of erecting palatial Government offices designed by an outside architect; but this was exaggeration, the faults which it had could easily be avoided in a future case; it was at all events a dignified building, and its quadrangle of the dimensions of 240 feet by 170 feet was on such a scale as to have a really fine effect. The argument that such buildings would be better produced by the official surveyors of the Office of Works was sufficiently answered by the buildings which were so produced—notably the post offices, which were nearly all in a poor and commonplace style of architecture. In 1882 the competition for new War and Admiralty Offices was announced, not on the Great George Street site, as had been expected, but on a site near Spring Gardens, in which a part of the new building, for economy and to avoid purchasing some street property on the west side of Whitehall, was relegated to the rear of the houses. The opportunity afforded for widening the upper end of Whitehall by throwing back the west line of the street, pressed on the committee by two eminent architects, was entirely ignored. The next step was that this scheme was abandoned, the building of the War Office was again postponed, and the committee of 1887 reported that the Admiralty could be economically provided for by retaining and adding to the old Admiralty buildings. He could not understand how any Government could sanction the retaining of a building with such an interior as that of the old Admiralty; nothing short of entirely gutting it could enable it to be made a satisfactory building, and the architectural exterior was not worth that. The new buildings, though well planned, represented a design originally commonplace though rich and costly, cut down to a cheap brick structure with stone dressings; the superficial richness being removed, only the commonplace remained. As

a building for the administration of the greatest naval power in the world, it was little short of a disgrace to the nation. Coming to the Parliament Street site, the new proposed buildings there would be well situated parallel with the Foreign Office, but in order to produce their proper effect the design ought to range in its main lines with that of the Foreign Office and harmonise with it in character; to erect an inferior type of building would be to destroy the whole architectural effect. The alternative proposal to set back the Parliament Street part of the new buildings at an oblique angle, merely with the object of getting a full view of Westminster Abbey from a point 80 yards higher up Parliament Street, was absurd; it would be spoiling the whole building and throwing away part of a site, already too small, for an almost imaginary benefit. Coming to the question of the War Office, the fact that the money had been voted for the Carrington House site surely did not bind the Government either to build War Offices and no other on that site, or to decline enlarging the site by the purchase of further property. It would be quite possible still to build the War Offices on the Downing Street site, and to provide for the departments, now on that site, on the Carrington House site. This would realise, with some modification, Barry's fine conception of the War Office and the Admiralty Office as symmetrical blocks on either side of the parade ground, the Horse Guards in the centre. Probably none of the buildings on the Downing Street site could be permanently retained in such a case—the interior of the Treasury building even was too old-fashioned to retain; but the little domed vestibule of Dover House ought to be respected in any case, and could easily be worked into a new building. The vote for the Carrington House site had been unexpectedly taken; it was distinctly promised that the committee would hold further sittings first, and it might be observed that for the first time, he believed, no architectural evidence at all had been taken on a scheme so important in the architectural embellishment of the capital. The official plan for the building on this site was a double mistake. In the first place, the shape of the building was to be settled by the irregular shape of the intersecting streets. That was an estate agent's and not an architect's way of planning; it was reducing what ought to be a national architectural work to the level of a block of flats or a monster hotel. In the next place the site would be overbuilt both for architectural effect and sanitary conditions; the largest quadrangle into which rooms would look was only 105 by 100 feet for a building five storeys high. They might compare that in their minds with the quadrangle of the Foreign Office, the same height and 240 by 170 feet, or a model which he had there would show the facts still better. There was nothing to prevent acquiring some further property north of Whitehall Place, and treating that portion of the building in symmetrical architectural relation with the courtyard of the old Admiralty, if that really was to be retained. There was no objection to building up Whitehall Place; it was shown that it was now an unnecessary street as far as traffic connection was concerned. The rest of the building could be planned symmetrically on the greater portion of the Carrington House site, the building line on the south side being brought in a little so as to make Horse Guards Avenue central with the Horse Guards, as it always ought to have been. It was absurd that a street facing a famous building and named after it should have been laid down out of centre with it; such a plan would be laughed at in Paris, but in London the alignment of streets and buildings was utterly ignored. Having got the extra width, they might then also make Horse Guards Avenue a real "avenue" by planting two lines of trees in it. When on the subject of what might be done, it was fascinating to go a little further and sketch out a really stately scheme for the combined treatment of the Admiralty and War Office. Suppose the old Admiralty removed, the new block already built might be lengthened southward a little, and returned towards Whitehall, with a similar northern block built on the foundations now being laid. On the centre of the fourth side of the quadrangle thus formed, facing Whitehall, would be the First Lord's House, with a columned screen and entrance on each side of it. Opposite to this we would buy up all the east side of Whitehall up to Craig's Court, and plan the War Office with a similar but shallower courtyard facing the quadrangle of the Admiralty, and the Commander-in-Chief's house or staff offices in the centre, facing the First Lord's house. The new block of the Admiralty would be retained in its interior plan, but faced with stone to form part of a new and superior architectural design. The whole west side of Whitehall up to Charing Cross would be set back on a new line to give it an equal width all the way up, and, above all, to connect it with the axial line of Trafalgar Square, the Charles I. statue being moved a few feet to get it also on the point of meeting of the axis of Whitehall and the Square. The Mall would be continued through in a straight line into Charing Cross, the space between that and the Admiralty being occupied by street buildings forming the offices of the Woods and Forests and one or two other small departments. Speaking of that reminded



him that the official plan showed the Mall continued through in the same way, but evidence had been given before the recent committee by Police-Superintendent Beard that it would be bad for heavy traffic to come out of the Mall on to the slope of Charing Cross, that the exit ought to be taken up at an angle into Trafalgar Square. This, however, was beside the mark; if the Mall were to be given up to heavy traffic it had better remain closed, and the very object of opening it was the straight vista along it. He had spoken plainly on the matter of the buildings because it was a subject of national importance. Architecture was not everything, but in history it would be observed that the effort to produce great buildings was coincident with the greatness and ambition of a nation in other respects; it was when a people was going downhill that national architecture was neglected. This looked bad for us, when we got to the point that the attitude of our Government towards architecture reminded us of Mephistopheles' definition of himself, "I am that which says 'No' to everything." The Government had one chance yet left to do something fine with a War Office, something to atone for the long series of blunders with public buildings in this country, in regard to which one might say, "They have made us a by-word among the people, a very scorn and derision to them that are round about us."

Mr. H. W. Brewer, who was asked to commence the discussion, said the question was too big a thing for him to deal with, and he felt overwhelmed at the thought of it. Were we or were we not to have Government buildings? The general feeling of Englishmen was that we should not. The loss the nation had sustained some years back when documents which had to be referred to had been found missing or spoilt seemed to have brought our countrymen from the error of their ways. The records then were kept, in sixteen or eighteen different places, and to search for one meant great labour and more often fruitless toil. Probably nothing would have been done to provide a Record Office, but that at a committee inspection of records the documents were found to be nearly spoilt by damp or else eaten by rats. The destruction of the Admiralty would not cause much sorrow, as the old place was not interesting, but in the case of its coming down he hoped the board-room would be taken care of and preserved. The prolongation of the Mall was one of great importance, and it happened that Charing Cross had to be struck out of the Jubilee procession because there was no means of getting back to Buckingham Palace. The speaker proposed a vote of thanks to the reader of the paper.

Mr. W. Woodward, who seconded the vote, thought Mr. Statham had been too hard on the Office of Works, and had also been distinctly unfair. The plans were produced most rapidly, and in the evidence before the Select Committee Mr. Taylor said that they were to be taken only as sketch drawings and not as matured results. Not one single elevation had been prepared by the Office of Works. With regard to the architecture it was easy for any gentleman to make comparisons and disagree. In speaking of Government buildings, Mr. Statham, he said, had omitted one, and that was the Royal Courts of Justice. After it was designed the Office of Works had to put right what the architect had left undone, and therefore much of the criticism would necessarily fall to the ground. If a bridge was preferable to a subway, perhaps the lecturer had not considered the question of lifts. The speaker disagreed entirely with Mr. Statham's views, and it was beyond his comprehension how any man could advise the retention of such a place as Dover House.

Mr. E. W. Mountford said it had been proposed to have an evening with regard to the County Hall, which would have brought in the question of widening the Mall, of which Mr. Statham had said something. If the Mall was to be improved at all, it should be widened to its whole width, and turned north. Going south it would be necessary to remove Drummond's bank, which was not a beautiful specimen of architecture, and then make Nelson's Column and the National Gallery a centre. Scott's building was not according to his original design, which was Gothic, and there was much left undone in the existing building which, if carried out, would have made it assume a more satisfactory appearance. The Law Courts also did not deserve all the blame which was expressed about the building. Judges were hard to please, and the recollections of the old courts at Westminster Hall had not died out among them. One of the causes of the shortcomings arose from the inadequacy of the space to accommodate such a variety of courts and offices.

Mr. W. D. Caröe and Mr. E. W. Hudson continued the discussion.

Mr. John Burns said he did not intend to follow the reader in his details. The committee were not, however, such vandals as had been supposed. They had no intention of excluding the evidence of non-official architects, and it would be an advantage if two architects were deputed to explain the views of the Institute before the committee. For his own part, he must own he did not approve either of Mr. Statham's proposals or those of the Office of Works. His views would be found described in the Blue-book containing a report of the proceedings of the com-

mittee. More could be made out of the Carrington House site.

The President spoke of the different sort of arrangement which was adopted in Florence when the cathedral had to be covered. There the effort was to obtain the finest effect. Modern English architects were ignored by the authorities as well as by the people. They could not be compared with writers who enjoyed popularity. He did not care much for giving importance to the Nelson Column as a centre, for it helped to conceal the National Gallery.

Mr. Statham, in reply, said he was glad to learn from Mr. Burns that non-official architects would be heard by the committee. There was a relation between the spirit of a country and the character of its public buildings.

## THE NATIONAL GALLERY.

THE report for 1896 of the trustees and director of the National Gallery, Sir Edward Poynter, gives the usual list of the pictures bought and presented during the year, the loans to various institutions, and other particulars. The gallery was visited by 489,842 persons on public days during the year, a daily average of 2,343. The number of visitors was highest in August, when the attendance reached 65,828 for the eighteen public days of the month, and in April, when there were 65,542 visitors on the seventeen public days, the months of September, May, October, July, March, June, February, January and November coming next in order; while the gallery received the poorest patronage in December, when there were 23,985 visitors on the eighteen public days. In addition, 29,607 persons visited the gallery on the twenty Sunday afternoons on which it was open. On students' days (Thursdays and Fridays) 42,580 persons were admitted, the admission fees amounting to 1,064*l.* 10*s.*, as compared with 1,037*l.* 17*s.* 6*d.* in 1895. The total number of students' attendances on Thursdays and Fridays was 20,057, and 999 oil-colour copies of pictures were made, 601 being British and modern, and 398 foreign schools.

In the report there is no information about the pictures selected by the copyists. All that is stated is that 87 of the 151 pictures were by foreign masters and 64 by British masters. In all 13,029 copies of the catalogues were sold, nearly one-half the number representing the sixpenny catalogue of the British and modern schools. Only seventeen copies of the 3*s.* catalogue were sold during the year.

The following pictures were purchased:—"The Picnic" (La merienda campestre), "The Bewitched" (El hechizado por fuerza), and both by Francisco Goya, the price being 265*l.* 14*s.*; "Portrait of Doña Isabel Porcel," by Francisco Goya (404*l.* 19*s.* 10*d.*); "Jupiter and Semele," by Andrea Schiavone (42*l.*); "Symbolic representation of the Crucifixion," by Giovanni Mansueti (435*l.* 14*s.*); "A Winter Scene," by Hendrik van Avercamp (89*l.* 5*s.*); "Portrait of Himself," by Gilbert Stuart (105*l.*).

The bequests and donations were as follows:—"The Crucifixion," by Spinello Aretino; "A Calm at Sea," by Charles Brooking; "The Moorland," by John W. Inchbold; "Portrait of a Lady," ascribed to Antony Mor; "Three Sketches (in one frame) of Rustic Figures," by W. F. Witherington; five miniature portraits set in frames as locketts, viz. "Mrs. Burrell," of Beckenham, "A Lady," "A Young Girl," "A Lady," "A Military Officer"; a miniature, supposed to represent the Young Pretender, painter unknown; "Portrait of Mrs. Siddons," by Sir T. Lawrence, P.R.A.; "Portrait of Miss J. E. Gordon," by Sir David Wilkie, R.A.; six sketches (in one frame), by Sir David Wilkie, R.A.; "Interior of Beckenham Church," by David Cox; "Portrait of Lady Clarges," by J. Downman; "A Study of Still Life," by Willem K. Heda; "A Battle Scene," by Jacob Weier; "Dredging on the Medway," by William J. Müller; "The Philosopher," by Cornelius P. Bega; "Portrait of Miss Gainsborough," by Thomas Gainsborough, R.A.; "Two Dogs: Tristram and Fox," by the same; "Study of an Old Horse," by the same; "Landscape," by the same; "Landscape," by the same; "Rustics with Donkeys," by the same; "Portrait of Thomas Gainsborough, R.A.," by Johann Zoffany, R.A.; "Nature Blowing Bubbles for her Children," by William Hilton, R.A.; "The Last Day in the Old Home," by Robert B. Martineau.

Of the six collections of Turner's drawings and sketches available for temporary loan to provincial institutions, Nos. 1 and 2 still remain at the Grosvenor Museum, Chester, and the Blackburn Art Gallery respectively, No. 3 has been lent to the Ipswich Art Gallery, No. 4 to the Leeds Art Gallery, and Nos. 5 and 6 remain at present deposited in the National Gallery.

George Cruickshank's picture, entitled "The Worship of Bacchus," which has been lent since January 1894 to the Albert Institute, at Dundee, has been returned to the National Gallery.

In conformity with the provisions of the National Gallery Loan Act of 1883, the following pictures have been lent:—



"Venice, Noon, from the Canal of St. Mark," by J. M. W. Turner, R.A.; "Highland Cottage Interior," by Alexander Fraser; "Crossing the Ford," by William Mulready, R.A.; "The Deluge," by William Westall; "Æneas and the Sibyl—Lake Avernus," by J. M. W. Turner, R.A.; "The Battle of Trafalgar," by the same; "A Woodland Dance," by Thomas Stothard, R.A.; "The Battle of the Borodino," by George Jones, R.A.

The eight pictures belonging to the National Gallery which have been on loan in the Oldham Art Gallery since 1884 were returned in July last for repair; the surface of each picture having been cleaned and some of the frames repaired they were again lent to the Oldham Art Gallery in September. The National Gallery board assented to the exchange of the following pictures lent to the Stockport Museum in 1884—"The Gouty Angler," by Theodore Lane; "Buttermere Lake," by J. M. W. Turner, R.A.; "The Visit to the Tomb," by J. M. W. Turner, R.A.—for the following pictures lent by the National Gallery in 1895 to the Peel Park Museum at Salford:—"The Burning Fiery Furnace," by George Jones, R.A.; "A Basket of Fruit," by George Lance; "Dutch Shipping," by P. J. Clays.

### CANTERBURY CATHEDRAL.

ABOUT three-fourths of the sum mentioned by Dean Farrar in his Thirteenth Centenary Celebration Fund Appeal has now been subscribed, and excellent progress is being made with the work of restoration, which, it is hoped, will be almost complete in those portions of the cathedral at present under treatment by the time—next July—of the great gathering of Pan Anglican bishops in Canterbury. The careful system of treatment to which the crypt has been subjected has revealed frescoes and paintings on the vaulting which had been hidden for a very long time. Not only have the French texts inscribed by the Huguenots in the early days of their worship in the crypt been left untouched, but the text over the bay facing the Black Prince's Chantry (at present used by the descendants of the Huguenot refugees) remains as an evidence of their recent occupation of the south aisle. At places there were remains of as many as twenty coats of whitewash on the vaulting and stonework, but the whole of these have been removed. For centuries past the crypt has been open to wind and rain, but the whole of the window openings have now been glazed, gas illumination introduced, and a warm dry condition of things has succeeded the former damp, cold and dreary state. The lowering of the floor to its original level and the covering of the entire area with concrete has proved an immense improvement to this interesting substructure, bringing into view the bases of the columns and restoring the original beautiful proportions. In compliance with antiquarian desires, the brickwork filling the arches leading to the apse of the chapel of St. Gabriel is to remain for the present at least. It has probably been there since about the year 1400, and obstructs the view of some very fine and probably some of the earliest Norman frescoes in the world. A most interesting discovery, made in the course of the excavation of the floor of the crypt, is that of a stone coffin of the date of the twelfth century, almost precisely similar to that of Stephen Langton in the Warriors' Chapel.

The preservation of the cloisters has also been taken in hand. The zinc roofing was found, on examination, to be leaky everywhere; the supporting timbers, too, had mouldered into touchwood in many places, and the vaulting was defective. The timbers, &c., have now been made good, and an entirely new lead roof constructed. Work in the chapter-house is also well in hand. The structural safety of the roof and ceiling has been secured, and the latter is now being re-decorated in its original handsome design. The windows on the south side have been opened out and glazed, that at the west end reglazed and that at the east end is to be occupied by the stained-glass to be presented by the Freemasons of Kent. The masonry is also receiving careful attention, Purbeck marble (the stone originally used) being largely employed to replace that which is defective. The carved work at the east end is found to be in very fair condition, but there is considerable redecoration to be carried out. The bells of the cathedral are now to receive attention, and the Dean and Chapter are very anxious to accomplish the restoration of Bell Harry Tower. This is perfectly sound structurally, but the surface and the decorative tracery were some years ago reported upon as needing attention. This view is now emphasised by Sir Arthur Blomfield. The magnitude of this part of the restoration may be gathered from the fact that the erection of scaffolding would alone cost about 1,000*l.*, and it must depend largely upon the continued inflow of subscriptions to the Restoration Fund whether this work is possible. That it is necessary is shown by the occasional fall of pieces of masonry on to the roof of the cathedral, and by such inspection of the structure as is at present possible.

### THE PREVENTION OF FIRES DUE TO LEAKAGE OF ELECTRICITY.\*

#### Introduction.

IT is scarcely sixteen years ago since the attention of the fire-insurance offices was first directed to a class of hazards previously unknown to them, viz. the danger to property arising from the use of electric current for furnishing power and light. The currents which then came into use were proportionately immensely larger than those previously used for telegraphic and other purposes, and now represent possibilities of energy which can be measured only in hundreds of horse-power.

Many will still remember the "danger scare" created about the year 1880 or 1881 upon the introduction of electric lighting by reason of the crude methods of wiring which were first adopted. Science and art, however, are in their nature necessarily progressive, and necessity has encouraged improvement and invention. In respect of electric wiring the increase in the demand for electric light has provided wider experience and demonstrated new wants. Public confidence has gradually become re-established, and it is now felt that the elements of great hazard are not necessarily inherent in all electric work, and that fires are preventable within the limits of ordinary wiring practice.

As this improved state of affairs must be ascribed more or less to the initial action taken by the various insurance companies—who ostensibly, for their own protection, posed as authorities, took the reins of guidance and produced "Rules" for the purpose of ordering "safe wiring"—it may perhaps seem somewhat inconsistent to suggest that their rules may now even bar the way to further progress. Consideration of this paper may, however, show that in the light of increased experience and with the lapse of time conditions are arising which prevent the rigid and consistent enforcement of the rules, and so failing to provide perfect safety and reliability they are becoming antiquated and inoperative.

Although we are having fires caused by electric agency, of recent years we have escaped those of such a nature that public attention would be called to them, and confidence as to the relative safety of electric light has been secured. This acknowledgment becomes all the more desirable for us to retain when it has to be admitted that, even with our restored reputation, there still lurks ominously in the public mind an undefined presentiment that electricity and electric fittings of all kinds are in some way "dangerous"—if only as presenting to the lay mind the possibility of an accidental shock.

It must, however, always remain a matter of congratulation that the early action on the part of our fire offices has so far enabled the electrical industry in England to escape the effect and criticism which would arise from the frequent occurrence of insidious and destructive fires caused through defective electrical installation work.

The problem of safe wiring is therefore of the utmost importance and involves the main interest and welfare of the electrical industry. The writer will seek to prove that the greatest "safety" is to be found in adopting the best means of securing and maintaining "perfect insulation," so that it becomes necessary to enumerate the principles that we have to follow, and to ascertain the conditions under which they have to be applied.

Perhaps before proceeding in our review of the present methods of wiring it will be helpful to take a momentary retrospect of the development of an analogous service, viz. that of gas. When gas was first introduced, many crude methods of installation were adopted, such as glass tubes, tinned iron or copper pipes. These practices gave the needful experience which ultimately led up to the employment of iron pipes, the use of which, indeed, sprang from the utilisation of old worn-out gun barrels, until the increasing demand for gas stimulated the production of wrought-iron pipes.

King's treatise on the "History of Gas Lighting" states that gas-piping service was at first very costly and cumbersome, and remained so until Whitehouse, in the year 1825, took out patents for improvements in the manufacture of wrought-iron pipe and produced it by machinery. It was the lower first-cost of installation due to this improvement in production of gas-pipes which afforded means for the general advancement of gas lighting, as it is on record that the chief impetus in gas consumption dates from the year 1830, that is the time when Mr. (afterwards Sir) James Russell took over Whitehouse's works and patents and largely increased the production of low-cost iron gas piping.

#### Conditions.

In order to compare the practice of "gas piping" with "electric wiring" we have to bear in mind the anomaly that electricity needs, instead of an orifice, a solid material as its conducting channel. The metal copper, owing to its good

\* The Fothergill Prize Essay, by Mr. Frederick Bathurst, A.I.E.E., published in the Society of Arts Journal.



electrical conducting properties, has by universal consent become the favourite material to employ.

A length of copper wire affords a simple means of transferring electrical energy from point to point.

This energy, according to the transmitting or transmitting device employed, may be caused to show itself as light, power, heat or chemical action. A part of the energy thus transmitted disappears in the conducting wire itself, according to the opposition or "resistance" offered. This resistance varies directly as the length, inversely as the cross section of the conductor and according to the specific conducting capacity of the material used, each conducting material possessing its particular specific resistance. Metals have, as a rule, the least resistance and are therefore usually selected as conductors. The portion of energy dissipated in the conductor because of its resistance really reappears in the form of heat, which action increases the temperature of the conductor above its surroundings, and unless the size or "sectional area" of the conducting medium is properly proportioned to the energy to be carried, this heating action may, from a fire-risk point of view, become serious—an over-taxed wire readily becoming hot enough to set fire to any inflammable material in contact with it. The conventional safe working current for copper wires has been fixed at 1,000 amperes per square inch of cross sectional area. The energy it is possible to pass through a wire is dependent upon the pressure or "voltage" at which the electrical supply is effected, and is measured by the product of the pressure or "voltage" multiplied by the ampere flow of current. The pressure or "voltage" which represents such an important factor in electrical supply may by the non-technical be taken as representing the power of the current to force its way along the conducting path by overcoming the resistance. The "voltage" also determines the ability of the energy transmitted to break through any environment for "insulation" which has been provided for the purpose of confining the current entirely to its conducting path.

As in the case of fluids where suitable pipes must be made and joints provided with a due consideration of the pressure they have to sustain, so also in electrical service, the metallic conductor has to be regarded in respect to these conditions, for, as "pressure" can burst a pipe, so "voltage" can puncture or pierce insulation.

Silk, cotton, rubber and other insulating coverings have been placed upon wire for the purpose of confining the current to its proper path. These materials in comparison with a metal like copper are such poor conducting mediums in themselves that they may be termed non-conductors or "insulators." The function of all insulators is to surround the conducting path with a non-conducting wall so as to prevent any extraneous deviation or "leakage" of current between the point of generation or supply and that of utilisation.

We see then that in the analogy between gas-pipe service and electric-wire service it is the frail insulating covering of the electric wire which corresponds to the substantial metallic coat which forms the gas-pipe.

Since in every electrical path or circuit we have a pressure or voltage constantly striving to break through the insulating covering, it is evident that the problem of safe and effective wiring is to secure and maintain perfect insulation for the conductors throughout their length and treatment. It becomes necessary, therefore, to study the nature and conditions of the insulating materials available.

Speaking generally of insulating materials, it is found that the influence of "moisture" upon them is very deleterious, for moisture being itself a conductor causes any insulating material absorbing it to lose its insulating property. A current leaking through a moisture permeated insulating material produces heat, the material itself becomes charred, and entirely loses its insulating properties, all its specific virtue being ultimately destroyed.

As an insulating covering may be subjected to the influences of heat arising from the conductor itself carrying excessive current, it is obvious that we should use an insulating material which is little affected by heat, although we find that our choice has to be modified by the consideration that heat-resisting materials are usually very great moisture absorbents.

In practice, moreover, insulated wires may be subjected to rough usage; it is important, therefore, to find materials which have sufficient inherent strength to withstand the physical vicissitudes.

In buildings wiring is everywhere adjacent to wood or brick-work, or in contact with plaster and cement. These building materials, when dry, may be classed as insulators; but if damp they are, on the contrary, fair conductors, and able to act upon the insulating covering chemically, so as to eventually destroy its insulating properties. A current leakage into plaster or brickwork at some one point may not in itself cause serious damage, but the fact of its having "earthed" a portion of the circuit makes its hazardous for the same occurrence happening in another place. If leakage only presented a temporary interference to the working of an installation and the convenience of

the user, it still should be avoided; but experience also shows that when backed by a dynamo and steam-engine, sufficient heat energy can be developed to cause a fire. Time, heat, cold, chemical action and moisture are all powerful influences that may tend to deteriorate any of the insulating materials in use commercially; whilst, in addition, accidental damage of the material in the process of manufacture or installation must also be reckoned with.

Incipient electrical faults, such as above referred to, are not readily detected—usually only when a sensational notice of the defect is given. This possibility therefore further accentuates the necessity of insisting upon good work and the right conditions to start with.

An insulator to be perfect should be one that will keep its insulating properties under all conditions of temperature, being non-corrodible, durable, moisture-proof, fire-resisting and a reliable armouring. This combination of qualities is at present only partially provided in commercial work, and considering the growing tendency to increase the voltage of supply, this "insulation" problem represents a strife between the power of penetrating and the power of resisting with an all too favourable possibility on the side of penetration.

### *Experience.*

The first electric wiring was done with wires very inadequately insulated and these were usually fastened directly against the nearest convenient support, with iron staples, brass saddles, or later with wooden cleats. If the insulation was not mechanically damaged nor the wires overloaded, and everything was kept quite dry, trouble would not perhaps be immediately experienced, but the natural moisture of the atmosphere or accidental conditions soon caused imperfections.

The leaking current could set fire to the partially insulating materials by gradually consuming minute particles, until the semi-conducting gases so generated would combine into a destructive "arc," or if leakage occurs between wire and wire a "short circuit" would be created so as to cut the translating devices out of action and allow the whole current to pass through the defective point.

The heating effect of the current increases directly as the square of its ampere value, so that the amount of heat generated by the short-circuit rush of current at the defective point can become very great, sufficient indeed to melt the conductor itself and set the immediate surroundings on fire.

It is true that we seek to gain protection from such hazards by the use of "safety fuses"—thin strips of tin, or easily fusible lead-alloy wires—which melt and volatilise when an excessive current is passed through them and so automatically form a break in circuit, and a means of disrupting the current. Such fuses are arranged in non-combustible containing chambers, usually earthenware, which will not be damaged by the momentary heat generated by the arc when the fuse melts. A "fuse" is designed to give protection against overloading a circuit; it has, however, its limitations. An abnormal current takes time to heat the fusible metal to melting point, thus introducing an element of uncertainty. Furthermore, a fuse does not give protection against a leakage of current less than that required to fuse it. In other words, a fuse so small as five ampere capacity will not prevent a four ampere leak, whereas with favourable conditions a leakage current of two amperes can cause a fire.

Early wiring work was also defective in respect to design and workmanship, the electrical distribution being effected on what is known as the "tree" principle, in which a main wire feeds branch wires, and these again feed still smaller wires. Construction of this sort necessitates the use of a large number of fuse points and electrical joints, fuses being provided wherever it is necessary to make a junction of a small wire with a larger one. The joints presented many chances for imperfect work and unless carefully made would give trouble. If two wires are joined together the electrical resistance of contact depends upon the perfection of the union; a slight or partial contact, say on account of rough or dirty surfaces, may mean high resistance, resulting in the production of excessive heat. The insulation of the joint is also an operation which requires care and experience, in order that the new insulating covering should be perfectly waterproof and mechanical, and correspond in effectiveness to the original protection. Carelessness in handling wires, besides damaging the insulating covering may, in the case of a brittle conductor, result in partial fracture of the copper under the insulating coating. Under these conditions the wire may become heated and an arc occur at the ruptured ends which can set fire to the insulation. Wires, again, which are too small for the current they are to carry become over-heated, or the same result is attained if translating devices are changed or increased whilst the "fuse" has been purposely changed or strengthened to allow the increased current. Accidental contact of an imperfectly insulated wire carrying a relative high voltage, with another designed for low voltage, can result in damage to the latter. The improper placing of wires or lamps, or the defects arising from poor and



defective contact of binding posts and switch terminals, can all become fruitful sources of trouble and swell the number of conditions by which electrically caused fires may result.

Most insurance companies preface their rules for electric wiring by reciting the principal sources of danger to be anticipated, including them under the following headings:—

1. Inferior material and workmanship, particularly in joints, fittings and connections.
2. Conductors of inadequate size and conductivity.
3. Perishable and inferior insulating materials.
4. Dust, dirt and moisture.
5. Undue heating.
6. Neglect of frequent testing and inspection.

In the light of our previous examination of the possibilities by which electrical fires may ensue, we see that these conditions might be broadly summarised as troubles arising mainly under three headings:—

1. Imperfect insulation.
2. Imperfect conductivity.
3. Imperfect workmanship.

#### Results.

The insurance companies after their recitation of the danger conditions add a paragraph by way of confirmation that no installation will be accepted by them as a "risk" in which all these conditions are not adequately provided against. It has already been stated that hitherto the experience of the English fire insurance offices has apparently been a singularly fortunate one, and although each office may hold records of the actual electrical fires which have come under its notice, no attempt (so far as the author is aware) has been made to classify in detail the causes which have produced them. Some inspectors may even urge that the fires have been too few to give real indication as to weak points in English wiring practice, but whatever the argument advanced, the utility of examining and considering the experience of some other country can hardly be questioned. The author holds therefore that the remarkably rapid and extensive development of the electrical industry in America, even though attended with a great number of electrically caused fires, may, if we are willing to make an unprejudiced examination, put us in possession of much practical and useful data which can well be studied with profit to ourselves.

In the United States the insurance authorities have been forced by their serious losses to establish a special bureau whose sole work is to examine and test electrical apparatus, collect and record particulars of electrical fires, and determine in detail their probable origin and cause. The results and deductions are very carefully arranged and tabulated in quasi-public reports.

An examination of the reports\* of these electrically caused fires shows that a classification can be made under the headings we have already employed. We find that troubles from defective "insulation" or defective "conductivity" are included under the general term "conductors," whilst "inferior workmanship" includes constructive defects which occur in wiring material other than the conducting wires, as well as those arising from chance or accidental injuries. The records show that defects in "conductors" cause nearly 70 per cent. of the total fires occurring, whilst "imperfect workmanship" accounts for the remaining 30 per cent.

If we arrange the headings in a tabular form, we find that the defects of conductors are ascribed to "crosses," "grounds" (earth leakage) and "short circuits."

In fairness to our comparison, however, we should note that fully one-third of the "conductor" troubles arise from "crosses" between the wires of different systems of electrical supply, such as telephone and telegraphic wires, with electric light or electric railway "trolley" wires, and between the two latter systems themselves. These fires have been caused by insulation breaking down before a very much higher voltage than that it was intended to withstand, and would not have occurred if greater precaution had been taken to prevent such possibilities. They occur in the United States on account of the method of overhead wiring so largely followed for outside work upon the score of economy. They inculcate a lesson which may be taken as showing the wisdom from a fire-risk point of view of the English practice of putting all outdoor electric light or railway wires underground.

Analysing further, headings can be made showing that the "grounds" come chiefly from "structural ironwork," "moisture," "metal pipes," "nails" and "overloaded wires," whilst "short circuits" result from "unprotected wires through floors," "flexible cords," "metal pipes," "fixtures" (chandeliers and electroliers) and "wood casing."

Upon analysing the cases of fire which occur from "poor

workmanship" and "defective material," we see that "imperfect contacts" and "connections" alone give rise to as many fires as all those occurring in the translating devices themselves combined.

Tables I. and II. give in synthetic form the analysis of the conditions causing electric fires. The subdivisions may be taken as representing approximately equal numbers of fires, the most prolific cause in each section being placed first, the others ranging in relative order:—

TABLE I.  
DEFECTIVE "CONDUCTORS" CAUSE 70 PER CENT. OF THE ELECTRICAL FIRES RECORDED, AS THE RESULT OF—

"CROSSES" OCCURRING WITH	"GROUNDS" CAUSED THROUGH	"SHORT CIRCUITS" ARISING FROM
Telegraph or telephone wires with electric light wires. Do. with "trolley" wires. Electric light wires with "trolley" wires	Structural or other metallic work. Moisture (electrolytic trouble). Metal pipes (unprotected). Nails. Overloaded wires.	Unprotected wires through floors. Flexible cords. Metal pipes and fixtures. Wood casing.

TABLE II.  
"IMPERFECT WORKMANSHIP" AND DEFECTIVE MATERIALS CAUSE 30 PER CENT. OF THE ELECTRICAL FIRES, AND ARE—

"CARELESS" OR "ACCIDENTAL," RECORDED UNDER	(or) "INHERENT" OR "INCIPIENT," BY REASON OF
Imperfect contacts and connections.	Transformers. Safety fuses. Switches. Arc lamps. Incandescent lamps. Motors. Lightning discharges.

#### Deductions.

These records when examined give us not only a statement of the actual hazardous arrangement which was the cause of trouble, but point out also how the destructive effects could best be counteracted. They indicate firstly that "leakage" should be prevented as much as possible, and secondly that the formation of any arc consequent upon "leakage" or "short circuit" should, if possible, be localised in its effect. Further, it shows the necessity of somehow preserving intact the insulation of the wire, even though the troubles incidental to a conductor may arise. Although theoretically we endeavour to provide an insulating covering which may be considered sufficient to withstand ordinary usage, the occurrence of fire from such causes as "structural metal-work," "moisture," "metal pipes," "nails," &c., show the severity of the accidental conditions which may be encountered in practice. Wires are called upon to withstand damage from being dragged over rough floors, trodden upon by wiremen or labourers and other untoward damage incidental to construction work. We know that the waterproofing and moisture-resisting qualities of the insulated wires in use depend entirely upon the completeness of the covering, and also that the best material can be damaged by careless workmanship or unskilful manipulation; whilst it needs only the presence of moisture to set damaged insulating material on fire. We seek in practice to supplement this evident lack of essential mechanical qualities by providing that wires shall be installed in wood casing or metal pipes. But before examining the relative merit of these practices, should we not ask ourselves whether there is any possibility of gaining greater certainty from the insulating covering itself by making some other disposition of it which may be better suited to the conditions arising within or without it? Paradoxical as it may appear at first sight, insulating material, inflammable, if simply laid upon a wire, can in a large measure be made self-protecting if applied about a wire. Perhaps I can best illustrate the principle I wish to impress by taking an ordinary piece of paper, which is in itself inflammable and easily ignited from the flame of a lighted match. If the paper is now wrapped around itself so as to form a tube, although it can be ignited by an outside application of the flame it cannot be ignited by inserting the lighted match inside it. Practically it is impossible to maintain a flame within the limits of a tube scarcely larger in diameter than the burning material itself. Such an enclosure acts as a snuffer, and its quality of suffocating combustion is in a great measure independent of the inflammability of the material of which the snuffer may be composed. May not this principle be applied to the insulation of electric wires in order to meet the condition that the over-heating of an electric conductor can set fire to the insulation around it? Having noted this fact, we reach the point of this paper to demonstrate the advantages of a method of wiring, which is in reality a well-

\* The author would here acknowledge his indebtedness to Mr. William H. Merrill, jun., the electrician to the Electrical Bureau making these reports to the National Board of Fire Underwriters, for copies of same and permission to make extracts.



worked out scheme of supplementing (perhaps eventually even supplanting) the present method of attaching the insulation to the wire itself, by providing a system of insulating tubes into which the conducting wires can be drawn. Incidentally also, it may be shown that such a system of insulating tubes is not, as some have asserted, simply an additional charge on the first cost of an installation, but one which from its sufficiency, "reliability" and immunity from break-down brings more than sufficient economical compensation to merit any additional cost.

#### *Methods of Wiring.*

As before stated, the inherent lack of mechanical strength in insulating coverings is recognised and some method of protecting them adopted. In England most of the electric-wiring work has been installed in wood casing. Owing to the fact that the greater percentage of the work already done has been installed in old buildings which may be considered "dry," perhaps the slight property of mechanical protection that wood casing can give to an insulated conductor may, in this class of work, be considered as being fairly well utilised. Wood casing, however, possesses many defects; it can absorb and retain moisture, and retaining it will rot. If leakage occurs, the wood being inflammable will first char and then take fire. Being combustible it also presents a medium for spreading and increasing a fire.\* If desirous of proving the unsuitability of wood casing, the experiment should be performed of securing two conductors of opposite polarity on a wet board, when if the insulation on the wires has been damaged it will be found that "leakage" readily takes place, and that so small a current as 2 amperes is more than sufficient to set the wood on fire. Tests made by the United States Electrical Bureau show that wood casing can absorb moisture to the extent of 15 per cent. of its weight, and that every kind of treatment in the way of "painting" or "impregnating" with moisture-repelling varnishes or fire-resisting compounds must be considered ineffective, both from the electrical standpoint of "moisture-proofing" and from the fire-insurance standpoint of "fireproofing." The report on this matter expresses the opinion that wood is undesirable for "supporting or encasing electric conductors," and concludes with the significant remark that "it was to be hoped that fewer feet would be installed in future construction work." The main arguments advanced by advocates of wood casing are its ready applicability and its possibilities for decorative effects. Whilst these may, perhaps, have some merit if the location is dry and mechanical disturbance is unlikely, it will now probably be generally allowed that, in view of the uncertainty of maintaining the necessary conditions, wood-casing construction is certainly not applicable for new building work, and is certainly destined in time to be succeeded by more perfect methods.

Without wishing to make an evil prediction, the author would desire those insurance companies still upholding the use of wood casing to be on their guard lest they shall find themselves nurturing this practice under the aegis of tradition.

The demand for perfection in mechanical armouring has led to the introduction of ordinary iron pipes, and a considerable amount of wiring work is now going on in which the two electric wires are simply drawn into an iron pipe. The writer contends, however, that this is only an intermediate stage in the development of electric wiring, and that time will again demonstrate that the pipe protection must not only provide mechanical, but electrical, qualities also. In the case of plain unprotected metal piping, we know that the effect of imperfect insulation on one conductor at a single point may be transmitted throughout the piping system, and await the occurrence of a second fault at any point upon the other conductor. When this occurs, unless the fuses happen to be small enough in size and act properly, it is quite possible that a hole can be "burnt out" of the pipe at one or even both of the defective points. Those who urge that "fusing" can give protection in the above condition surely ascribe greater perfection to this device than is consistent with absolute safety. Most of the fuses in practical use will easily carry from 100 to 200 per cent. more current than their standard rating. Generally also the placement of the fuse is left to the judgment or experience of the constructing wireman and afterwards to whoever may be in charge of the installation, and should it at any time become necessary to increase or enlarge the translating devices, there is no means of counteracting the desire to replace a small fuse by one of greater carrying capacity. In any case, when it is shown that over-heating or leakage trouble can be obviated in a more perfect manner, I maintain that it is not the best practice to depend upon fuses as "safety" devices. Such fuse construction is certainly hazardous and seriously menaces perfect and uninterrupted service.

Again, those who state that they are willing to depend entirely upon the perfection of the insulating covering surround-

ing the conductors cannot surely have had practical experience with ordinary iron pipe construction. Anyone who has cut an iron pipe in two will allow that a "burr" is formed on the inside edges of the severed ends, which is sharp enough to abrade or tear any insulating covering. This means that every piece of plain iron pipe cut up on an electric wiring job must, if safety is to be ensured, be carefully and effectively reamed out. It is not satisfactory to feel dependent for good service and safety upon this condition, for can we hope that every wireman will give exact and careful attention to this point—or feel at ease in the hands of new or careless men? On the other hand, if an insulating lining is placed inside an iron pipe it inherently provides against the most wilful carelessness that can be suggested or the worst "burr" that can be made.

With an insulating lining all doubt is removed as to the interior smoothness of the tube, and, providing the proper thickness of lining is chosen, no burr can be caused to cut through it into the inside of the tube. The possibility of moisture and electrolytic trouble is prevented, and not only is the insulating material on the conductors placed under favourable preservative conditions, but the further safeguard is provided of an imperishable insulating protector permanently ensconced behind an effective iron armouring.

Furthermore, experience has demonstrated the necessity of insulating electric fixtures from the gas-piping of the building, because if this is not done a defect occurring on the electric fixture would be transmitted throughout the gas service. The insurance rules state that it is "entirely inadvisable" to combine electric-light fittings with gas-fittings, and allow such practice only under the protection of an insulating joint. Surely those who would advocate plain iron pipe for electric wiring, entirely overlook these determinations?

Many instances can already be quoted where the union of gas with electric fittings has resulted in disaster to both, either lighting agency having the ability to release the other. The author believes that practical experience will show that where gas or water systems are used concurrently in the same building with electric wires, unless an auxiliary insulation is provided between the insulated conductor and the metal piping system, unlooked for troubles will occur.

The main argument that can be advanced by plain iron pipe advocates—that of lower first cost—does not hold if regard is given to uninterrupted service and to the future.

At the present time there are advocates to be found for "earthed" wiring systems, one method suggested being the use of a single insulated wire within an ordinary iron pipe. The pipe is to form the return conductor, and is to be guarded against as such. Under the conditions which pertain to such a system the advantages arising from an insulated lining inside the pipe are apparent, because any over-heating of the conductor would be effectually guarded against, and there would not be the possibility of a "short circuit" burning out the iron pipe. It is also suggestive to notice that on such a metal-pipe-return concentric system an insulating joint at the fixture outlets would be entirely out of place, since its insertion would break the metallic continuity of the return circuit. Combination gasfittings connected with it would, therefore, present a fire hazard. On the other hand, a bare copper wire insulating-lining-metal-pipe concentric system would have the advantage in these respects. Although an "earthed" wiring system can be advocated on the score of low first cost, the writer believes that the difficulties it introduces (if not insurmountable in extended practice) should only be approached with diffidence, and therefore prefers (for the present) to advocate a system in which both lead and return conductors are insulated and enclosed under the covering of an armoured insulating tube.

(To be concluded.)

#### ABERDEEN UNIVERSITY BUILDINGS.

THE two ancient Universities of Aberdeen were amalgamated under the Act of 1858 as the University of Aberdeen, and the continuance in perpetuity of the University is provided for by the Act of Union between Scotland and England. In 1889 an Act was passed which devolved the buildings and property upon the University Court, and an annual grant was given by the Government, which, when reinforced by a share of the equivalent grant, amounts to 14,400*l.*, which has to be devoted to salaries, library and administration, except to the extent of about 700*l.*, which is available for repairs and maintenance of existing buildings, but not for the erection of new. The Act also provided for the appointment of a commission for organising and extending the scope and teaching power of the departments of the Scotch Universities, and the effect of the commissioners' ordinances on this University was to add a new faculty—that of science—as well as to expand the four former faculties, and largely to increase the building requirements in respect of laboratories, museums, &c., in almost all the departments of the University, while it made no provision for supplying the buildings to accommodate them. The University was

\* A conspicuous instance of this imperfection occurred so recently as October last at the Prince of Wales's Theatre, where a serious calamity was only averted by the effective action of those in charge.



in these circumstances, compelled to build, but had no funds for the purpose.

A movement was therefore started in 1891 for meeting this demand. A large and influential committee was formed, and application made to the Treasury for assistance. In 1892 Mr. Goschen, then Chancellor of the Exchequer, agreed to give a grant of 40,000*l.* if the public subscribed a similar sum. Up to the present the appeal has been successful with the public to the extent of 75,000*l.*, and, with the Government grant, 115,000*l.* have been raised and expended, while the works at present in progress entail a further liability upon the University of fully 21,000*l.* To meet this exigency, as well as to complete the buildings extension scheme and the still urgent necessities of the University, a total sum of at least 40,000*l.* is required.

In this jubilee year of the Queen's accession it is felt to be appropriate to make an appeal for the completion of a building whose foundation as a modern structure was laid in 1837, and which is therefore a coeval monument of Her Majesty's long and beneficent reign.

### GLASGOW ARCHITECTURAL ASSOCIATION.

AT a meeting of this Association, held in the rooms, 107 Pitt Street, on Tuesday, the 6th inst., Mr. Wm. Tait Conner, in the chair, Mr. Wm. Fraser read a paper on "The Influence of Economics on Architecture." He showed the bad effect the present land tenure had on architecture, how, especially where leases of a limited period existed, the buildings were built only to last out the lease; how building for profit, and not for use, tends to depreciate our art, as the great proportion of the buildings in Glasgow are erected by the speculative builder, whose aim is to make a profit, and not to erect the best building he can. He showed also how the unequal distribution of wealth, competition and the subdivision of labour were against the appreciation of good architecture and unfavourable to thoughtful design and good workmanship. The remedy he suggested was collectivism, which, he said, would give greater opportunities for good architecture, as buildings would only be erected when required, and not as profitable speculations. There would be no glaring inequalities in wealth with the ostentation of riches and the degradation of poverty. The worker would be well fed, and be sure of employment, and could therefore take greater delight in it and produce better things. There would be no need for work being cut down to the cheapest point to make things pay, for buildings would be erected for the good of the community, who would take a delight in seeing their own property beautiful. On the motion of Mr. James Craigie, a hearty vote of thanks was awarded to the essayist.

### OPEN SPACES IN LONDON.

THE joint committee of the Commons Preservation Society, the Kyrle Society, the Metropolitan Public Gardens Association and the National Trust for Places of Historic Interest or Natural Beauty have appealed for funds in order to acquire and preserve open spaces for the benefit of the Metropolis. The following are the spaces which it is considered desirable to secure:—

1. Riverside Ground, Wandsworth.—Twenty acres, in poor locality, price 31,300*l.* The District Board has agreed to give 10,000*l.*, and an application for a grant has been made to the London County Council, but it is expected that not less than 7,000*l.* will have to be raised from voluntary sources. Chelsea, Battersea, Putney and Fulham all possess public riverside grounds, Wandsworth only has none. A space adjacent to the Thames is equivalent to a far larger area inland.

2. Churchyard Bottom Wood, Highgate.—Fifty-three acres of charming woodland. The price, 25,000*l.*, named by the owners, the Ecclesiastical Commissioners, is extremely low. The offer holds good until June. Ten thousand pounds subscribed by the Hornsey District Council, 2,000*l.* by Islington Vestry, 3,000*l.* by residents in the locality, thus leaving about 10,000*l.* to be raised by a more extended appeal.

3. Bowes' Mahor, Wood Green.—Thirty-two acres of well-timbered estate, with an interesting old house, price about 20,000*l.* In a very rapidly increasing neighbourhood, the population chiefly consisting of the poorer and middle classes. If this opportunity is lost, no other land is available; earnest efforts are being made, and a local committee has been formed to promote the scheme, but outside help to the extent of about 10,000*l.* will probably be required.

4. Pymmes Park, Edmonton.—Fifty acres of park land, with an interesting house, price about 30,000*l.*; 30 acres of the above are already held on short lease as a public recreation ground by the district council. The council are anxious to buy the whole, which otherwise will be built on, but the district is too poor to purchase it unaided. The council would probably subscribe 10,000*l.* and have appealed to the committee for further help. Owing to workmen's trains with a

return fare of 2*d.*, there is a large and increasing influx of London working classes, the bigger houses being pulled down and replaced by cottages let at weekly rentals of 5*s.* to 10*s.* Population increased fourfold since 1871. Therefore this recreation ground is urgently required and should be saved from builders. About 15,000*l.* will be needed from outside.

5. The Chestnuts Estate, South Tottenham.—Eleven acres with good trees and house, price about 9,000*l.* The district council would probably purchase, if aided by voluntary assistance to the extent of about 4,000*l.* District similar in character to No. 4, only much larger and probably poorer, having a population of about 80,000, chiefly of the working classes. About four acres of common adjoin this estate, to which it would form an excellent addition.

It will be seen that some 50,000*l.* is requisite to supplement local efforts in order to carry out these five schemes for adding some 160 acres to the open spaces of London and its suburbs. Any persons whose interests may be aroused are earnestly invited to view the places or to make inquiries for themselves.

Funds will be received by this committee for any specific object or for application generally at the discretion of the committee, if the donor so prefer.

### EDINBURGH ARCHITECTURAL ASSOCIATION.

UNDER the leadership of Mr. Hippolyte Blanc, R.S.A., the members of this Association on the 10th inst. visited Niddry and Duntarvie Castles. The former, situated in Kirkliston parish, Mr. Blanc described as a fair example of an early keep, one showing the first development from the simple square tower. The doorway in the inner angle enters upon a circular staircase leading to the several floors, now in ruin. The walls average 9 feet thick. The foundation of the tower was ascribed to George, fourth Lord Seton, probably in the last quarter of the fifteenth century. The castle receives prominence in history as having in 1568 afforded shelter and protection to Queen Mary. During the troublous times of Charles I. and II. the castle and lands passed to the family of Hopetoun, the castle giving the title of Baron Niddry to Lord Hopetoun. Duntarvie Castle, situated in Abercorn parish, Mr. Blanc explained, was a residential manor-house of about 100 years later date than Niddry. It presents a large rectangular building, 80 feet long, facing south, with projecting wings at the extremes on the north side. This castle was in marked contrast to Niddry, the walls being so much thinner. There was much evidence to associate the period of foundation with the end of the sixteenth or beginning of the seventeenth century. The castle continued habitable until quite recently, and is now in ruin. Mr. Blanc was heartily thanked for his contributions.

### GENERAL.

The Rev. S. A. Barnett, whose Easter exhibitions of pictures during the last twenty-four years have been an advantage to Whitechapel, has appealed for funds to erect a permanent gallery in the parish. The cost of land, building and endowment would be at least 20,000*l.* Gifts amounting to 7,000*l.* have been offered, and a site adjoining the library, approved as sufficient by Mr. Harrison Townsend, architect of the Bishopsgate Institute, might be obtained if purchased within a fortnight.

The Corner-Stone of the new chancel of Croyland Abbey was laid on the 8th inst. The work now in progress is carried on as nearly as possible on the lines of the old work. The new chancel is simply the removal of the recently erected east end to the next bay or to the original western arch of the north transept. By this addition the unique Norman arch of the nave will be greatly strengthened.

The Sudden Death of Mr. R. S. Parker, the esteemed principal of the well-known building firm Patman & Fotheringham, of Theobald's Road, is announced. We are informed that the important business of the firm will in future be conducted by Messrs. James F. & Alfred E. Parker.

At the Ordinary General Meeting of the Surveyors' Institution held on the 5th inst., the president, Mr. Daniel Watney, in the chair, a paper was read by Mr. Walter Simms (Fellow), entitled "London—An Appreciation." The next ordinary general meeting will be held on Monday, April 26, when a paper will be read by Mr. W. H. Payne, L.C.C., entitled "Local Authorities and the Building Laws."

A Street in Volo, Thessaly, has been named after the late Mr. C. Chaloner Ogle, a young architect of great promise, who while on his travels in Greece had drifted into journalism, and was barbarously murdered in 1878 by the irregular soldiery under Amoussa Aga, a Turkish major and chief of the police in Thessaly, whose enmity he had incurred by his denunciation of an atrocious massacre at Boulgarini, a village near Volo.



# The Architect.

## THE WEEK.

AMONG Metropolitan builders until a comparatively recent time one of the most important firms was that of Messrs. LAWRENCE in Commercial Road, Lambeth. It was closely associated with City works, for the founder of the firm was WILLIAM LAWRENCE, of whom it is recorded, "that when the approaches to the new London Bridge furnished an opportunity, at that time unprecedented, for at once making large provisions for the necessities of a rapidly-increasing commerce and adorning a City which greatly needed the graceful art of the architect, Mr. LAWRENCE had sagacity enough to avail himself of the occasion and public spirit enough to improve it so as at once to decorate the Metropolis with creditable buildings and to lay the foundations of his own fortune." Four of his sons carried on the business of contracting during several years, and when they retired it was made over to their principal assistants, an example of generosity which is almost without parallel in the history of industrialism. One of the sons was the late Sir WILLIAM LAWRENCE, who died on Easter Sunday. He was one of the most respected notabilities in the City. Born in 1818, he succeeded his father as alderman of the Bread Street Ward in 1855. Three years afterwards he served as sheriff, and in 1864 he attained the dignity of Lord Mayor. During his mayoralty he opened Southwark Bridge after it was freed from toll. In 1865 Alderman WILLIAM LAWRENCE was elected as one of the members for the City. He was knighted in 1887. Sir WILLIAM LAWRENCE was one of the most useful members of the Corporation, and he used his position, as well as his wealth, in aid of many philanthropic works. His brother, Sir JAMES CLARKE LAWRENCE, is also an alderman, and a second brother is member of Parliament for the Truro division of Cornwall.

ON Easter Sunday the last service was held in the church of St. Pierre, Montmartre. The building is, in part, ancient, and is supposed to be in a dangerous condition. Accordingly the Government has ordered its demolition. A great many antiquaries are opposed to the decree. As the most ancient among the Paris churches it should, they say, be treated with more respect, and it can be made safe without an excessive outlay of money. Just now, however, officials are not disposed to rely on the judgment of architects. The collapse of the vaulting of the church at Brousse, in the diocese of Albi, when several of the congregation were killed, has had the usual effect of magnifying the indifference or the ignorance of architects, although ten years ago a local architect endeavoured to persuade the Administration about the danger of the building. That catastrophe was preceded by some others in Paris, and as a result of the prejudice there is not likely to be any reprieve of the church of St. Pierre. A part of the building dates from the twelfth century, but it is mainly of a much later period, and presents a combination of Renaissance and Gothic details. One municipal councillor is anxious to have the building upheld in order to convert it into a museum of the relics of Old Montmartre which are at present huddled in the Mairie.

THE sub-committee appointed by the Edinburgh Town Council to examine the sites suggested for the proposed Usher Hall have prepared their report. The adoption of the Charlotte Square site is recommended by a majority, although the opinion of those who are competent to judge in Edinburgh is opposed to it. The sub-committee say that if the Usher Hall is not erected on one side of the square the permanence of the square in its present form is not secured. The report offers the following explanation:—"Causes are at work which may render change inevitable; and, even if the Corporation in self-denial refrain from erecting the hall there because of a feeling that the design should not be interfered with or destroyed, the permanence of the design would not be secured, but would still be in constant danger. After buildings have stood for a hundred

years, while the developments and changes of the city around have been going on, and are still going on with ever-accelerating speed, it cannot be expected that these alone will be untouched by change. The causes which have changed Princes Street and St. Andrew Square from dwelling-houses to business premises of a money value which would have seemed fabulous to the citizens in the beginning of the century cannot be expected to spare Charlotte Square. Even if it be held that the present buildings in the square form an architectural feature of great value which cannot be found in any other part of the city and will never be reproduced, this does not form a reason for objecting to the hall being placed there, unless it is affirmed that in the public interest it is necessary to maintain this unique and characteristic feature permanently in its present form. But no proposal has been made to secure such permanence. If it is realised that change ere long is inevitable, would it not be better that the Corporation should have the control of the design which is to replace the present, rather than that it should be replaced by eleven different buildings of miscellaneous designs, and at different times, according to the tastes or requirements, for business or otherwise of the individual owners? The objection which rests on the idea of securing the continuance of the present symmetrical design loses much of its force when it is seen that the rejection of the proposal to place the hall there would not secure that continuance. In the case of CROALL against the Magistrates of Edinburgh, December 20, 1870, 9 Macpherson, 323, the Court of Session held that there is no binding restriction against the proprietors in Charlotte Square making alterations upon the elevations of their buildings, so long as they do not build upon their back greens. It would be too sanguine to expect that a site will remain for ever devoted to dwelling-houses which is required in the market for banks, insurance offices, and other business premises commanding a much higher price. It seems more probable that the process which has been seen in St. Andrew Square and Princes Street will be repeated in Charlotte Square ere many years are over, even if there was no proposal to place the new hall there. In fact, that proposal gives the only chance to secure the maintenance, in part at least, of the present façade and that any change shall be for a public purpose, instead of at the will of unconnected private owners." In conclusion the sub-committee recommend that the requisite steps should be taken for acquiring the site. It will be observed that the committee are not able to refer to any definite project for the transformation of the square with the exception of their own.

THE annual spring visits in connection with the Architectural and Building Construction classes of the Glasgow Technical College were made a few days ago—the places selected for special study this year being Edinburgh and Chester. The visit to the former city took place on Monday, 19th inst., when a party of about thirty students was conducted by Professor GOURLAY, who had made arrangements for studying the more important works of architectural interest—ancient and modern—in Edinburgh, including St. Giles's Cathedral, St. Mary's Cathedral, St. Margaret's Chapel in the Castle and the McEwan Hall, while the Museum of Science and Art received much attention in respect to its interesting collection of architectural and other remains. The visit to Chester was made by a party of ten students under the guidance of Mr. JAMES LOCKHEAD, A.R.I.B.A., and extended over four days, which time was principally occupied in studying by sketching, measuring and photographing in and about the cathedral, St. John's Church and the numerous half-timber houses and fronts with which the city abounds, and of which the time at disposal only permitted too brief an examination.

THE space which will be allowed to foreign exhibitors in the Paris International Exhibition of 1900 is to have an area of about twenty French hectares, or nearly fifty English acres. But the foreign demands, if satisfied, would need double that quantity. It has required a long series of calculations to arrive at the result, but the more delicate subject of allotting the space has next to be encountered by the authorities.



## JAMES GANDON.

THE names of English architects are so quickly forgotten, it behoves all who are able to use an opportunity to recall their services, if it were only momentarily, and especially to the minds of those who are destined to share a similar fate. Such an opportunity is now presented to describe the career of JAMES GANDON. His name was not thought worthy of mention in the "History of Modern Architecture" by the late Mr. FERGUSSON. But any claim which Dublin can have to be considered as an architectural city depends mainly on GANDON's works. Their importance is so prized among the discontented exiles from Ireland in America, it is difficult to gain belief for the fact that they were designed by an Englishman, and one, too, who was a Huguenot by descent. It is commonly believed they were the works of Celtic architects. Indeed, there would be less opposition at the present time to the proposed enclosure of an arcade in GANDON's Custom House if it were known that its origin is to be credited to a stranger. GANDON was, however, only one among numerous English architects that from the time of the Invasion—seven centuries ago—devoted their talent to the adornment of Ireland.

Any impartial judge who considers the Custom House and the Law Courts (Four Courts), which stand by the side of the Liffey in Dublin, is likely to conclude they were designed by a man who by nature was endowed with constructive ability. And yet if it had not been for a reverse of fortune it is not unlikely that GANDON would never be included among the architects of the eighteenth century. He was born in London on the last day of February, 1742. GANDON early displayed a love of art, which was not a common weakness among young gentlemen in that age. When, owing to various misfortunes, it was found that his father could not provide an adequate income for him, young GANDON was wisely advised to be guided by his predilections. He joined the old Academy in St. Martin's Lane, and evidently he profited by the teaching, for in his fifteenth year he was able to gain a prize offered by the Society of Arts. About the same time WILLIAM CHAMBERS, who, although only twenty-nine, had gained much experience on sea and land, returned to London, and had resolved to set up as an architect, his first commission being the improvement of Kew Gardens. GANDON was able to gain employment from him, for CHAMBERS, knowing the English weakness for novelties, had resolved to tempt fortune with designs for buildings in the Chinese style, and he was likely to prefer a clever novice as assistant before one who had gained experience in the Classic style which then prevailed. Subsequently, when CHAMBERS's prospects of success as an architect became more assured, GANDON became his articled pupil. In his twenty-third year GANDON commenced practice as an independent architect. After the example of his master, his practice included the production of architectural books. In connection with JOHN WOOLFE he brought out the fourth and fifth volumes of the "Vitruvius Britannicus." Their respective shares are not to be ascertained, but apparently the greater number if not the whole of the plates were drawn by GANDON, and many of them were engraved by him.

Although a member of the Free Society of Artists, GANDON could hardly be opposed to the Royal Academy, which was founded mainly through the efforts of CHAMBERS. He was rather young to be included among the associates, and as a professional architect he could hardly care to be accounted a student. As was to be expected, the province of the Academy was not then fully defined, and the duties of the professor of architecture, which were confined to the delivery of six lectures, were mainly intended for the instruction of painters who might have to introduce buildings into the backgrounds of pictures. The offer of a premium for architecture, the subject being *A Triumphal Arch Commemorative of the Seven Years' War*, amazed GANDON. He says he was electrified. He ran off to consult PAUL SANDBY, who was one of the Academicians, and was informed that he was ineligible, for the competition was restricted to students of the Academy. GANDON immediately entered his name as a student, and apparently no more was required than to attend the lectures of the various professors in order to become qualified. In due time he was

awarded the gold medal. But before surrendering it the Academicians wished to impose another test. All the students of the architectural class were asked to submit impromptu designs, the subjects being determined by lot. An ornamental entrance to a park fell to GANDON, and his design was considered even more satisfactory than his triumphal arch. Sir WILLIAM CHAMBERS expressed satisfaction on finding his pupil so early distinguishing himself. It was probably no great victory, for GANDON's opponents were not able. But some interest must always be attached to the first winner of the medal. In the same year he responded to an advertisement from the merchants of Dublin, and submitted a design for a Royal Exchange. The first premium was awarded to THOMAS COOLEY, who was also an Englishman. GANDON received the second premium, and we need hardly say he was confident that to private interest the victory of his rival was due. He was successful in another competition for the new Bethlehem Hospital, a London work; but he was hardly more fortunate than in Dublin, for he was not entrusted with the erection of the building.

The neglect of GANDON, who was not offered many commissions for buildings during some years, may be explained by the difficulty which was found by the public in separating an architect's work from a builder's. CHAMBERS, although patronised by the Court, designed few buildings, and they were ordered by a special class of nobles. GANDON was less likely to be patronised. He had serious thoughts of abandoning England and accepting an invitation of the Princess DASHKOF to practise in Russia. In 1779, however, it was decided to erect a new Custom House in Dublin, and as GANDON's design for the Royal Exchange had attracted the notice of JOHN BERESFORD, the commissioner of Customs, he was requested to undertake the work. BERESFORD belonged to a pugnacious family, and apparently in making arrangements for the new building he enjoyed himself by ignoring all the rights of proprietorship which were attached to the site. The Corporation considered the ground belonged to the city, and as they were most loyal there would be no difficulty in arranging with them. But that course appeared absurd to BERESFORD, who was in all things an autocrat. Accordingly, after consulting GANDON, the Commissioner persuaded the Government to leave the affair in his hands. In the beginning of 1781 BERESFORD considered the time had arrived to start operations, and the following epistle which he sent to the architect will suggest the extraordinary strategy which was then adopted in dealing with public works in the Irish capital:—

Dublin: January 15, 1781.

Sir,—I have the pleasure to inform you that I have at length obtained an order from Government for the building of a new Custom House, with all possible expedition, and I have proceeded so far as to send to take possession of a large lot in the lower situation. I expect to accomplish this in the course of this week, and the sooner afterwards we can settle our plans the better. This business must be kept a profound secret as long as we can to prevent clamour, until we have everything secured.

Our first step will be to wall in the ground as soon as we shall get possession of it. This will discover us, and the clamour will then be made that there will not be sufficient room for shipping; to answer which, it will be right to have our plans for the new docks ready, to show the people how well they will be accommodated.

I therefore request you will turn your thoughts immediately to that subject, and, as I hope, we may hereafter claim you as our own, that you attend to us in the first instance, as the business is of a delicate nature, and must be managed still with dexterity, having the city of Dublin, and a great number of the merchants, together with what is considered as the most desperate of the mob, to contend with on this side of the water, and also some persons of high interest and weight on your side, who will make use of every exertion to prevent us.

However, a Custom House must now be built, so we shall now expect you, and I must beg to know when you think you can come over.

We shall wall in and carry on the dock as soon as we can, and the plans for the building may be adjusted during this period. I would recommend it to you to come by Liverpool by all means, as you will then see their docks, and procure every information about them. Let me hear from you immediately.—

I am, sir, your humble servant,

JOHN BERESFORD.

James Gandon, Esq.



It is manifest from what Commissioner BERESFORD wrote that the Government could have no title to the ground required for the building, docks and the other works which he contemplated. The letter suggests the indifference to law and equitable considerations which inspired officials in those days, and by which the loyalists of Ireland were estranged from the Government of their country. The Corporation invoked the interference of the judges, who decided against the Government. The people were only too glad to have a share in the contention between the imperial and municipal authorities, and the hoarding was thrown down with the acquiescence and in the presence of the High Sheriff. That was on a Saturday. BERESFORD was in his glory. He gave orders that on the Sunday the hoarding was to be again set up, and he advised GANDON to prevent all opposition and to "laugh at the extreme folly of the people." GANDON was inflamed by the combativeness around him. He resolved to bear a part in the scrimmage. He wrote: "Having been in early life a good swordsman I am determined to defend myself to the last." We suppose the mob could not fail to admire so much courage, and they may have thought that the works could never be carried out on so unsuitable a spot.

Generally, ground beside a river is a difficult place on which to erect heavy buildings. In Dublin there are geological peculiarities along the Liffey. About thirty years ago it was necessary to take down a large goods store which formed a railway terminus before one ton was placed on the floors. The site was not far from the Custom House. Careful boring was undertaken before the store was started, and it was ascertained that a bed of the hardest gravel existed at a certain depth below the surface. The foundations were carried up from it, but it succumbed under the weight, and then it was discovered that the ordinary geological arrangement was reversed, for the hard gravel was a mere covering to a bed of soft peat.

GANDON found he had to deal with an enemy that was not to be scared with a cane sword. For the north side and wings there was no difficulty in obtaining a secure gravel foundation, but with the south front adjoining the river it was otherwise. The great cupola which gives so much character to the building was also to be provided for on a soil of which water appeared to be the principal constituent. GANDON was without the aid of such pumping machinery as can be now obtained on moderate terms, and the endeavour to oppose the power of a navigable river by scoops and hand-pumps is too interesting a feat to be described in any words but his own. He said:—

The labourers had scarce got down 2 feet below the surface when they came to water, which four men emptied with scoops as they continued to extend the line of trenches, which were carried on in short lengths, and, for convenience, of different depths. It became necessary to make dams across parts of them with sods, and to empty the water from the lower to the higher dam, until it was at last sent off in a drain prepared for that purpose, our pumps not being then ready. The ground was opened first at the north and continued round to the east front; then to the south end, where a boiling spring with sand appeared at about 4 feet below the surface, which filled up as fast as it was cast out. It extended for a considerable distance. Inch and half sheeting piles, about 7 feet long, were driven down with a maul to keep up the bank, and sods were fitted in layers between it and the piles, which prevented the sand from being washed out, thereby enabling the men to clear out the trenches to the depth required. The general texture of the ground was gravel, mixed in some places with a layer of blue clay and sand, under which was a hard strong gravel. When the trenches were thus prepared and cleared out, the rough masons then proceeded to carry on the first bench or course with all possible expedition with the black stone, and immediately filling in with earth, in order to give less water to the pumps. In the meantime another length, and of the same depth, was got ready, and an additional number of masons set to work. In this manner the whole was continued until all was brought up to the level of the ground.

The quay wall or road on the south front was an old embankment, made about the year 1725. It was 60 feet wide at top and badly constructed; the walls of black stone; its foundation laid on the surface of the strand. On the side next the river it was 12 feet high, but on the inside only 8. The filling between the walls was a sand used for ballast. The base of the foundations stood at least 6 feet above the bed of the river; the tide not only soaked under them, but filtered in several places through the joints of the masonry. It was

therefore deemed most prudent to commence with the north-east wing, after the portion of the store-room, it being less liable to be incommoded with water from the river.

Directions were now given for excavating that part of the centre of the south front for the cupola and portico, and as this advanced so near the river we were certain of much obstruction from the flowing of the tide, which was the only water that now gave us any trouble, for the springs were now pretty well dried and kept under. The pumps hitherto used were but 13 or 14 feet; we now used two of 18 feet in length. As the ground altered in its texture towards the river, becoming more loose, with small sandy gravel, like that of the south-west angle, to which depth we had sunk, we deemed it prudent to bore it in several places which were near the angles of the front of the portico, but particularly where the walls of the cupola were to be erected, to the depth of 8 feet below the then surface, and it appeared to be much of the same substance as that already described. A pile, 10 feet long and 1 foot square, was driven down in the centre to 9 feet depth, but after twenty strokes of the ram it could be driven no further, which assured us that we had got down to firm ground.

Upon consulting with the principal artificers on the spot, it was thought advisable to desist from sinking any more, but to make an artificial foundation, in order to sustain the great weight of the cupola; but whether by piling or otherwise was submitted wholly for my consideration. This part of the work had long occupied my thoughts, and to it I had given every attention, my conjectures having led me to expect great difficulties on this subject. I had nearly made up my mind as to the means I should adopt, and was the more strongly confirmed in my intentions, having remarked a circumstance which escaped the notice of those around me. Immediately after the pile had been driven I perceived a small stream of water arising up close all around it, as if it had pierced a spring; and recollecting an observation in Labeyle's account of Westminster Bridge, "that piles sometimes loosen and open fresh springs, which often make it very difficult to get rid of the water," I was now apprehensive of just such an impediment. The great expense of preparing the piles, and the very long time it would take to drive so great a number as would be required presented a strong objection to the use of them. I therefore gave directions to have a grating of Memel timber prepared, the timber to be 1 foot square, to have the upper ones notched down 3 inches in the ground pieces, which were to be bedded on a layer of cut heath, the whole ground being first correctly levelled; the interstices of the grating to be filled in with hard sound stock-bricks up to the level of the timbers, swimming in mortar composed of pounded roach-lime and mortar well mixed, which answered nearly as well as tarras; over which was laid 4-inch fir plank fastened down on the grating with oak trennels, which was all completed. The foundation-walls were then set out on September 17. The part directly under the cupola was laid with rough blocks of mountain granite in regular courses; in the first course was sunk an iron chain of flat bar 4 inches wide and 2½ inches thick, into collars which were run with lead, but the bars were only covered with a cement of wax, resin and stone dust. The rest of the foundation was done with the usual black stone and was carried up to the plinth by October 16, 1782, thereby completing the whole of the foundations in one year and four months from the opening of the ground.

The authorities should have respect for a building which exemplifies so marked a victory over physical obstacles. From its character as well as its position it cannot be enlarged, but to block up the open arcading of the south front will be an act which must be deplored, for it means a debasing of the building. If a general transformation took place, it would form a less hideous spectacle than will be the consequence of the official proposals. The Custom House is a masterpiece which would impart dignity to any city in Europe. It will bear a comparison with the chief work of GANDON'S master, although it was erected with a more limited sum of money. The effect of adaptation can be judged in Somerset House, and the opinions which have been expressed about that experiment should be enough to compel the Government to hesitate before committing a second blunder. In Dublin the effect will be more hideous, for the alteration will be equivalent to destruction.

The next work on which GANDON was engaged was the Parliament House, now used as the Bank of Ireland. He was commissioned to carry out alterations which were probably intended to conceal the impending fate of the building, for as the Union with England was decided on there was not much use in expenditure to provide a special entrance for the Peers. Although without height the Parliament House is an impressive building. But when GANDON was called in it was less attractive than it is now.



It possessed the colonnades which unite to form the principal feature, but as the building stood between private houses on the east and west sides, it could hardly be considered as complete, and seemed to be a sort of screen to something which, in order to see it properly, the spectator must stand elsewhere. The genius of the unknown designer appears more remarkable if we consider the restrictions imposed on him, by which he was practically limited to the forming of a passage around three sides of an open court to a building which was almost concealed from view. GANDON's duty was to remove the adjoining houses and to substitute lateral porticoes. The Ionic order was adopted in the original structure. On the eastern side, in which a special entrance to the House of Lords had to be formed, he decided to employ the Corinthian. It is popularly supposed that the variation was dictated by the peers, who assumed that their dignity would be suggested by the superior order. But GANDON may have discovered that, owing to the difference of levels, he could not employ Ionic columns of the same dimensions as those in the colonnades; he would be forced to impart more height to them, and, as the lesser of two evils, it was therefore preferable to set up a Corinthian portico. The contrast between the two styles is more apparent than was contemplated by GANDON, for the banking company added several Ionic three-quarter columns in order to insure the unity of appearance which was considered desirable. The western side of the building was also much altered afterwards, and GANDON cannot be held responsible for it. There is now an Architectural Association in Dublin, and the members could usefully employ themselves in the preparation of drawings which would suggest the various changes of the building.

At the Parliament House GANDON had to take up the work of a great architect, whose name remains unknown. In his next commission he was to complete the Law Courts, which were commenced by COOLEY, his successful rival in the competition for the Exchange, and who died in 1784. The group of buildings, like the Custom House, is on the side of the river. The quadrangles were already erected, and for all we know to the contrary the planning of the central part was to some extent arranged by COOLEY. However, the circular hall and the courts are supposed to be GANDON's work, as well as the dome above the hall, the portico, &c. But in this case also there was a conflict of authority, and in consequence GANDON dared not realise his intentions. After the laying of the first stone by the Lord Lieutenant, and before the crowd had dispersed, a travelling carriage arrived containing a gentleman whose name GANDON does not mention, but as he describes him as having "considerable fortune and influence, a privy councillor, and a member of the Irish Parliament, from whom, on my first arrival in Ireland, I had experienced considerable attention and hospitality," there is little doubt it was BERESFORD. In an uncourteous tone the mysterious stranger demanded to know what was going on, why the quay was enclosed, &c. "I informed him," records GANDON in his diary, "of the reason for enclosing the ground, and stated that, as the architect, I was no way responsible for the situation of any public building, but merely acting as a professional man, employed by Government, had been requested to make designs for new Courts of Law, adjoining the law offices which had been previously erected. I stated I had submitted my designs to the Lord Lieutenant, who, with the Lord Chancellor and chief judges, had, on consideration, approved of the design and had given directions for the building to commence." But the stranger was not to be satisfied, and declared that if the building proceeded it should be pulled down. GANDON consulted Lord PORTARLINGTON, and was advised to set back the portico; but, as he says, "even this sacrifice of my design was not sufficient, for as the gentleman had not been consulted about the building he disapproved of the designs, which he condemned in every particular, stating the most singular objections." In its new position the portico was valueless, and conveyed the notion that it was only one among several shams.

The position of the Law Courts in Dublin could not be defended, and the reason for the selection of such a site is not easily discovered. But when the courts were erected it would be reasonable to conclude that lawyers would con-

gregate in the neighbourhood. Once more perversity prevailed, and it was decided to erect "the King's Inns," or substitute for the "Temple" in London, at a more remote distance from the centre of the town. GANDON obtained the commission, and although his building is rarely seen by visitors to Dublin, for it stands in a wretched quarter, it is an interesting example of architecture. Additions have not improved it, but the original façade to the garden shows skill in composition. GANDON had discovered an Irish sculptor named SMITH, and in order to utilise his talent he flanked the entrance to the dining-hall with figures of Plenty and a Bacchante as caryatids, while at the corresponding entrance to the Prerogative Court Security and Law appear. There are also reliefs of Queen ELIZABETH presenting a Bible and a charter to the Irish lawyers and prelates, Wisdom, Justice and Prudence offering one sort of sacrifice, and Bacchus and Ceres offering another. Architectural ornament is liberally introduced within and without.

GANDON was supposed to be competent to direct all kinds of construction in stone, and when a new bridge had to be erected, the commission came to him as a matter of course. It was known as Carlisle Bridge, but a quarter of a century ago it was removed as it was not equal to the increased traffic, and a wider and more level bridge was substituted.

GANDON was too shrewd a man and too closely connected with the Government to be indifferent to the perils which might arise to a stranger who could be made responsible for the errors of those in authority by ignorant people. The coming events of the Rebellion were casting their shadows, and the architect considered it was wiser to leave the King's Inns unfinished and to seek safety in England. There he remained for two years. On his return he found there were more changes than he had anticipated. The operations which were needed to bring about the Union did not sweeten the official temper, and the lawyers who were uncertain about their future were glad to utilise the incomplete King's Inns as an excuse for grumbling. Money for the works was doled out grudgingly. GANDON endured his fate as well as he could, but when at length the Lord Chancellor, who was an Englishman, joined the discontented critics, he was compelled in self respect to resign all his appointments. But he had become attached to Ireland, and having purchased a small estate at Lucan, a few miles from Dublin, he lived there until 1823. It is believed that by his desire he was buried in the grave in which his old friend FRANCIS GROSE, the antiquary, was lying for thirty years, the "dainty chiel," the "fine, fat, fodge wight, o' stature short but genius bright," beloved by ROBERT BURNS, and who, after so many drinking bouts, had fallen a victim to Irish conviviality.

#### COST OF ELECTRIC LIGHTING FROM PUBLIC AND PRIVATE SUPPLY.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

THIS subject has, of late, been brought into prominence by inquiries in the electrical journals; and as I have had several cases to consider, and at present have the matter before me, advising with reference to a private installation at a large institution, it may be of interest to republish some curves which I recently prepared, showing the cost of electric lighting from supply mains and from a private plant, in order to show clearly when it is approximately advisable to adopt a separate plant.

In these curves gas-engine plants of less than 50 horse-power have been considered, and they will not apply to a much larger plant.

In their preparation assumptions have been necessary, and they are given in full, but they may be altered, and the curves will not lose their value owing to any uncertainty as to the kind of assumptions made.

The charge for attendance has been taken as 20s., plus 2s. 15s. 6d. per kilowatt installed; or, what is the same thing, 20s. plus 20d. per lamp on at one time per annum; where plant is provided for the whole of the lights to be run at one time, and where 15 units per 8 candle-power lamp per annum are consumed.



An amount equal to 10 per cent. of this is added where plant is provided for half the lamps on at once, and 20 per cent. for quarter-lamps on at once. The charge for attendance is 20 per cent. higher when 30 units are used per 8 candle-power lamp per annum than when 15 units are used.

The capital expenditure on plant and works has been taken as follows (including accumulators) :—

Kilowatts installed.	£	Kilowatts installed.	£
1.2	240	9.0	600
2.4	300	18.0	950
4.5	420		

The interest on the capital, and depreciation and repairs have been taken together as 10 per cent. of the outlay per annum.

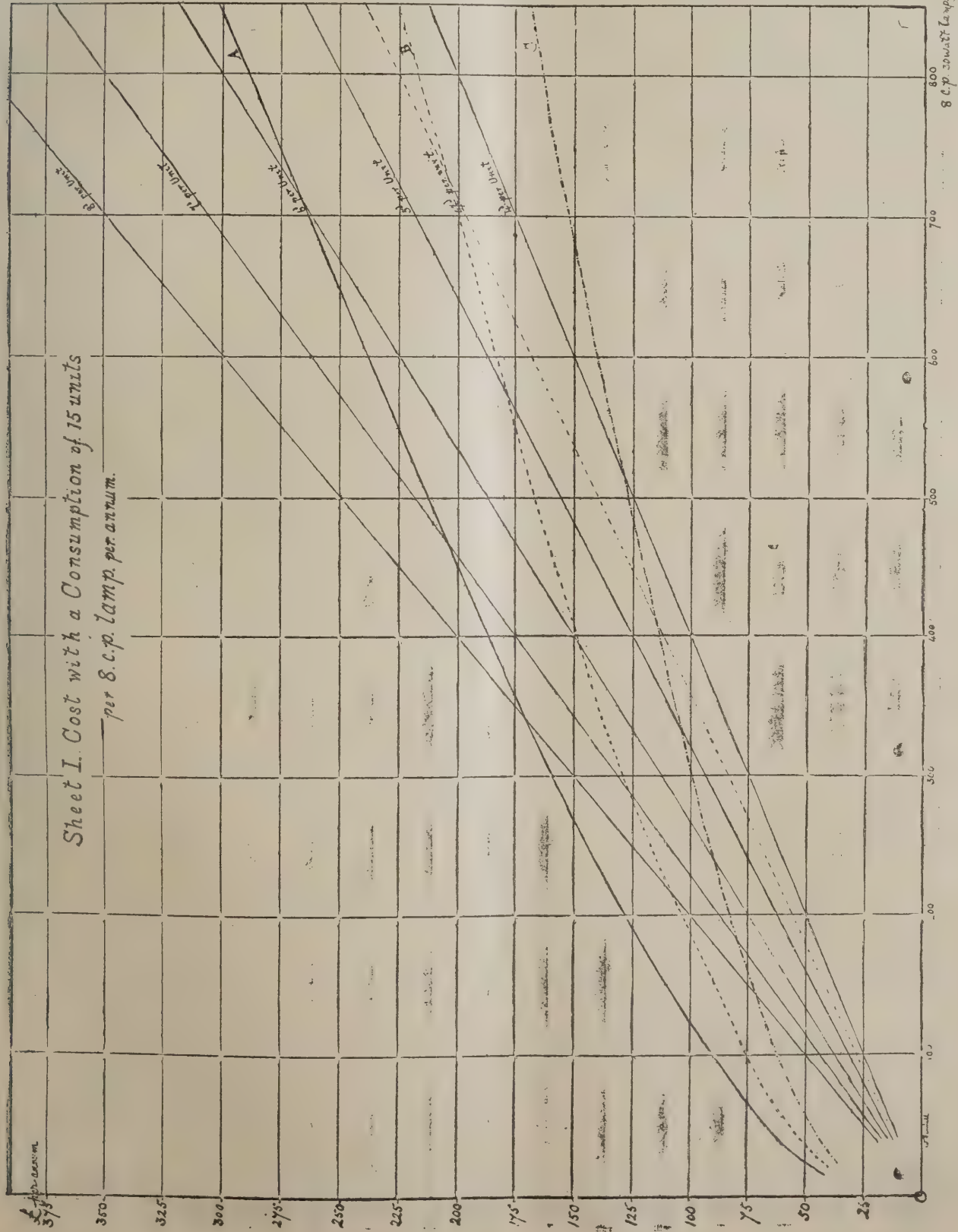
The charge for oil and stores is taken at 2 $\frac{1}{2}$  ros. per kilowatt.

The gas consumption is taken to be as follows :—

Kilowatts installed.	Cubic feet per unit.	Kilowatts installed.	Cubic feet per unit.
1.2	56	9.0	42
2.4	53	18.0	32
4.5	49		

Price of gas—2s. 6d. per 1,000 cubic feet.

The plant estimated for does not include any reserve with the exception of the accumulators, as it is assumed that there is a connection with the supply company's mains. It has been questioned whether a supply company, or local authority, can be compelled to make a connection. I am of opinion that the undertakers under a provisional order must make a service connection for any applicant





within the area of supply, and cannot demand a guarantee to pay for any fixed quantity per annum beyond that allowed by the provisional order, if the applicant bears the cost of the connection.

The cost of running the private plant has been taken to be the sum of:—

Interest on capital, depreciation and repairs, cost of attendance, oil, stores, &c., gas, accumulator renewals (at 10 per cent. per annum), and rent of gas meter.

The cost for current only, from supply mains, is compared with the above. All expenses which are common to both, such as wiring, fittings, &c., have been excluded.

#### Explanation of Curves.

The horizontal ordinates show the number of 8 candle-power lamps (30 watt) installed, the vertical ordinates the cost per annum.

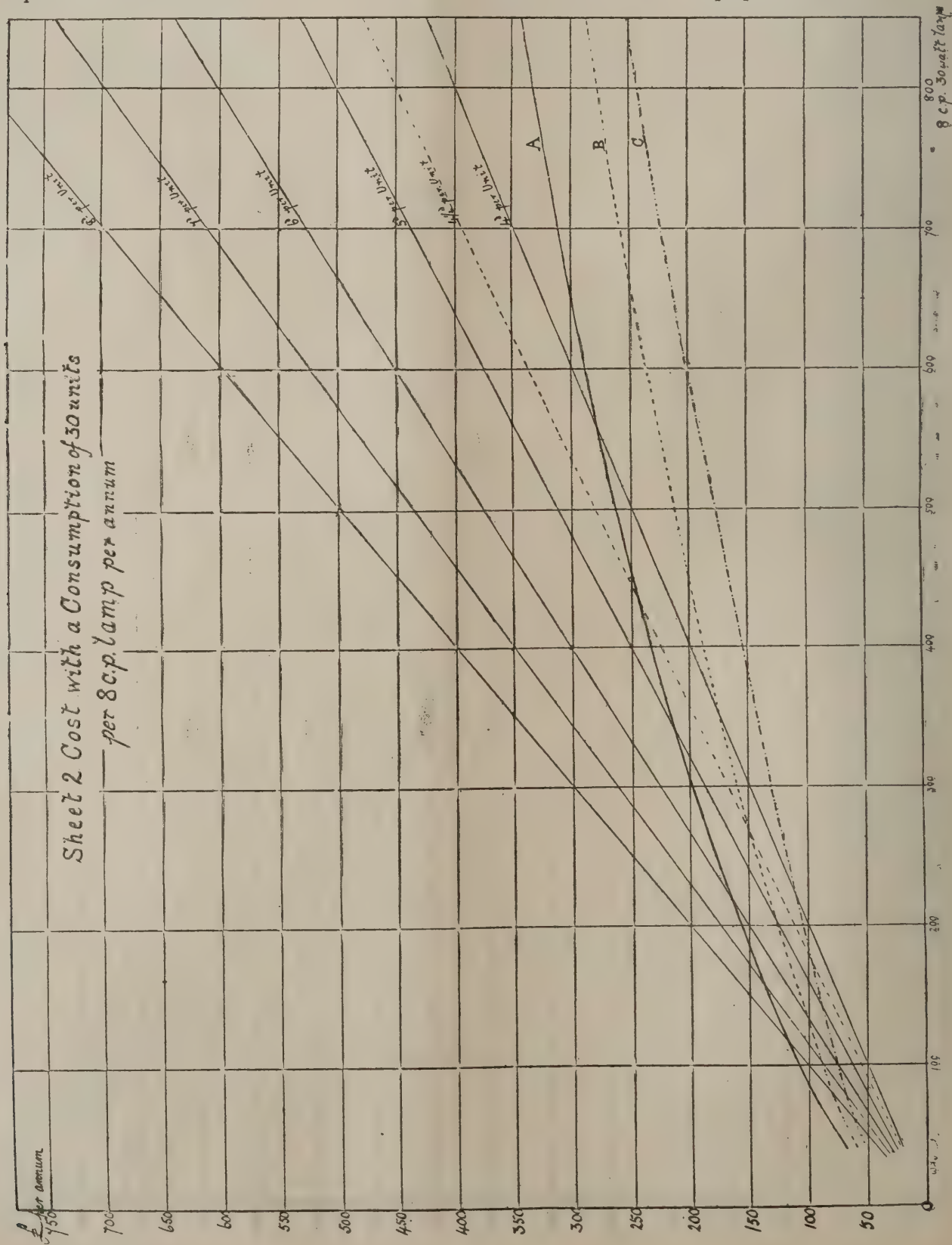
The thin line curves refer to current from supply mains, and the price per unit is marked on each.

The thick line curves show the cost for current when a separate plant is provided.

The full thick line shows cost when plant is provided for all the lamps to be running at once. The line dotted - - - - shows cost when plant is provided for half the lamps to be on at once, and the line dotted — . — . shows cost when plant is provided for quarter-lamps to be on at one time.

The curves on diagram 1 are worked out on a basis of 15 units per 8 candle-power lamp per annum, and those on diagram 2 for 30 units per 8 candle-power lamp per annum.

*Example 1.*—To find the least number of lamps which can be economically worked from a private plant where current can be obtained at  $4\frac{1}{2}d.$  per unit.





It is evident that a line drawn representing the cost of current at  $4\frac{1}{2}d.$  per unit (see thin dotted line) will cut the thick ones at three points on each sheet :—

## DIAGRAM 1.

15 units per annum.

- (a) All lamps on at once, about 1,200 lights.
- (b)  $\frac{1}{2}$  lamps on at once, about 725 lights.
- (c)  $\frac{1}{4}$  lamps on at once, about 410 lights.

## DIAGRAM 2.

30 units per annum.

- (a) All lamps on at once, about 435 lights.
- (b)  $\frac{1}{2}$  lamps on at once, about 270 lights.
- (c)  $\frac{1}{4}$  lamps on at once, about 170 lights.

It is also evident that these numbers of lamps can, under the different conditions, be run at the same cost by either method.

The highest estimate is 1,200 lamps, and the lowest comes out at 170 lamps of 8 candle-power. This result explains to some extent the widely different results given by different experts to the same question in the *Electrical Review* of December 25, 1896.

If, however, the units consumed per 8 candle-power lamp per annum and the maximum number of lamps usually required at once are specified, the number of lamps can be given accurately. Suppose 22 units are used per 8 candle-power lamp per annum, and that half the lamps are required at once, then the number is the mean of the two, line (b), i.e. 725 and 270. Result, 500 lamps (approximately).

Owing to the anxiety caused by a private plant I should say that, under the above conditions, it would pay to lay down a private plant if there is an equivalent of 600 8 candle-power lamps connected.

In any case, where the units consumed are less than 15 or more than 30 per 8 candle-power lamp per annum, the method here described, of taking proportional parts, will not apply, and the problem must be worked out separately.

*Example 2.*—To find the annual saving by running a separate plant for 400 8 candle-power lamps, using 30 units per annum each (or about 1,000 hours burning), where a supply can be obtained at  $4\frac{1}{2}d.$  per unit.

Referring to diagram 2, thin dotted line, the cost of current is 225*l.* The cost, if a private plant is used, is (a) 233*l.*, (b) 189*l.*, (c) 155*l.*

Thus there would be no saving if plant is provided for all the lights at once, 37*l.* per annum if plant is provided for half the lights at once, and 70*l.* per annum if one-quarter of the lights are provided for at one time.

If the number of units is between 15 and 30 per 8 candle-power lamp per annum, proportional parts may be taken between the results of diagrams 1 and 2, as in the last example.

It will be noticed that the ratio of the plant provided to the total number of lights has a very great effect on the point when it will pay to provide a separate plant. It is not necessary to instal plant sufficient for the greatest number of lights ever on at once. The plant can be laid down sufficient for the usual maximum; rock-over switches can be placed on each sub-circuit, so that one or more circuits can be switched over to the mains in case of an abnormal load, or in case of any breakdown of the plant. These rock-over switches could also be used at times of fairly light load, when the demand is too low to warrant the starting of the engine, and when it is too heavy for the accumulators to undertake.

The points which I wish to emphasise are :—That the units consumed per 8 candle-power lamp per annum, and the usual maximum demand have a great deal to do with the question of when it will pay to instal a separate plant, and that, unless these figures are known, no answer can be given to the question.

In conclusion, it must not be imagined that these curves are intended to take the place of the advice and assistance of a consulting engineer, as there are many special conditions, considerations and questions which cannot be introduced into a curve; but I think they will prove of value (if the assumptions are studied carefully before the results are taken for granted) to architects who wish to know when (given ordinary circumstances) it will pay to put

down a separate plant. They will be even more useful to those who wish to see what effect the varying of the units consumed per lamp and also of the maximum demand has upon the point when it will pay to discard the public supply.

I am greatly indebted to the editors of the *Electrical Review* for their permission, kindly granted, to reproduce this article in its almost original form.

## EDINBURGH ARCHITECTURAL ASSOCIATION.

THE next visits of the session take place on Saturday, April 24, and (by kind permission of Mr. Charles Gulland, commissioner for Mr. George Johnston, of Bavelaw) will be to Bavelaw Castle, which is beautifully situated on the northern slope of the Pentlands, about two miles from Balerno Railway Station. It is of seventeenth-century date, on the L plan, with a small additional wing at the south-east angle. The kitchen has a fine arched fireplace and window adjoining. The entrance into a wheeled staircase is on the east side. The elevations are characteristic of a Scottish house of a late date. There is, too, Lennox Tower, situated about one mile west from Currie, on the summit of a lofty ridge on the right bank of the Water of Leith. It has been an important structure and of great strength, is isolated on all sides and surrounded by extensive earthworks. The main structure is an oblong keep, measuring 57 feet by 33 feet 2 inches, with walls about 7 feet 6 inches thick.

## GOTHIC ARCHITECTURE.

SIR JOHN SOANE used to tell students of the Royal Academy in his lectures emphatically that Gothic architecture was anything that was not Grecian. Wren unfortunately called it "a gross concameration of heavy, melancholy and monkish piles." But Wren was blind to the beautiful details of Gothic architecture, although he appreciated those of its scientific construction and its general forms, as his well-known reverence for King's College Chapel, Cambridge, which he declared to be inimitable; and his clumsy imitation of York Minster in his west front of Westminster Abbey; his pseudo-Gothic of St. Mary, Aldermary; his almost beautiful imitation of Magdalen Tower, Oxford; in that of St. Michael, Cornhill, tacked, by the way, to a Doric interior; and his singularly beautiful spire of St. Dunstan-in-the-East, although disfigured by Roman mouldings, abundantly testify. Nor must the Gothic construction of some of the concealed parts of St. Paul's Cathedral be omitted in this category of Wren's blindness to the beauty of this style, or of his willingness to be taught by such an enemy to the taste he revered. It is painful to speak thus of a man like Wren, but his fame as a mathematician, and as the greatest constructive architect that England has produced, besides his many other eminent qualities in the highest branches of learning and science, will more than counterbalance this defect, although not a small one. Another architect has declared that Grecian, Roman, Byzantine, or such like architecture used in ecclesiastical edifices is Pagan and unchristian; as did Taylor the Platonist declare, in as dictatorial a manner, that all who did not believe in the religion of the Platonist school were infamous, daring and Galilean. What says the anathematiser of Pagan and unchristian edifices to the "Pagan and unchristian" style of the cathedral of the Christian world, or the beautiful Christian churches of Michel Angelo, Raphael, Bramante, Palladio, Scamozzi, and other Christian architects of the Medicean period of Italian art? William Hazlitt justly compares the correctness and chastened rules of Grecian architecture to those of the Greek tragedians, and the elements of its style to the purity of their incomparable language. "A Doric temple," observes this discriminating critic, "differs from a Gothic cathedral as Sophocles does from Shakespeare." The principle of the one being simplicity and harmony, governed by severe rules; that of the other richness and power, directed more by fancy and taste than by too rigid an observance of scholastic discipline. The one relies on form and proportion, the other on quantity and variety and prominence of parts. The one owes its charm to a certain union and regularity of feeling, the other adds to its effects from complexity and the combination of the greatest extreme. The Classical appeals to sense and habit, the Gothic or romantic strikes from novelty, strangeness and contrast. Both are founded in essential and indestructible principles of human nature.

New Sunday Schools which have been erected in connection with the Castlemere Chapel, Rochdale, were opened on the 15th inst. The schools, which will accommodate 700 persons, have been erected at a cost of 3,500*l.*



## NOTES AND COMMENTS.

It is not satisfactory to learn that the finances of the University of Cambridge are in such a state the new buildings which are so urgently demanded cannot be erected. According to a correspondent of the *Times*, who evidently writes with authority, "More space is urgently needed for the University Library; the School of Law is without a home, though a site for one is available; lecture-rooms are wanted for classics, history, philosophy, languages, music and other subjects; the executive officers of the University are without suitable offices; for many examinations rooms have to be hired in the town, and the antiquarian and ethnological collections are robbed of a great part of their usefulness by the want of a proper museum." It cannot be said that the authorities of the University are indifferent to the necessity of suitable buildings, for the greater number of the museums and laboratories which are to be found in Cambridge were unknown thirty years ago. Nor is the deficit owing to the greed of Fellows. In seventeen colleges the corporate income has been diminished by 35 per cent.; in only two colleges can the full fellowship be paid, while in some what is received is no more than a third of the normal amount. There are endowments for specific purposes, but it appears the free endowment revenue of the University is considerably under a thousand a year. The colleges are expected to contribute to the University expenses. On the basis fixed in 1877, it was anticipated that last year the amount would reach 30,000*l.*, but all that was paid was 22,000*l.* The demand for more expenditure arises from the inadequacy of the buildings. Efficiency is now maintained by self-sacrifice on the part of teachers, but that strain cannot always be endured. Cambridge is essentially the representative of modernism, and if it is to keep pace with the advances of science there must be outlay which will enable it to compete with foreign universities. How that end is to be attained demands the attention of all who wish to see England hold its own in the highest educational planes.

THE completion of the Pont Alexandre III. in Paris will be watched with much curiosity, for an effort is to be made to produce a steel bridge which will be a work of art. Two architects, MM. CASSIEN-BERNARD and COUSIN, are co-operating with the engineers, MM. RESAL and ALBY, to that end. At each extremity will be two pylons formed of four columns of white marble, rising to a height of 20 metres, which will bear bronze figures of "Renown;" at the bases, for which Finland granite will be used, there will be figures of France and Russia in war and peace. In front of the pylons will be pedestals with figures of Victory. The balustraded parapets will be in wrought copper and bronze, terminating in figures suggestive of the branches of the Seine. There will be twenty-eight figures of white marble carrying lamps on the superstructure, and in the centre an immense number of electric lights forming a constellation. The steel arch will be partly gilded, and with the marbles and bronzes it is expected a colour scheme of extraordinary richness will be realised.

THE Americans are congratulating themselves on the completion of the Congressional Library in Washington, and if we consider how well sculpture and painting are made to subserve architecture in it the building is deserving of all their admiration. There is, however, one stigma upon it which must diminish its interest in the eyes of architects at least. In an elaborate description by Mr. ORVIS, published in *Architecture and Building*, it is explained that the architects, Messrs. SMITHMEYER & PELZ, "received practically no commission or pay for their work, on which they had been employed for over twelve years." After their appointment the architects, in order to facilitate arrangements, accepted salaries instead of advances on the advice of the chairman. But from the time the works were commenced the Congressmen meddled with the operations, and eventually the control was handed over to an officer of engineers, for in the United States as in England the sappers and miners are always prepared to undermine an architect's position on public works. Mr. SMITHMEYER

resigned, but Mr. PELZ was allowed to remain, as without him the working drawings could not be prepared. After three years he was also superseded. Messrs. SMITHMEYER & PELZ then claimed 2½ per cent. on an estimated outlay of 7,000,000 dols. At the trial several of the most prominent architects gave evidence in support of the claim, while not one could be found to testify against it. Instead of 170,000 dols., the Court assessed the damages at 48,000 dols., ignoring the evidence that the outlay amounted to a much larger sum. Circumstances compelled the architects to accept the money, and after the expenses of the lawsuit were paid they found there was left a sum which was "scarcely a sufficient equivalent for the services of a third-rate draughtsman." The indebtedness of America to them for an able work is ignored, and the credit appears to be given to others. Mr. ORVIS says "That they are this day still obliged to fight for their own, and will in all likelihood be compelled to do so, no one knows for how long, fills all who know these facts with sympathy," and in that sympathy Messrs. SMITHMEYER & PELZ can be assured English architects will not fail to join.

A SANITARIAN who visits the palace of Versailles should never inquire about the arrangements in which he has interest. In its palmy days it possessed only a single bath-room, which was never used. A colossal "vasque" of marble was placed in one of the corners of the building, but neither the Grand Roi nor one of his marshals could attain the courageous mood that was necessary in order to bathe in so much water. As the marble bath was useless, Madame DE MONTESPAN asked for it, and LOUIS XIV. was glad to be rid of so unnecessary a superfluity. It was placed as an ornament on the lawn of her property, the "Ermitage," and there it remains.

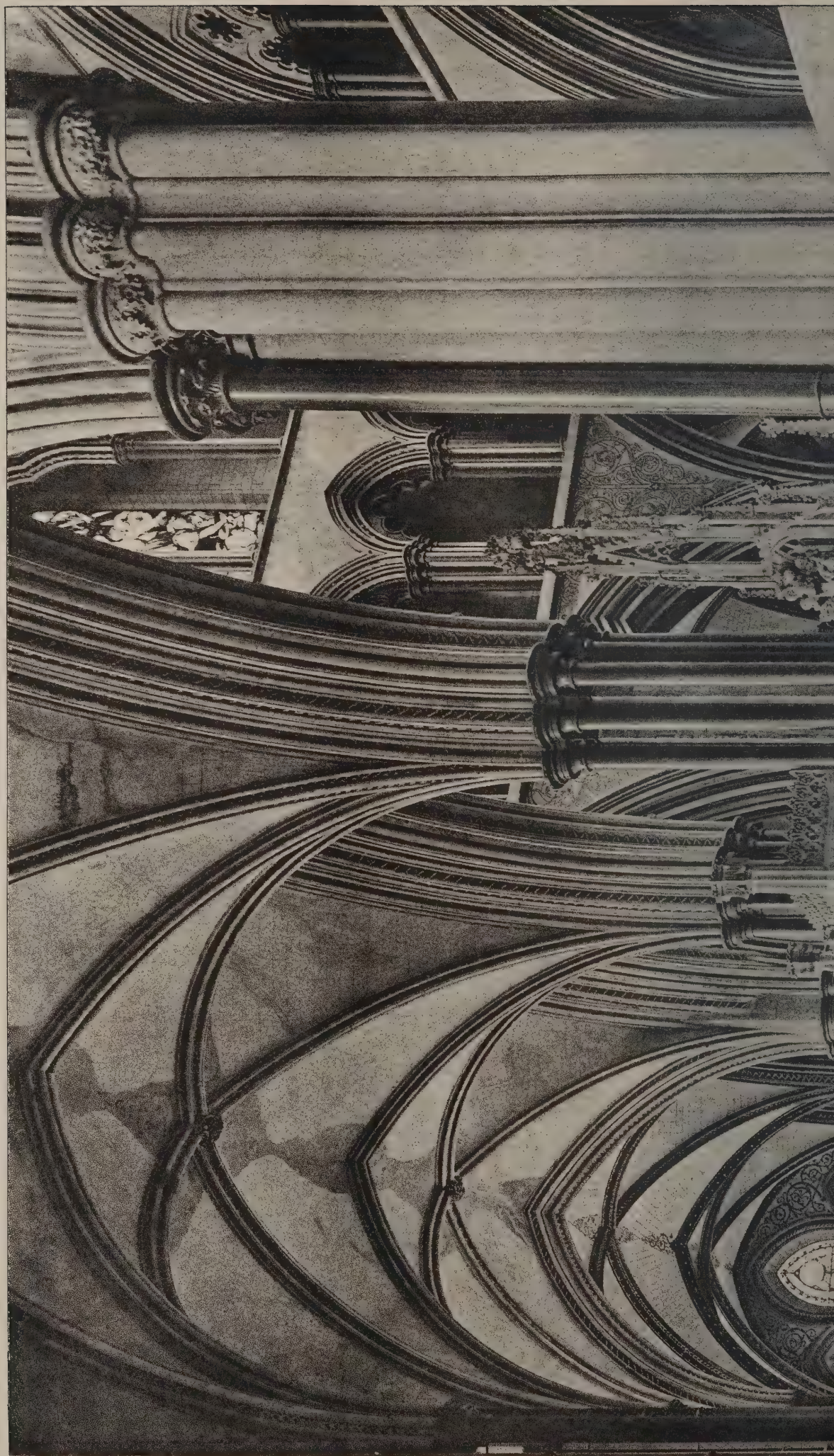
A SPECIAL committee of the Society of Beaux-Arts Architects in the United States have recommended the following conditions as essential to the fair and orderly conduct of a competition:—*a.* That a professional adviser shall be appointed by the party instituting the competition, whose duty it shall be to assist in the preparation of the programme, to assume all the direct relations with intending competitors, receiving and answering all communications, and giving all information in writing to all intending competitors alike; to examine all drawings or other matter called for by the programme, and place out of competition and return unopened any that do not conform to the terms of the programme; to make a selection of one or more designs, as the programme may direct, and to submit his selection, together with his reasons therefor, to the parties instituting the competition. *b.* If the proposed work is of sufficient magnitude, a jury of award of three experts should be put in charge, to consist of the professional adviser of the party instituting the competition, an architect nominated by a vote of the competitors, and a third, also either expert architect, and chosen by the other two. This jury to have the same duties and powers as above given to the expert adviser. *c.* A standing committee of experts, so chosen as to represent the various architectural societies, and exercising the duties of the jury, would give even greater guarantees of fairness and impartiality, and members of this Society are urged to use their influence towards bringing about such united action on the part of other societies as would enable competitors to ask for such a jury. *d.* The author of the best design to be appointed the architect of the work, with privilege on the part of the party instituting the competition of having a consulting architect without additional charge to them. *e.* The architect of the building to receive at least the rates of compensation established by the schedule of the American Institute of Architects. *f.* The programme to be full and explicit on all the above points, and, besides, to fix a definite time and place for the receipt of drawings, fix an exact limit of cost if practicable, give all useful or necessary information as to lot and surroundings and as to requirements for occupancy, fix the number, scale and character of drawings, give essential details as to construction and materials, and prescribe definite limits regarding descriptions, estimates, &c., which shall accompany the drawings.



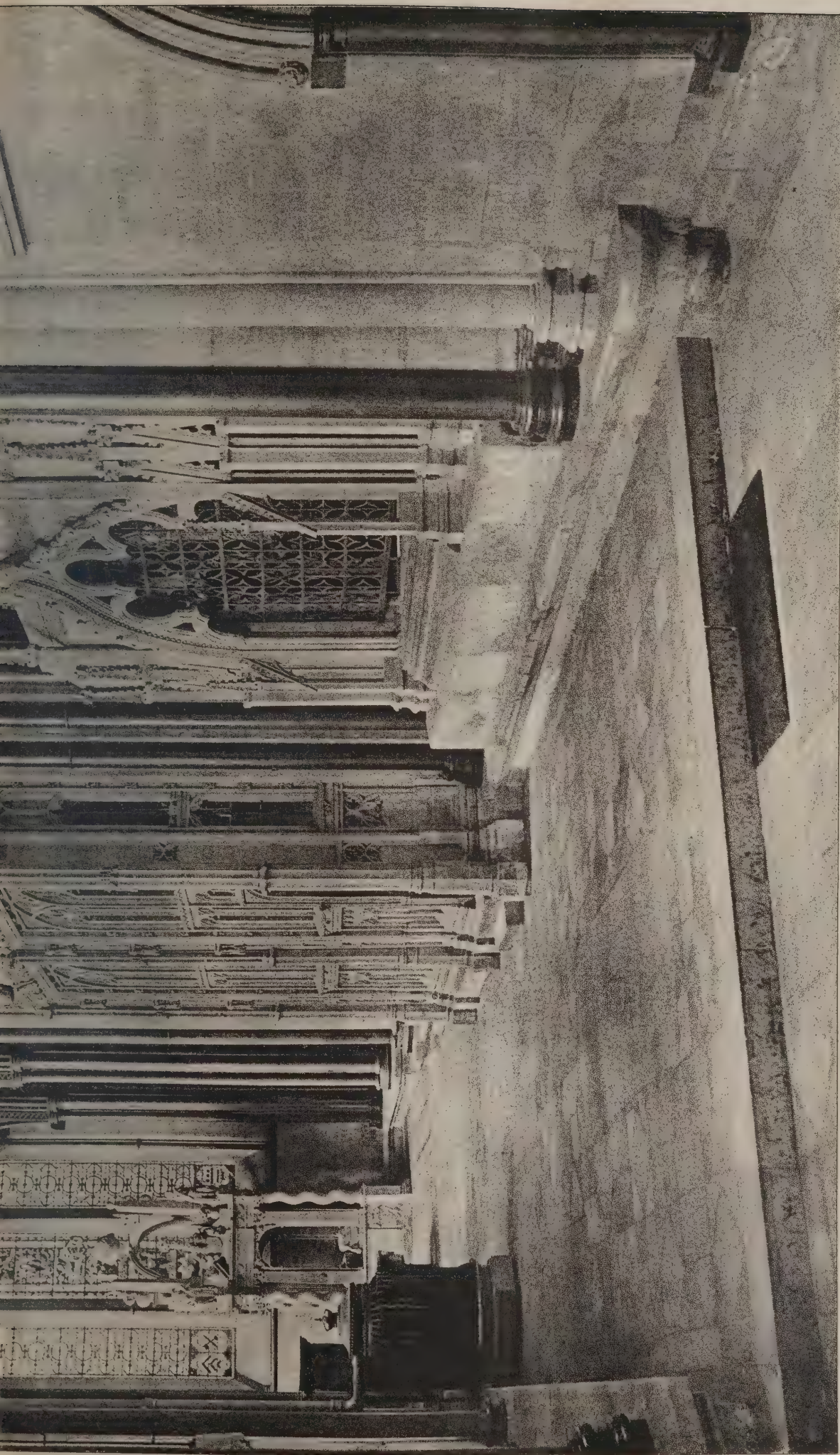




*The Architect, Apr 23<sup>rd</sup> 1897*







PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

INK- PHOTO SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 29.—SALISBURY: NORTH CHOIR AISLE.

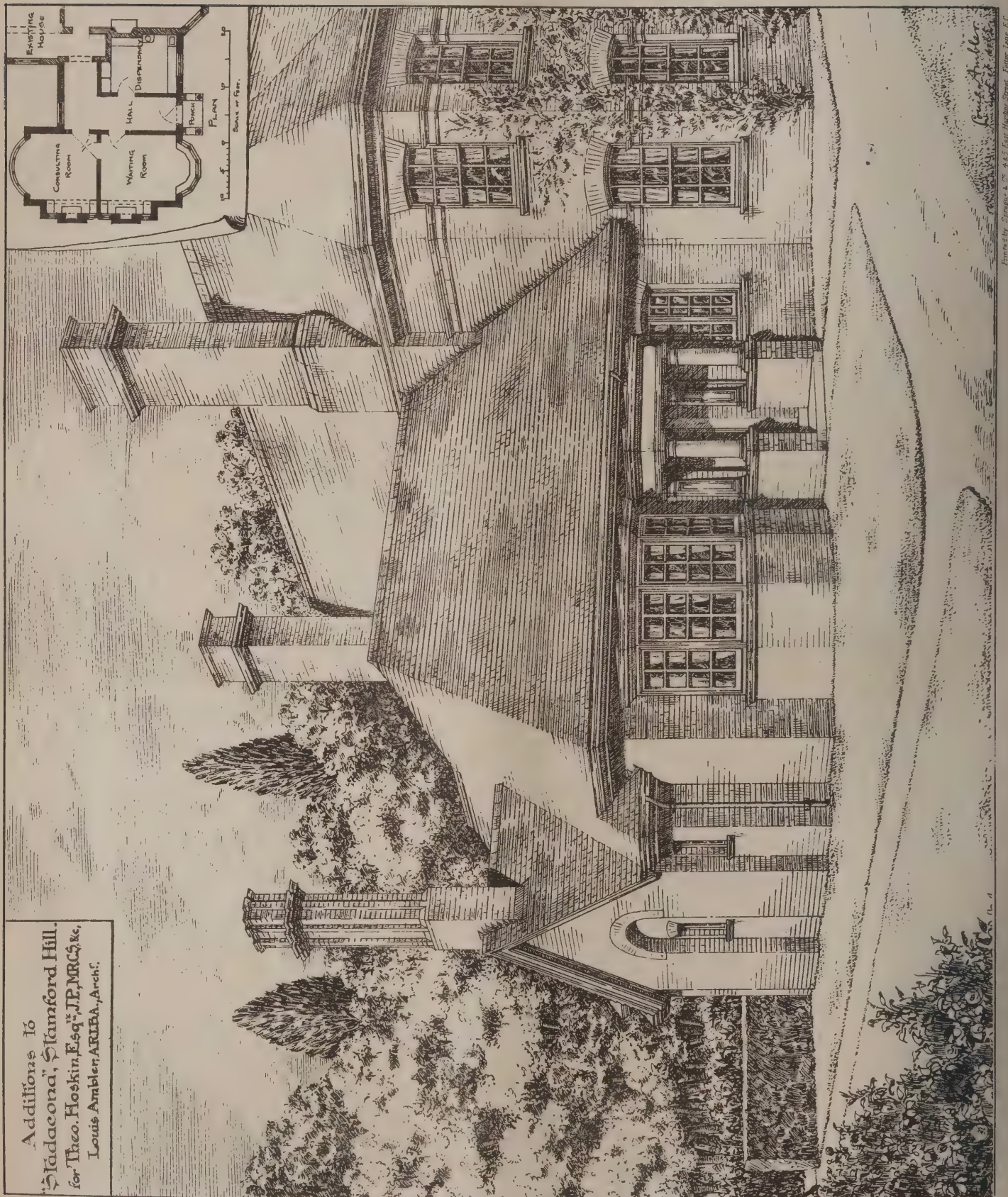








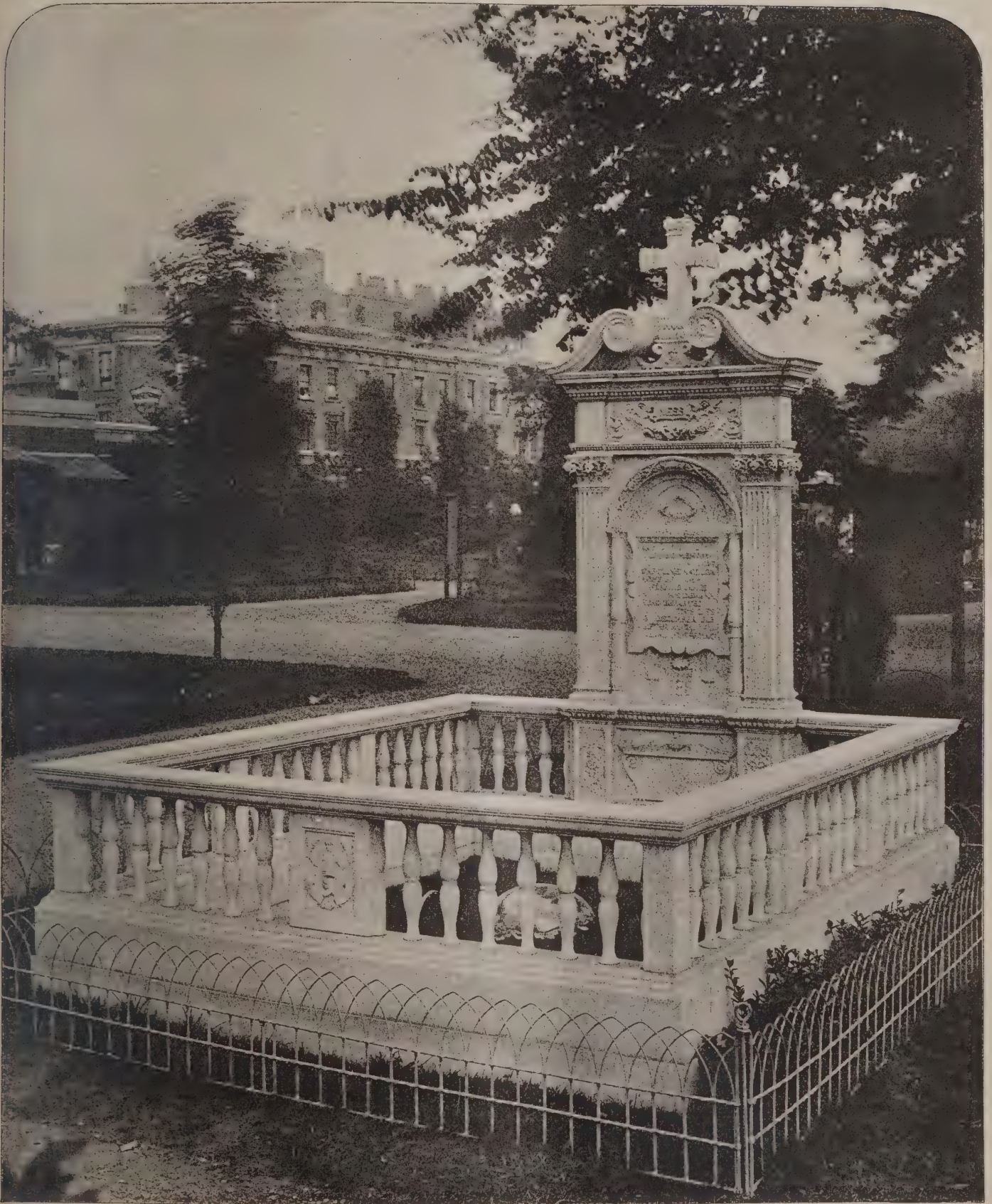




Additions to  
 "Madagascar", Stamford Hill.  
 for Theo. Hoskin, Esq.<sup>r</sup> J.P., M.R.C.S. &c.,  
 Louis Ambler, A.R.I.B.A., Archt.



*The Architect*, Apr. 23<sup>rd</sup> 1897



INK-PR. PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET FETTER LANE, E.C.

THE WEIDEMANN MEMORIAL, BROMPTON CEMETERY.  
LOUIS AMBLER, A.R.I.B.A., Architect.







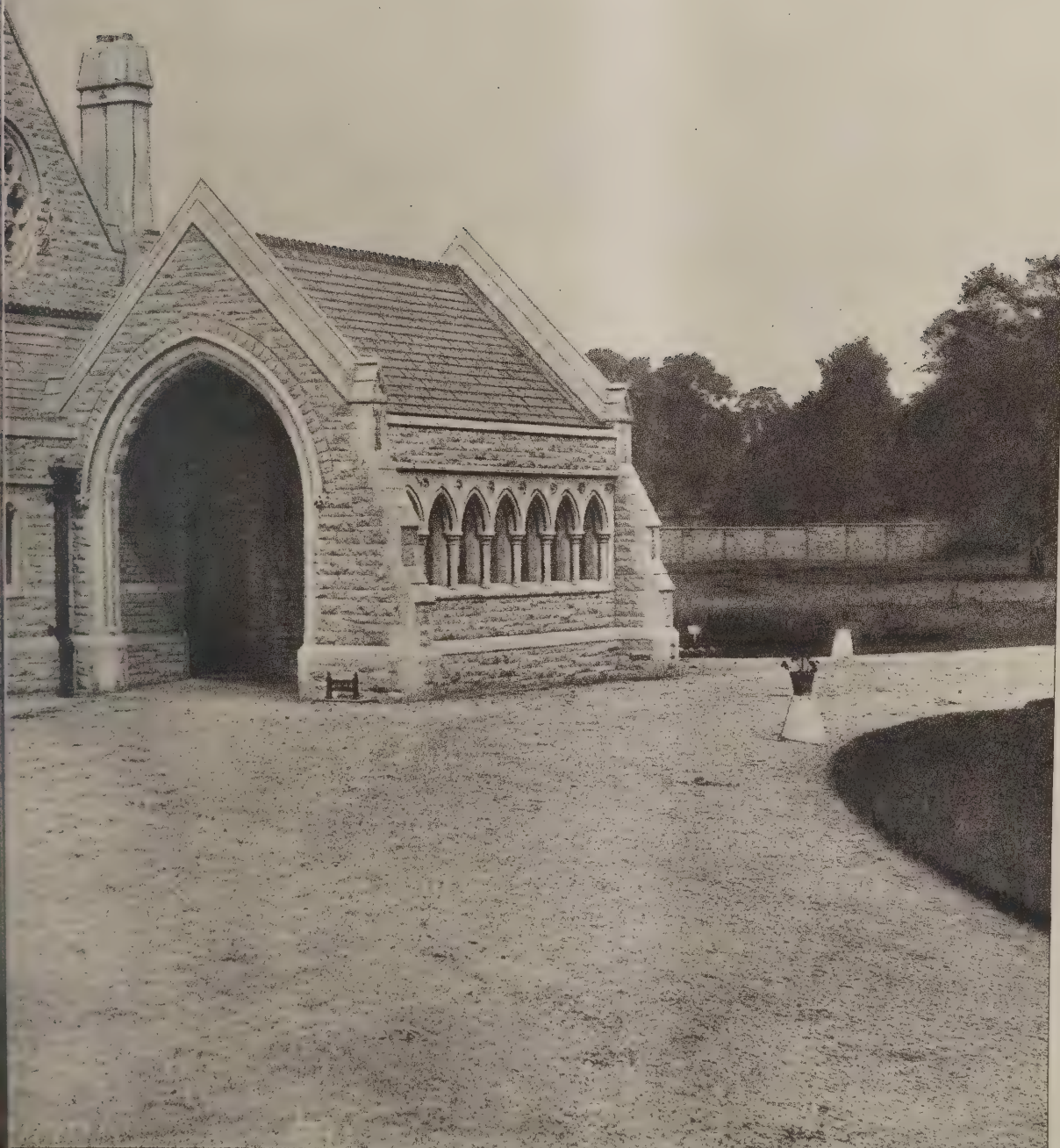








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## ILLUSTRATIONS.

CATHEDRAL SERIES.—SALISBURY: NORTH CHOIR AISLE.

ADDITIONS TO STADACONA, STAMFORD HILL.

THESE additions, as will be seen from the plan, comprise the professional portion of the residence of Mr. THEO. HOSKIN, J.P., M.R.C.S., &c. The house is in Amhurst Park, Stamford Hill, and has been considerably altered as well as added to, the principal internal alteration being the formation of a large hall in the centre of the house, by the removal of a small room and lobby, &c., which were of no importance. The additions are carried out externally in red brick, to correspond with the existing house, and the roof covered with Broseley tiles, the old roof being also tiled. The moulded work to chimney-stack and window sills, &c., is of Portland stone. The porch, windows, bargeboard and eaves cornice are of wood, painted white. Internally, the principal features of the waiting-room and consulting-room are the ingle-nook fireplaces and the bay windows with fixed seats. The floors of the additional portion are of wood blocks, stained to match the woodwork, that in the consulting-room and dispensary being "palm-leaf" green, and the waiting-room "American walnut" colour. The other woodwork in the halls, staircase and corridors throughout the house is painted white, and the doors red, the darker tint of De Morgan lustre tiles, from which the colours of the paper are copied. The chimney-pieces for the new rooms and the new hall were supplied by ALDAM HEATON, the grates by ELSLEY & Co. and STEEL & GARLAND, the fireplace tiles by DE MORGAN & Co., and the slips and fenders are of antique marble. Mr. T. W. RHODES, Stoke Newington, was the builder, and Mr. LOUIS AMBLER, A.R.I.B.A., 7 Arundel Street, Strand, the architect.

THE WEIDEMANN MEMORIAL, BROMPTON CEMETERY.

THIS monument was erected rather more than a year ago by Mr. F. J. WEIDEMANN, in memory of his wife. It is executed in white statuary marble. The whole of the carving is symbolical, and the ornamental work representative of the favourite objects and tastes of the deceased, this latter work being carried out in sunk carving run with lead in the panels at the back of the monument. The full-size detail drawings of the carving were made by Mr. WEIDEMANN. The memorial was carried out by Mr. EDWARD LANDER, monumental mason, of Kensal Green, the carving being executed by his assistant, Mr. J. SWAINE. The architect was Mr. LOUIS AMBLER, A.R.I.B.A., of 7 Arundel Street, Strand.

STREATHAM CEMETERY.—THE CHAPEL.

## LIGHTHOUSES.

By ALFRED J. GLASSPOOL.

*(Concluded from last week.)*

THE method adopted in building a lighthouse depends on the nature of the soil upon which it is constructed, and also as to the character of the sea fight to which it is exposed.

If the lighthouse is to be built upon a sandbank, six or eight iron cylinders are grouped so as to form a hexagon or an octagon. These are "joined to piles screwed or forced in some other manner to a considerable depth down into the sand, the piles and cylinders being braced together by strong iron ties. Upon a skeleton structure of this kind is built the lighthouse, the living rooms for the keepers, surmounted by the lantern." We may see four of these lighthouses off the coast of Essex: they are the Chapman, the Mucking, the Maplin and the Gunfleet. Though slim in appearance, these constructions are in reality very strong, for the waves pass through them with little obstruction; the Maplin has stood the test for over fifty years.

Mr. Edwards, in his excellent little book, declares that the oft-repeated statement that there is some analogy between the construction of a lighthouse and the form of a tree is altogether wrong, though he does not deny that Smeaton gained his idea for the construction of the Eddystone by contemplating an oak tree. He gives us a concise idea of the form of a lighthouse in the following words:—"A number of horizontal conic sections or frustra with varying diameters, placed one upon another in

such a manner that the vertical outline of the tower forms a curve convex to its axis, commencing at the radius of the base and ending at the radius of the top, the curve being made to approach parallelism with the axis towards the top. Starting with a large circular base the tower gradually becomes narrower upwards to about three-quarters of its height, after which it continues the same size up to the top. In some cases the upper part has a gently swelling curve outwards to a cornice at the top, designed to throw off the waves when running up the tower and to prevent the water striking the lantern." A building constructed in this way produces a low form of gravity; great strength is therefore imparted to the lower part of the tower; it is here that the greatest strength is required, for here the greatest force of the waves is expended.

A lighthouse is so constructed that it is practically all one stone; the stones are joined by dove-tailed joints, by metal bolts at the sides and at the top and bottom. No single stone can therefore be removed without disturbing the rest. Such a mass of stone weighing, as in the latest Eddystone, 4,000 tons, is not likely to be removed by the force of any ordinary storm, especially when we remember that the tower is fixed to the rock in the same manner as it is erected, so that for all purposes the tower and the rock are one piece of stone.

Builders of lighthouses have many points for consideration. Proper means of landing must be provided; a sufficient internal space must be arranged; the building must be properly ventilated, and there must be ample accommodation for storing coal, water and provisions.

Among the eminent builders of lighthouses may be mentioned the names of Smeaton, Stevenson, Walker and Douglass. Everyone knows that on the Eddystone Rock, fourteen miles S.S.W. from Plymouth, three lighthouses have been constructed—Winstanley's wooden building, swept away in a storm, November 26, 1703; Rudyerd's lighthouse, of wood and stone, destroyed by fire, 1739; and Smeaton's, made entirely of stone. This stood from 1756 to 1882, and was only removed because the rock upon which it was constructed gave way to the violence of the waves. Sir James N. Douglass built the fourth Eddystone on a neighbouring reef in 1882. It may be interesting to compare a few particulars in connection with Smeaton's and Douglass's work. Smeaton's tower was 95 feet in height, Douglass's 170 feet. Smeaton's contained 988 tons of stone, Douglass's 4,668 tons. Smeaton's cost 40,000*l.*, Douglass's 61,500*l.*

The writer in a recent conversation with the keeper of the old Eddystone, now on Plymouth Hoe, heard the opinion expressed that the new Eddystone was too tall, the light being somewhat obscured by fogs, which would not be the case had the tower been lower.

Many interesting particulars might be given of the Bell Rock, the Skerryvore, the Wolf Rock and others, each of which has its own peculiarity, but space will not allow those peculiarities to be inserted here.

The internal arrangements differ somewhat in various towers. The water-tank in the new Eddystone is below the entrance; in the Bell Rock it is just above; in the Skerryvore it is on the same level. The room for the storage of oil generally comes next, but in the Skerryvore it is on the top, just under the lantern. The next floor is allotted to coal storage; then comes the room for provisions and above this the kitchen; higher still come the bedrooms, the living room, a library, and at the top we find the light-room and the lantern.

The central point of attraction in a lighthouse is of course the light which it is constructed to shed forth. The value of the light depends upon the use it is to the sailor, for however brilliant that light may be, or however complicated and expensive may be the means of its production, all is useless if the light will not penetrate the darkness and bring hope to the despairing mariner.

By what kind of light a lighthouse is illuminated depends very often on the position in which the lighthouse is placed. A lighthouse on a rock far from the land must necessarily be illuminated by oil. A lighthouse to be illuminated by gas must be in the neighbourhood of a gasworks, and a special gas, made from expensive cannel coal, must be provided. To be illuminated by electricity, valuable machinery must be erected, and skilled men placed in charge. Whether the lighthouse be illuminated by gas or electricity, there must be a certain amount of space available for the necessary plant to produce the illuminating power. Such space can never be found on rocks out at sea.

Nothing need be said as to the experiments with the oxy-hydrogen, the Bude and the voltaic lights; all that is necessary is to refer to the varying powers of oil, gas and electricity.

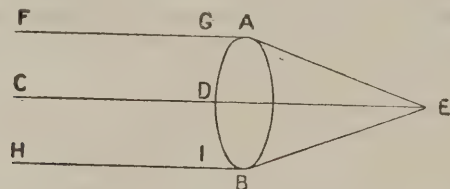
Oil carries the palm at the present day. Previous to 1846 oil obtained from the sperm whale was chiefly used; from the high cost of such oil, or what is generally known as colza oil, this is now giving place to petroleum or rock oil. It is well known that in burning either a candle or oil it is the gas or vapour given off which is really burned; the candle or lamp is therefore a small gasworks. Vapours are given off by mineral



oils at a low temperature, and when these vapours are mixed with atmospheric air, the presence of a light may cause a dangerous explosion. This explains the cause of the many accidents which occur when thoughtless persons endeavour to discover an escape of gas with a light in their hands, the gas alone being not explosive, but mixed with air is highly so. It was therefore important to take from the oil its more volatile portions, so as to reduce the flashing point; thus, with ordinary care, an oil having a flashing point above 100 deg. Fahr. is quite safe.

There are many objections to colza oil. Capillary attraction is not so active with it as with mineral oil, and it is double the price of paraffin. The rays of light produced by the burning of any gas must be caught as it were and amalgamated, so that the united rays may go forth in the required direction. In the lighthouse we have a fixed light, which must always be of the same power. This might be produced by a naked flame, but then a large quantity of the light rays not falling on the navigable track of shipping would be lost. Some rays would be too high up in the air, others would be too low down. Some arrangement is therefore required which will bend down the rays going too high, and bend upwards those pointing too low. The lamp of a lighthouse is arranged to bring about this object. Let us see how this is arranged.

1. When a ray of light passes from one medium to another of the same density, and in a perfectly straight line, no alteration of its course takes place, but if the light passes in an oblique direction its course is refracted, or bent from its natural path.



Such a bending of a ray of light is carried out when light passes through an ordinary reading or burning glass, or, as it is generally designated, a double convex lens. Suppose that AB is such a lens; a ray of light, CD, falls perpendicularly on the refracting surface, and passes straight through the glass to E. The other two rays, FG and HI, fall at an angle on the lens, undergo refraction and are bent inwards, and so meet at the point E, known as the principal focus.

In many lighthouses the system known as the catoptric, or reflective system is in vogue, oil being the illuminating agent. A number of Argand lamps are employed; behind each is a metallic reflector, shaped like a cup; the reflecting surface is very highly polished, the cistern containing the oil to feed the lamp being placed at the back of the reflector. The rays from lamps placed in such a position fall, of course, upon the sea, but many fall upon the polished surface of the reflector, and are there reflected forward.

A number of such lamps are placed on a framework; at a short distance the beams from each lamp will meet and form one large beam of powerful light, so that the mariners see only one light, and not a number of lights. Such a system requires a large number of lamps, a large consumption of oil; the reflectors require much polishing, there is much trimming and cleaning, much time is occupied, and the whole system is described as cumbrous and troublesome.

In another system, designated dioptric, or the system of lenses, we have a number of concentric rings; two to six wicks may be used, thus forming one great blaze of light, this powerful lamp being enclosed in a glass hive 2 to 6 feet in diameter for a fixed light.

The dome and lower belt of this hive catch the rays proceeding obliquely upwards or downwards from the central lamp. A careful mathematical arrangement of the prisms is necessary that the rays may be caught, and by refraction and reflection sent forth in parallel lines. The central belt gathers up the rays also and sends them forth in parallel lines; the rays from the dome and the lower belt coincide with the rays from the centre light, thus forming one powerful beam of light streaming forth from the centre of the apparatus.

A six-wick light will give a light equal to 722 sperm candles, a flame 5 inches in diameter, and will burn about 1,750 gallons of oil in a year.

For a revolving light the hive is divided into segments or panels; a separate beam is thus sent forth by every segment; the hive being made to revolve we have intervals of light and darkness; there is, therefore, a constant waxing and waning of light. When group flashes are required the panel is further subdivided; thus, one panel will in this way be made into several smaller panels, each giving a beam or flash, a short interval of darkness separating the flashes.

Sometimes 20 feet below the actual light is seen another light. This is caused by the light falling upon a hole in the

floor, and thus on to another reflector, so placed as to reflect the light through a lower window out to sea.

This method of an apparent light is carried out at times on a much grander scale. Thus, the Armish Rock, Stornoway Bay, which is separated from the island of Lewis by a channel over 500 feet in width; from this rock shines a magnificent light, and yet it is only an optical delusion, there being on the rock only a conical beacon with mirror and prisms. The explanation is simple. From a window in the lighthouse or Lewis a stream of light is sent forth; this falls upon the mirror on the rock, and thus a light is given to show the dangers of the rock.

With gas and electricity there are no reflectors. Lighthouses illuminated by gas have lamps with a number of concentric rings. Six rings of jets will have a varying number of jets of gas, the innermost having 28 jets, the outermost 108. The cost of gas is enormous; a 48-jet burner will burn 1,000 feet of gas an hour. This, in consequence of the great expense of production, will cost at least ten shillings. The cost, therefore, of a lamp burning some 340 jets of gas must be enormous.

The use of electricity in lighthouses has had a varying experience; much depends on the formation of the rock or the coast upon which the lighthouse is placed. Thus, when the electric lamp shone forth at Dungeness it was found to have many disadvantages; the use of oil was therefore resumed. At a low elevation the glare of the electric light was found to be dazzling and bewildering; the sailors could not judge accurately of the ship's distance, and, especially when a ship was approaching the shore, were unable to see the light of any intervening vessel. It may be mentioned that the Conservators will not allow the use of electric light on the bridges crossing the Thames, the shadow caused being dangerous to the river traffic.

In lighthouses the only colours used are white, red and green; the coloured lights are produced by the white light passing through coloured glasses. In doing so, the light is much weakened, white light passing through a red glass losing half its power. To those not acquainted with the system adopted it must seem bewildering to the mariner to distinguish one light from another; but since all the characteristics of each individual lighthouse are correctly stated on charts, and since lights of the same character are seldom placed within a hundred miles of each other, the difficulties are not great in clear weather, though of course greatly increased when a hazy atmosphere overhangs the sea.

Many suggestions are made to the Trinity House for the improvement of lighthouses, but most of them are found to be very futile. One suggestion was that all lighthouses in a certain district should exhibit a certain uniform colour, and that only. Thus all the lighthouses in Essex would be white, all in Suffolk blue, all in Norfolk red, and so on; but this would be practically impossible, for all colours cannot be readily distinguished at a distance. Another suggestion was that every lighthouse should be supplied with a small steam boiler, upon which a certain unseen whistle should be placed. These were to be sounded automatically by the boiler being fitted with a crank and a barrel, similar to a barrel organ; the number of sounds given forth would indicate the position of the lighthouse. One of the numerous suggestions for the protection of vessels nearing the Goodwin Sands was that small attached balloons should be placed near, they being of sufficient power to raise beacon lights to any required altitude.

The lighthouse is undoubtedly a sign of brotherly affection; its cheering beams speak of a desire to inspire hope and to save life. We may repeat the words of Longfellow:—

Sail on, it says, sail on, ye stately ships,  
And with your floating bridge the ocean span;  
Be mine to guard the light from all eclipse,  
Be yours to bring man nearer unto man.

## THE NEW MUSEUM FOR EGYPT.

THE foundation-stone of the new museum, destined to contain the national collection of Egyptian antiquities now at Gizeh, was laid on the 1st inst. by the Khedive, says the correspondent of the *Times*, the ceremony being attended by the Ministers, high officials, the Diplomatic Corps and a few invited European residents.

An Egyptian monolith coffer of the twelfth dynasty, about 2500 B.C., was used to hold a box containing the following objects:—The *procès-verbal* of the ceremony in French and Arabic; an account of the finding of the coffer; a bronze medallion portrait of the Khedive, bearing on the reverse the names Abbas Hilmi II., Khedive; Mustapha Fehmy Pasha, Prime Minister; Hussein Fakhry Pasha, Minister of Public Works and Instruction; J. de Morgan, Director-General of Antiquities; Marcel Dourgnon, architect; specimens of current coins, photographs on parchment of the plans and façade of the building, an ivory metre measure, a copy of the building speci-



fications and copies of native and European journals published in Cairo.

The ornamental design of the *procès-verbal* represented two pylons, on which, after the names of Champollion and Mariette, inscribed as the chiefs amongst Egyptologists, were those of Rosellini, Nestor l'Hôte, Lepsius, De Rougé, Brugsch, Prisse d'Avennes, Chabas, Lieblein, Maspero, Dumichen, Lepage Renouf, Grébaut, Lanzone, Naville, Schiaparelli, Erman, De Morgan, Lenormand, Pleite. The only English names inscribed on the document were those of Birch and Goodwin. The coffer, after being lowered into an underground cavity of masonry, was finally covered with a large cubical block of stone.

Comment has been excited at the exclusion of such eminent names as those of Belzoni, Young, Wilkinson, Petrie, Spiegelberg, Sayce from the roll of Egyptologists deposited under the foundation-stone of the new museum.

The building is to be completed by March 1899. When it is considered that in that time a building, roughly speaking, 125 metres square, with a mean height of some 22 metres, is to be constructed—not to mention the levelling and enclosing of the precinct—it will be seen that the Italian firm who have undertaken the contract have a heavy task before them. The credit at present voted for the undertaking is 110,000*l.*; the contractors' estimate is about 17,000*l.* less than that figure, but this balance will be none too large to cover all the extra expenses which will be incurred before the building is ready to receive the treasures of Gizeh.

The new museum is to be an improvement in all respects on the old. Its site is on the Cairene bank of the river, just below the Kasr-el-Nil bridge, and as convenient to the best quarter of the city as could be obtained where so large a plot was in question. It is within a short distance of both the river and the railway sidings, and the transport of large monuments to it will be even easier than to Gizeh. The proximity, however, of a river which periodically overflows its banks has obvious disadvantages. The architect proposes to obviate flooding by the method which (after much tribulation) has proved effective at the British Agency, namely, by surrounding the building with a wall of concrete some 2½ metres high, and the rising damp is to be combated by a very thorough system of cellar ventilation.

The new building is to be classical with no distinctively local features. The architect has exercised a wise discretion in eschewing the adaptations of the Egyptian temple style which found favour with many of his competitors. Externally the most noticeable points will be the cupola, rising some 32 metres above the pavement of the Hall of Honour, and a columned portico of severe but not unpleasing character. It is to be hoped that a judicious reserve will be maintained in the matter of its decoration. It is probable that large Egyptian monuments will be displayed between the columns, and with these nothing florid or trivial in the classical style would agree. Egyptian decorative methods, on the other hand, could not be applied to a classical building. At the two ends of the portico will be rooms opening directly into the precinct, of which it is intended that one should be the *Salle de Vente*, where duplicates and surplus objects are on offer at fixed prices to the public. This store will be open to buyers even when the main building is closed, and should prove an investment even more remunerative than at Gizeh. It is something for the tourist to know in the land of forgery *par excellence* that there is one place at least where he can purchase with some assurance of not being egregiously cheated.

As the light is almost all to be supplied from the roof, the side and rear walls of the building will be pierced only by doors and ventilators; and, indeed, the sides are to be left in the rough for the present to admit future lateral extensions.

Internally special attention has been directed to the questions of light, ventilation, and what may be called perspective. The visitor on entering will be struck by the absence of party-walls, whose place is taken by columns. By this arrangement not only will lightness and airiness be much promoted, but supervision will be exercised easily by a *personnel* far smaller than that at Gizeh at present. Although the building is to have an upper storey, all light will be obtained from the roof by the device of carrying every alternate hall right up the whole height of the building. The intermediate halls will obtain their light slantwise from their neighbours, and will thus be suited especially for the display of bas-reliefs, always most effective when illuminated obliquely.

A system of double roofing will be adopted to lessen the summer heats, and this with the elaborate ventilating apparatus ought to make the new museum one of the coolest places in Cairo. It ought to become a most popular resort, and the Department of Public Works would have no reason to regret their policy were they to lay out a public garden in the precinct. Could the strip along the Nile be included ultimately the attraction would be greatly increased. One of the most obvious needs of modern Cairo is a really pleasant garden on the right bank of the river.

The arrangement of exhibits is hardly determined on as yet. Speaking roughly, the small objects will occupy the upper floor, the famous jewelry of Dahshur being assigned an honourable place above the portico. It is to be hoped that a chronological system will be adhered to as far as possible. Even the division of small objects from large is objectionable. The magnificent collection at Gizeh, it will be seen, is in a fair way to be housed worthily. In the meantime, stimulated by the prospect, those in authority will perhaps see their way to introduce certain reforms into the department of antiquities, than which department none in Egypt stands in more need of reconstitution. Crying necessities of detail are being attended to already. A beginning has been made this season with a new and adequate catalogue of the Gizeh treasures. A German Egyptologist of distinction has made considerable progress with the description of the exhibits of the Old Empire, and so fully is the urgency of this work recognised that there is little fear that the new museum, on its completion, will be even as Gizeh has been all these years. We may look forward also with confidence to proper labelling.

Unfortunately, however, both money and men are wanting at Gizeh, and reforms, to be effective, must not be in details only, but in the general constitution of the department. The Service des Antiquités under its existing constitution dates from the days of Bulak, and is quite inadequate to the needs of the present time, when not only are the collections enormously increased, but excavations are carried out on a much larger scale, and the demand for the preservation of ancient sites and monuments, being much more imperative, requires a huge body of watchmen, overseers and the like scattered up and down the great length of Egypt. The Director of Gizeh is head of the whole under the Department of Public Works, and he has in fact three distinct functions, each sufficient for the energies of any single official. He has to direct the great museum itself, with its large *personnel*, workshops, library and so forth; he has to supervise or himself conduct excavation and exploration carried on at great distances from the museum, and lastly, he is responsible for the maintenance and proper guarding of monuments everywhere, and to that end has under his orders as mudir a very numerous irregular police.

Until the irregular police of the Service des Antiquités is put upon an equal footing with the regular guardians of the peace, so long will the penal provisions of the law regarding antiquities remain practically a dead letter in Egypt. As Professor Petrie told the subscribers to the Egypt Exploration Fund last November, convictions under that law are almost unknown; while, none the less, destruction of monuments by natives, stealing from European conductors of excavations and rifling of sites, in spite of custodians and overseers, are things of daily occurrence. Far more antiquities are found by Arab diggers in the summer months than ever are unearthed by licensed excavators in the winter. A hillside left smooth one season is found honeycombed the next; the dealers' shops are crammed with every sort of *antiqua*—and no one is one penny the worse. As soon as the inundation is on the fields the cultivators occupy their enforced idleness with tomb-opening and town-rifling, secure both of a liberal market and complete immunity. The breaking and scattering of precious things goes on unchecked, and every day evidence is lost never to be recovered.

Much good might be done by making the local sheikhs and headmen of villages responsible—something more by placing the ghaffirs (watchmen) themselves on the same sort of footing as policemen, giving them a semi-military organisation, a uniform, and European inspectors. The "Mudir of Antiquities" might still exercise supreme control, and secure their duties being performed more effectively than they might be if his police were confounded with or absorbed in the regular force. A few convictions in native courts also would do a world of good. But native judges, witnesses and police are notoriously not to be reckoned upon with any confidence, and we suspect that more would be effected in a season by a measure of a wholly different kind than in ten seasons by any that we have indicated hitherto.

The universal digging by natives is due directly to the openness of the market in antiquities. Dealers are always at hand to buy. It is useless to raid or prosecute them, even if they do not trade under consular flags. They can always hide away their treasures when danger, of which they always have warning, threatens. The raids undertaken a few years ago at Luxor proved totally futile, and have never been repeated.

The ultimate market, however, is not in Egypt but abroad. As there would be no diggers without dealers, so there would be no dealers without foreign collectors. If Egypt wishes to abolish the illicit digger and dealer she must put herself in the position of Greece or Turkey, and absolutely prohibit exportation of antiquities without exception or reserve. Such a protective measure, however, entails upon the country which passes it the obligation to preserve exhibits and publish all its treasures as well as any other country could do it. Greece, it may be said, fulfils this condition now; Turkey, needless to



say, does not. Egypt at this moment could not do all she ought. So long as her museum is at Gizeh she cannot exhibit worthily; so long as her department of antiquities is constituted as at present she lacks both men and money for proper study and publication. What, for instance, could have been done at Cairo with the papyri of Aristotle or Bacchylides?

The Government has a year or two before it. By the time the new museum is finished perhaps a reconstitution may have been effected which will make a protective law possible and justifiable. In such reconstitution there is no reason why French influence should be impaired. Science at least ought to be closed ground to international intrigue. The claim of France to be in the high places of Egyptology is based on such great achievements and services in the past that there may well be conceded to her for years to come the proud position that she occupies at present at Gizeh. But that position entails great obligations, and whoever holds it must not fall short in the competition of science in which all nations partake, or fail to pursue a policy of equality and fraternity towards all workers in the same field.

### CHELSEA HOSPITAL IN DANGER.

THE recent erection on grounds belonging to Chelsea Hospital of a score or two of lofty red-brick houses, dwarfing Wren's beautiful building and disfiguring the river-bank, should draw attention to the danger which threatens a most charming fragment of old London. In Ministerial circles, says a correspondent in the *Times*, there is a restlessness on the subject of Chelsea Hospital which bodes no good. Within the last thirty years no fewer than three departmental inquiries have been held on the subject. The removal of the pensioners from Greenwich not unnaturally led to the suggestion that a similar course should be adopted at Chelsea; and so long ago as 1870 the Secretary of State for War appointed a committee on the subject. This committee, over which Mr. Vivian presided, pronounced in favour of the retention of the hospital as "an almshouse of the best description for the most infirm and helpless of a body of about 64,000 pensioners." Such a decision might have been accepted as final, but the modern preference for out-pensions was not so easily to be set aside. In 1881, Mr. Childers referred to a second committee the question, already answered in 1870, whether the in-pension system at Chelsea should be continued. This committee confirmed the view of its predecessors, holding that a special institution for the helpless would always be needed in connection with the army, and that "Chelsea Hospital appeared to be admirably suited for the purpose." But a loophole for further inquiry was left by sundry allusions to the probable effect on the hospital of the short-service system; and accordingly, in 1894, a third committee was appointed to consider the broad question "whether the revenues of Chelsea and Kilmainham Hospitals could be more advantageously used for the benefit of the army." This committee, upon which three members of the House of Commons sat, had before them a proposal of a pensioners' association, advocating the sale of the two hospitals, and suggesting that by this and other means an additional 6*d.* a day might be provided for a large number of the oldest army pensioners. The committee examined a considerable number of the inmates of Chelsea Hospital, and took evidence as to the value of the land. The result of their inquiries was the conclusion that "the hospitals of Chelsea and Kilmainham should continue to be maintained for the benefit of deserving 'aged, maimed and infirm' pensioners."

Such decided opinions expressed by three independent tribunals of inquiry, composed of officials of high rank, of soldiers and civilians, and of members of both Houses, might be thought to have placed Chelsea Hospital beyond danger. Unfortunately, we have the very practical comment embodied in the glaring bricks of "Embankment Gardens"; we have the fact that his Royal Highness the late Commander-in-Chief, who was a staunch upholder of Chelsea, has ceased to hold that high position; and we have a suggestion of the last committee of inquiry which is, perhaps, almost as dangerous in its way as the proposal to abolish the hospital in favour of out-pensions. The committee advise yet a further inquiry "as to the necessity for an increase, either at present or in the near future, in the accommodation of Chelsea Hospital"; and they further recommend that "the question whether any portion of the lands of the hospital could be disposed of to provide a fund for such purposes without detriment to the hospital should be included in such an inquiry." Indeed, it was proposed to the committee to sweep away the present hospital and to build a larger institution of the same kind in the country. A similar proposal recently deprived London of Lady Dacre's Almshouses at Westminster; and though, in the case of Chelsea, the committee "were not prepared to recommend such a scheme for adoption," the fact that it should have been made shows how many and various are the dangers which threaten the spot consecrated by Wren's genius. Conversion into out-pensions may for the present be

put out of consideration; but demolition for the purpose of reconstruction elsewhere, or enlargement at the cost of a portion of its charming surroundings, are obviously still questions exercising the minds of those in authority over our military establishment.

Chelsea Hospital is of about the same age as the standing army of the country. It had its origin in Letters Patent of December 22, 1681, declaring the royal intention "to erect an hospital for the relief of such land soldiers as are old, lame or infirm in the service of the Crown, and to endow it with a revenue suitable thereunto," and constituting the paymaster of the forces for the time being the receiver-general and treasurer of "all such moneys as should be given or paid" towards the erection of the hospital. Money was not very plentiful in the days of the Merry Monarch, and the royal mind seems to have been in some doubt respecting the sources of the proposed endowment. A start was made with secret-service money and private donations, and then, fortunately, more permanent means were found of defraying the necessary expenses without increasing the cost of the army. Sir Stephen Fox, when paymaster of the forces, hit upon the brilliant idea of at once serving his own interests and those of the soldiers by making prompt payments of the sums voted for the army at a discount of a shilling in the pound. This discount he afterwards surrendered to the Crown, and one-third of it was allotted for the expenses of his office, and another third to Chelsea Hospital. The allotment to Chelsea was made in 1683, and in the following year the revenues of the hospital were further increased by the deduction every year of one day's pay throughout the army. With the moneys thus provided over 60 acres of land were purchased at a cost of about 1,000*l.* an acre, and a building capable of receiving nearly 700 inmates was built at a cost of 145,000*l.* It would be out of place to dwell upon Wren's work. Constructed of the simplest materials, brown and red bricks and grey slates, the hospital has that freedom and nobility of line, combined with delicacy of finish, so rarely to be met with in buildings of the present day. Facing towards the river, it stands on a succession of broad, low terraces, while on all sides wide walks and spacious lawns were designed by the architect to harmonise with the central structure, and to carry on the prevailing idea of size and repose. The building itself remains substantially as it issued from Wren's hands, but in its surroundings changes have taken place. Originally canals, after the fashion so dear to the French school of gardening, ran below the terraces of the hospital and on either side of the broad walk to the river, to which access was given by a handsome flight of stairs. The canals have disappeared, and an unmeaning row of bushes has been planted at the foot of the terraces, while the Chelsea Embankment has—very unnecessarily, one would think—abolished Wren's stairs. Landward, the hospital looked upon a noble garden, almost as spacious as that on the river side, and this in turn was approached from the King's Road by a long double avenue. Garden and avenue still remain, but the garden has been severed from the building, to which it gave dignity and importance, by a modern road which passes almost under the windows of the hospital. Thus detached the garden has been laid out as a cricket-ground, and now goes by the name of Burton's Court. On each side of the avenue small houses, in no way in keeping with such an approach, have been built, and the treatment of Burton's Court, as well as the interpolation of the new road, has obscured the meaning of the original plan. There have been some filchings also for building purposes, notably an acre and a half leased for industrial dwellings about twenty years ago. Nevertheless, until the recent erection of the new houses on the river frontage no very serious injury had been done. The simple but beautiful lines of the hospital could still be seen from all sides; and its rich, sober colouring, in contrast only with the grass and trees of its grounds, was still saved from the intrusion of any jarring element. This can no longer be said. From Battersea Suspension Bridge the new houses obstruct the view of the hospital; and from the Battersea bank they are painfully conspicuous—inharmonious in height, in colour, and in the evidence they obtrude of painful effort to house large numbers on a small plot of land—an object so foreign to the amplitude of Wren's design. An ugly blot has been made upon a beautiful picture—a picture of the greater value to London, because she possesses so few of them. It is for the public to see that this blot is not followed by others, until the picture is blurred beyond recognition.

Such places as Chelsea Hospital, indeed, sorely tempt that desire to make money for money's sake which constitutes a weak side in the English character. Here is a large area or land, used merely as the garden of an old-fashioned mansion, and as an open space upon which a few old soldiers may breathe fresh air, sun themselves in summer and see something of their neighbours. It is true that the garden is open to the public and is incidentally of great value to the crowded districts of Chelsea. Still, it might be sold for building by the square foot. There are persons who have a feeling that it



is almost sinful to waste such an opportunity, although they may value the place in itself and may have no very distinct views as to the use to be made of the money produced by a sale. The rent of the land now occupied by new houses—750*l.* a year—has been applied, we are told, in giving extra comforts to the pensioners of the hospital. Everyone would wish that the invalid veterans should have all possible comforts; but, seeing that Chelsea Hospital is now supported mainly by Parliamentary votes, it would surely have been better to add the paltry sum required to the amount voted by Parliament rather than to disfigure the hospital grounds. It is pleasant indeed to note that there is some growth of opinion on these subjects. The committee of 1894, in discussing the proposal to demolish the hospital, question whether "the public, the London County Council, or Parliament" would look with equanimity upon the covering of the ground with streets and houses after the sweet will of the speculative builder. The danger is that steps to this end may be taken without the full knowledge of the public. The hospital estate is administered by a board of trustees or commissioners appointed by the Crown, and composed mainly of military and civil representatives of the War Office; and these commissioners have been advised that they have power to let the hospital lands on building leases. In the exercise of this power the charm of the hospital has already been marred; further leases for the purpose, for example, of enlarging the hospital, may produce yet worse effects. It should not be in the power of any commission to injure a national possession of the great value of Chelsea Hospital and to deprive its inmates and the public of London of a priceless open space without the authority of Parliament, given after full discussion. Whatever the interests of the army may from time to time demand—and upon this question opinions have differed in the past and are likely to differ in the future—it is abundantly clear that in the interests of the capital and of the nation a beautiful specimen of the genius of the most characteristic English architect should be left intact in the midst of the harmonious surroundings which alone enable the graceful simplicity of the design of a master-mind to be appreciated. When the New Forest was threatened with destruction at the hands of a Government department, Mr. Fawcett obtained a pledge that no further action should be taken without the sanction of Parliament. A similar undertaking should be obtained—and that without delay—in relation to Chelsea Hospital.

The following letter appeared in the *Times* on Thursday:—  
Sir,—As a lover of old buildings and open spaces, I find myself in complete sympathy with your article of to-day under the above heading.

But, as the architect of the houses and flats which form the text of the article, and upon which you vent your wrath, I feel that your note of warning would have been equally effective without the incidental attack upon the design of my work.

It is an ineffective form of criticism that would compare the old and the new in architecture. It is unjust to the new, and a slight upon the old; and the argument that the amenities of Wren's structure should not be disturbed is not helped by taunts thrown at modern work, produced under such different conditions and for such different purposes.

If my buildings dwarf Wren's structure they do not necessarily "disfigure the river bank," any more than other groups of buildings, by more eminent hands, which line the remainder of the embankment.

All red bricks are "glaring" until the weather has toned them; and the unconscious charm of the hospital itself is largely due to the mellowing influences of the atmosphere.

Although the land I have covered is part of the estate of Chelsea Hospital, it was not part of the familiar grounds which still surround it. As a matter of fact it was a triangle of ground detached from the hospital gardens, and formerly part of the grounds of Gordon House, at one time the residence of General Gordon.

The land itself was more or less waste land, and had been the scene of the Naval Exhibition of 1891 and of the Military Exhibition preceding it.

With due regard to a profitable development of the land, I have made every endeavour to preserve the amenities of the neighbourhood, in illustration of which I may state that, of the total area of about two acres, only about five-sixths of an acre is occupied by the houses known as Embankment Gardens and by the flats known as Chelsea Court, the remaining one and one-sixth acre being devoted to spacious roads and ample gardens, thus completely answering the suggestion in your article that the development is evidence of "painful effort to house large numbers on a small plot of land."

The encroachment now being an established fact, it may not be out of place to consider its economic advantages to the institution.

A ground-rent of 750*l.* a year has been established in favour of the institution, with a reversion at the end of eighty years to buildings that have cost something under 150,000*l.* to erect—

more than the cost of the building of the hospital itself, as stated by you.

This ground-rent could be sold, no doubt, at thirty years' purchase, producing a capital return of 22,500*l.* for the two acres, which represents 11,250*l.* an acre, and which compares favourably with the 1,000*l.* an acre paid for the land in 1683. This operation would thus produce a sum of money which could be usefully applied for the enlargement of the present hospital.

As a detail of secondary interest, I may point out that the execution of my designs for the houses and flats has given employment to many hundreds of artisans in all trades over a period of more than two years.

Personally, I am accustomed to these outcries as soon as the new impinges upon the old; for example, when, some years ago, I pulled down St. Paul's Schools in St. Paul's Churchyard and built thereon huge stone warehouses, an agitation was started for throwing this priceless land into the public way in order to improve the view of St. Paul's Cathedral.

However much one's pulse may be stirred by the nobler monuments of the unapproachable Wren, and however much one may hunger to preserve all possible open spaces in this overcrowded city, it will be found impossible to resist the natural tendency in the development of a huge metropolis towards the new encroaching upon and obscuring the old.—  
Yours obediently,

DELISSA JOSEPH, F.R.I.B.A.

17 and 18 Basinghall Street, E.C.: April 21.

### A NEW GUILDHALL FOR LONDON.

A PAPER was read last week before the members of the Bishopsgate Ward Club, by Mr. Alfred Frampton, on the question of a new Guildhall for the City. The following report of it appears in the *City Press*.

Mr. Frampton said:—The first publication of my views on this subject appeared in the columns of the *City Press* some three years ago, when the London County Council possessed far greater public esteem and more Parliamentary power than now. The members of the Corporation were then dreading that the coming mayoralty of Sir Joseph Renals, Bart., would be the last scene of all that would end this strange eventful history of the most ancient and privileged City of London; but happily the City is not at present threatened by its former rival, the London County Council, as that body has lately been too much occupied studying the curious principles of betterment and investigating its own intricate affairs, which are evidently too much for it to manage without worsement creeping into its unwieldy organisation. To-day the City is enjoying a most undisturbed and honourable truce, luxuriating beneath the shades of its once powerful rival, and basking in the sunshine of the Diamond Jubilee year. The City is, therefore, enabled at the present time to pursue the arts of peace and progress without fear of being incorporated into a mushroom organisation not yet in its teens; and, further, a great change is taking place in the destinies of outer London, many a district considering the desirability of managing its own local affairs. In this direction Westminster, Kensington and Marylebone are leading the way to a new order of things that will encourage more men of position and learning to identify themselves with municipal affairs. Provincial cities and towns such as Manchester, Sheffield, Portsmouth and many others, have with much public spirit erected municipal buildings in accordance with their requirements and worthy of their proper dignity. Unfortunately the City of London cannot do likewise, as it is at present suffering from two great disabilities. Firstly, the Common Council of the City of London is not, as elsewhere, a power and the stepping-stone to the civic chair, the dignity being entirely monopolised by a few apathetic lifehold aldermen, who almost invariably have their equals, and often their superiors, in their own wards amongst the representatives of the Council. This is a system which dates from 1475, prior to which time the whole of the citizens elected the mayor and sheriffs; that ought to be so again, and if that cannot be accomplished forthwith then the best and most capable alderman should be selected to fill the civic chair, for seniority is an absurd theory when capability is the requisite. This year the City is most ably represented by Mr. Alderman Faudel Phillips. Why the Common Council in these days of strikes have never thought of taking a holiday is really astonishing, but sincerely must we pray that this change will soon take place, and a greater public spirit be infused into the Court of Common Council, which certainly would take place if all the members of the Court were eligible to fill the highest office in the City. The London County Council is the City's second disability as regards power, and until the County Council is abolished and outer London subdivided into municipalities, the City of London, aye, and even London itself, will ever be in an anomalous position. The City at present arrogates to itself the representation of London, but it is only a



square mile of it, with one-eighth of its rateable value. The City should therefore endeavour to reform itself whilst its friends hold political power, and the achievement of its requirements is still attainable, or unification may incorporate the City, and a new Guildhall worthy of all London may be located in some place not at present dreamt of. Manchester, Leeds, Sheffield and Portsmouth all have fine municipal buildings. London, however, is unable to possess a building worthy of its position, it being too poor and unable to afford it, or else too indifferent; but let us hope that ere long the municipality of London may become as rich as some of the provincial cities, and be willing to uphold the dignity of the Metropolis. I do not intend to give a long historical account of the present Guildhall buildings, for the Great Fire almost swept away the original Mediæval structure erected in the reign of Henry IV., leaving only the piers and crypt of the large hall as mere relics of the glories of two centuries and a half. Since 1666, that memorable year in the history of the City, another two centuries and a half have almost rolled away, and to-day these fragments of 1411 are still being solemnly surrounded by all the architectural incongruities of construction that the ingenuity of man can devise. The large hall, which is built on the original lines, is exceedingly well proportioned and beautiful, but the roof and many of the embellishments belong to the present reign. The civic buildings surrounding the hall are fine examples of architecture, but the relative positions they occupy to the large hall are most aggravating, and it really seems as if the object of every alteration and addition were to put the main floor of the new building on a different level from any other. Why this principle should have been adopted is a profound secret. Were a live turtle let loose in the large hall, or in any of the chief apartments, he would certainly be unable to extend his knowledge of the surrounding buildings without elevators being constructed at numerous points for his special convenience of going up or down stairs. The new buildings for the Commissioners of Sewers have gone down steps costing something like 10,000*l.*, and what the level of the ground-floor will be it would be interesting to learn. The Corporation has lavished its treasures most unwisely, and produced a tangle and jumble of buildings that are a standing disgrace to the first city of the world. Some may reverently refer to the old associations of this centre of municipal authority, and cherish the spot where the great of this nation and of other lands have met, and by their presence recognised the power of municipal institutions which has been much to their benefit and to the City's great praise. Mr. Frampton next showed that the population of the City was 31,148, and the rateable value 4,481,860*l.*, the population of the county being 4,433,018, and the rateable value 31,351,608*l.*, while London had a population of 4,464,166 and a rateable value of 35,333,468*l.* Liverpool's population, he pointed out, was only 629,443 and the rateable value 3,775,045*l.*; Manchester came next with a population of 529,561 and a rateable value of 2,934,545*l.*

Continuing, Mr. Frampton said:—The present is a desirable period for the citizens of London to compare its administration and municipal buildings with those of other corporations, in order to consider how it stands relatively with them, and also to consider whether it is or is not behind the times. Certainly during the present reign it has stood still and merely occupied the proud position of being the municipality of part of the Metropolis dispensing hospitality for the whole. The administration of London as it now exists is a miserable muddle, and is by no means a model municipality for our provincial and colonial cities to copy. The City has opposed its own development and progress in the past, and the inclusion of Southwark will hardly save its position in the future. The Board of Works has come and gone, the County Council has come, like its predecessor, but is not yet in its teens, and is infinitely less popular than the City administration and has probably not come to stay. It therefore behoves the City of London to begin making arrangements for possessing majestic municipal buildings within the City area worthy, not only of the City, but of the Metropolis. The Christ's Hospital site might be purchased, and possibly no other large site will ever come into the market in consequence of all the open spaces in the City being covered. The Mansion House should be sold, the money obtained being applied to the purchase of the Christ's Hospital site, and the present Guildhall should be converted into a Mansion House with museum, library and picture gallery attached. The scheme would cost about a million and a half, or about the amount that Manchester expended when its rateable value was about half that of the City of London, and its population about 350,000. Finally, the City should look ahead and prepare for developing its power and position, and, above all, it should prevent any other local body or union of local bodies from usurping its position as the centre of the administrative power of London. The London County Council municipal offices are not yet erected at Trafalgar Square. London is waiting for the City to take the lead, and to do this a municipal meeting house should be erected worthy of London, worthy of the Metropolis, worthy of the City that rules the

waves and worthy of the greatest and richest centre the world has ever seen.

In conclusion, Mr. Frampton spoke of the town halls of Belgium, and gave details of their architectural features.

A lengthy discussion followed, and a hearty vote of thanks to Mr. Frampton brought the meeting to a close.

## MODERN ART.

AT the opening of the annual exhibition of pictures (this year there are eighty-seven works by Mr. Watts, R.A.) in St. Jude's Schools, Commercial Street, Whitechapel, Lord Crewe delivered an address. His lordship said that in looking round those walls what must strike everybody above all was that they were looking at the work not only of a great painter but of a great poet. What was it that made a man a poet? Matthew Arnold had said more than once that the essence of a great poet was the application of ideas to life, and he went on to say that he was a great poet who applied to whatever subject he had in hand those ideas of nature and the life of men which he had himself acquired. That, it seemed to him, was what Watts had done in the work they saw before them. It was the fact that Watts had put so much poetry into his work which enabled him to stand the test, which was a very severe one, of having so much of his work exhibited at the same time. He ventured to think there was no artist in our time, and very few of the great masters of any time, who would stand so well as did Watts the test of having so large a number of his works hung together. The present exhibition consisted of three separate divisions. In the first place there were the portraits. A great many of the portraits executed by Watts were not there, because, with a generosity and public spirit to which he could think of no parallel, the artist had presented many to the National Portrait Gallery. They were, however, enabled to see many of great artists, statesmen and men of letters, and throughout them all there was noticeable the one special quality that they were far removed from what he might call the "coat and trousers" view of humanity, and gave a picture, not only of the outward resemblance of the men, but something of their character. Then there were the subject pictures, dealing with a great variety of matters, but whether they were taken from the beautiful old Classical myths or Mediæval stories, or from Dante, Shakespeare, or Spenser, they were all alike in this—that they dealt with the deepest feelings and passions of humanity. And then lastly, and perhaps most interesting of all, were those allegorical pictures which had made Watts's name so famous. These philosophical pictures were, after all, simple enough. They dealt with the really great things of life—faith, hope and love, and the relations between life and death; and he ventured to think that there was nobody who looked round the pictures who would not be reminded of something that had happened in the past, some hopes, ambitions, disappointments or bereavements. It was just that quality in the pictures which defined the kind of pleasure felt from visiting such exhibitions. But in speaking of some of the lessons which could be drawn from those splendid pictures they must not forget that besides conveying lessons they were also very beautiful in themselves. It was impossible to over-estimate the advantage which everyone derived from the mere regarding of something beautiful. We were all in different ways made more human by looking at beautiful pictures. We were supposed to be living in what was called a very artistic age. We drank out of art mugs; we made up our fires out of art coal-scuttles. There was a great deal of art about and a great deal of luxury, and though the so-called art might sometimes seem to be a little absurd and extravagant, it certainly had its good side if it taught people in all ranks of life to avoid what was ugly. There was also in this great spread of artistic spirit, sometimes ill-directed, but often well-directed, the further advantage that it had so affected the industries of the country that during the last twenty or thirty years there had been a vast impetus given to work in all kinds of design. The effect of that upon the workers could not be other than a good one. It must be a good thing to give workers, as was now the case, an increased personal interest in their work, and it could not be denied that, since so much impetus had been given to design a far greater scope had arisen for the exercise of personal and individual talent in the working classes. He wished the scheme for providing a permanent art gallery for Whitechapel every success.

**The Annual General Meeting** of the Liverpool Architectural Society will be held at the Law Library, Union Court, on Monday, May 3, at six o'clock P.M., and the prize drawings of the Royal Institute of British Architects, 1896, and students' testimonies of study will be on view at the same place during the week commencing Monday, April 26, 1897.



## GLASGOW ARCHÆOLOGICAL SOCIETY.

THE last meeting for the session of this Society was held in the Philosophical Institution, Bath Street, on the 15th inst., Dr. David Murray presiding. Mr. John Orr exhibited the upper stone of a quern found near Glasgow Green, and perforated stones found in the Clyde near Rutherglen Bridge. The exhibits were described by the chairman: Mr. F. R. Newberry exhibited a lease of the lands of Dryslwyn, Carmarthenshire, 1593, by T. Etherington Cooke. Mr. Macgregor Chalmers read a paper on the "Vaulting of the Lower Church of Glasgow Cathedral," in which he subjected the theory promulgated recently by Mr. T. L. Watson to a searching criticism. A careful examination of the building showed that there was no evidence that there had been any intention to carry out any design other than that existing in the centre aisle. It was found that mouldings which were described as late insertions and of late date were actually wrought on the same stone as mouldings described as of early workmanship, and it was found that the early thirteenth-century walls were designed to carry vaulting ribs which were now claimed as afterthoughts of 200 years later. The new plan proposed and described as the plan originally designed was very commonplace, and was quite unworthy of the great artist to whom they owed their cathedral. The fact that this structure was a church and not a crypt had been overlooked, as well as the significant character of the shrine of St. Mungo. The evidence of the building left no room for doubt that, whilst some part of the work betrayed want of skill, the present design was as originally projected. Professor Ferguson exhibited some English receipt books of the sixteenth and seventeenth centuries.

## SHEFFIELD SOCIETY OF ARCHITECTS AND SURVEYORS.

THE annual general meeting of the above Society was held on the 13th inst. in the library at the School of Art, Mr. Charles Hadfield, the president, in the chair. There was a good attendance of members, amongst whom were Messrs. R. W. Fowler (vice-president), Fred. Fowler (hon. treasurer), C. J. Innocent (hon. secretary), E. M. Gibbs, Joseph Smith, Thos. Winder, W. J. Hale, C. B. Flockton, C. M. E. Hadfield, J. B. Mitchell-Withers, C. F. Innocent and E. Winder, jun.

Mr. C. J. Innocent (hon. secretary) read the annual report of the council.

The statement of accounts was read, and showed a balance in hand of 43*l.* 7*s.* 6*d.* This statement and the annual report were unanimously adopted.

Mr. Mitchell-Withers and Mr. E. Winder, jun., were then elected scrutineers for the election of officers, which resulted in the following elections:—President, Mr. R. W. Fowler; vice-president, Mr. Joseph Smith; treasurer, Mr. F. Fowler; honorary secretary, Mr. C. J. Innocent; council, Messrs. A. Smith Denton, H. W. Lockwood, W. F. Hemsoll, T. Winder and W. C. Fenton.

A hearty vote of thanks was passed to the retiring officers for their services during the past year.

## THE PREVENTION OF FIRES DUE TO LEAKAGE OF ELECTRICITY.\*

(Concluded from last week.)

## Reasons for Advocating Insulating Tubing.

THE wiring system thus advocated as best and safest would be a series of continuous tubes or conduits of insulating material which can be placed throughout a building after the manner of gas or water pipes, the conducting wires being afterwards drawn into the tubes. In this way the conductors are insulated electrically from all the materials used in the building, whether plaster, wood or stone work, gas or water pipes, &c., and the woodwork of the building is effectually protected from being ignited by "leakage" or the "accidental heating" or "short circuiting" of the wires themselves. The effects of "careless handling" or "defective workmanship" are also readily detected and remedied. For these reasons the building is effectually protected from the liability of fire arising through electrical service. Insulating tubes can be found which are waterproof, and will provide a high and durable insulation unattainable by any other method or at as low cost. Such a system can be installed coincident with building construction, and lends itself effectively to the placement, alteration, repair or enlargement of the conductors. A suitable metallic armouring provides protection from external trouble, whilst all internal troubles arising from moisture or damaged insulating material on the conductors are, from a fire-risk point of view, absolutely counteracted. From a prac-

tical point of view every desiderata is provided. Any defect in the tube construction itself would prevent the wires from being drawn in, so that the raceways themselves have to be mechanically perfect. The wires need not be brought into the building until all construction work is done, and are, therefore, not so liable to accidental damage, so that increased surety of insulation on the wire itself is obtained.

A perfect insulating tube should not be liable to decomposition by heat, should withstand moisture and resist electrolysis, be cheap, durable, pliable, strong, and not liable to shrink or warp. Such tubes can be produced, and are already commercially successful.

Many independent tests have been made by well known consulting engineers and others in respect to the realisation of the above advantages. In order to reproduce the condition where the insulation between two wires in the same tube might break down, "arcs" have been formed in a tube, with the result that the arc was found to last only a few seconds and affect the tube but slightly. To reproduce the condition where a conductor becomes heated through an excessive current, an insulated wire was placed in a tube and an increasing current passed through it until the conductor was burned out. The tube became heated but was not set on fire. To reproduce the worst possible moisture conditions an armoured tube was used, slightly bent and filled with water. After twenty-four hours' soaking, an insulation resistance measurement was obtained of eleven megohms, which was maintained as a permanent value throughout the series of tests, which were continued for several days. To prove the feature of "accessibility" a wire was placed in a tube, both were kept at a temperature of 190 degrees Fahr. for fifty hours and then allowed to cool. It was then shown that there was no sticking, and the wire could be withdrawn with ease.

Turning once more to the United States fire records, one single fire will be found recorded as having occurred upon wiring carried out in insulating tubes, whilst it is a fact that there are already many more lights installed in this manner than for the total lighting of England. The report of this fire, in detail, shows that an "unarmoured" tube had been installed, and that this had been broken between floor and ceiling, probably through careless construction work; moisture was thus able to affect the insulation on the wires at the unprotected point, and a "short circuit" resulted.

In order to determine the merit of iron pipe with an insulating lining over plain iron pipe, the following tests have been made:—A length of bare iron pipe and another of insulating tubing were taken, and two insulated wires run through both under exactly the same conditions. These wires were short circuited, with the result that a hole was blown in the iron pipe, whilst the insulated iron pipe stood the test perfectly. A 150-ampere fuse was arranged in the circuit employed for this experiment.

Again, an ordinary insulated wire was taken and the insulation on it damaged; the wire was then run through both tubes, and in order to reproduce the conditions of moisture occurring, cotton waste, impregnated with a caustic soda solution, was applied to the damaged insulation inside the tube in both cases, the tubes resting on damp woodwork, side by side, about 4 inches apart. Between the tubes an iron bar was placed forming the earthed pole of a supply system. This arrangement was intended to reproduce the state of affairs that might obtain when the pipes were fastened to a floor board or wooden beam attached to the iron girders of a building.

Current was applied, and under the above conditions the "leakage" arising from the defective wire placed in the bare iron pipe caused a fire to break out on the woodwork, whilst the insulated iron tube stood the test without suffering or causing any damage. It was further found that a fire could be caused with such a small "leakage current" as 1½ amperes, a three-light fuse placed in the circuit remaining intact.

## Conclusion.

Perfect electric wiring should combine in the fullest degree the attributes of safety, accessibility, convenience, economy and durability. The author has endeavoured to point out that an insulating tube method of wiring does provide "safety" by giving the greatest surety of action and freedom from the danger of fire. In respect to "accessibility," it provides for examination, replacement or repair to any part of the circuit with a minimum of trouble and expense. With respect to "convenience," the insulating tube is first fixed, due regard being given to the requirements of the building, and then completely fulfils its function of protecting the conductors. In regard to "economy," material utilised in the highest degree must admittedly be economical. Finally, as to "durability," a tube can be constructed, the materials of which are in themselves practically imperishable, and which at the same time find preservation for the conductors.

In short, it is thought that an insulating-tube system fully meets the various conditions of safe and perfect wiring, compensating crass ignorance, and counteracting gross carelessness on the part of those installing or using the electrical service.

\* The Fothergill Prize Essay, by Mr. Frederick Bathurst, A.I.E.E., published in the Society of Arts Journal.



The true principle which should guide the insurance interests is really the absolute prevention of fire, inasmuch as any fire loss at all necessitates that the community at large suffers, the rates charged being regulated from the total actual loss of the combined companies. The continued extension in the employment of electricity for power, light and heat must, if properly directed, tend to minimise the occurrence of any fires, and it is hoped that a case has been made out to show that an insulating tube or conduit system of wiring provides the best means of preventing fires arising from the leakage of current to earth, and the other causes of danger in electrical installation.

The chairman, Mr. W. H. Preece, C.B., said he could not help calling in question to some extent the statement that moisture was so deleterious to the insulation of wires. In the branch of the public service with which he was connected, they were only anxious that the cables which ran all over the world should remain in peace and comfort at the bottom of the sea. If one thing more than another conduced to the durability of gutta-percha and indiarubber, it was its being kept constantly at one uniform temperature under water. The great evil was not moisture, but alternations of moisture and dryness, and heat and cold. Such changes caused the elasticity and viscosity of the insulating materials to disappear; then it cracked and the moisture got in, and they got electrolysis and leakage. To guard against these evils, fuses were introduced, and though he should be sorry to say one word against their proper use, he could not speak too strongly against their abuse. His experience was that out of one hundred faults in an electric-light installation, ninety-nine were due to the fuses. By the rules of the insurance companies they were forced to introduce these fuses wherever they could be put. Fortunately, he was in a position where they were not subject to these rules. The Government offices were their own insurers, and made their own rules, and they reduced the number of fuses to the smallest possible limit. It was to a certain extent a satisfaction to an English engineer, that for statistics about fires caused by electricity he had to go to America, where very interesting and valuable reports were written upon them. That was because they had so many fires, but this arose rather from climatic conditions than from difference in practice. Here there was abundance of moisture; in America it was just the reverse, for there all wood-work was in such an inflammable condition that the least spark would set it off. But there was one thing in which our practice in England differed; that was the care bestowed, first in specifying what was wanted; secondly, in having the work done thoroughly, and properly inspected; and thirdly, in being guided by the regulations of the insurance offices as well as by those of the Institution of Electrical Engineers. So long as this was done there need be little fear of danger from fire.



#### The R.I.B.A. Elections.

SIR,—The list of members officially nominated to serve upon the Council and standing committees has just been issued. There are on the four committees sixty-four positions to be filled up, and for these no less than sixty existing committee-men are self-renominated; this is unfair to those who may wish to take their turn, and contrary to the best interests of the Institute.

There is, unfortunately, a tendency causing members of the Institute to vote for those candidates who have asterisks before their names in the balloting lists (these indicating existing members); still more unfortunately, not one-fourth of the members trouble to vote at all, probably on account of those repeated self-renominations which tend to keep out of office a reasonably fair proportion of new men and fresh ideas. Surely it should be compulsory that a few each year should *not* be eligible for re-election, that others may have a chance.

With regard to the Council, matters are even worse; the president, vice-presidents, secretary and members of Council number twenty-four persons, and no less than twenty-three of these gentlemen have (officially) renominated themselves for election; therefore, having in view the manifest advantages of the asterisk prefixed, there is but small prospect that new names will appear in the new Council.

If all the members throughout the country would vote, the result of the elections might bring in new men who would restore the Institute to its former condition of prosperity. Although the income of the Institute is vastly greater than when I joined it more than twenty years ago, yet its publications are not now to be compared with those given in years past. We used to have a large and handsome volume yearly,

beautifully illustrated; but this was discontinued for the sake of economy, and now we have merely a fortnightly journal, with a higher price marked on the outside cover than the contents usually warrant.—Yours faithfully,

METROPOLITAN FELLOW.

London: April 17, 1897.

#### GENERAL.

**The Fanmakers' Company's Exhibition** will be opened on May 25 at Drapers' Hall. There will be a historical section. Several prizes will be offered for painted fan-leaves and fan-sticks.

**The Dean of Winchester** says the nave roof of the cathedral is now finished, but 6,000*l.* more are required for the repair of the other roofs, more especially of the choir and north transept. The organ is also being reconstructed at a cost of 1,000*l.*

**M. Paul Blondel**, the French architect, has passed away in his fiftieth year. About two years ago he was appointed successor to M. Hardy as architect in charge of the Louvre and the surviving part of the Tuileries.

**Mr. W. J. Locke, B.A.**, has been selected as secretary of the Royal Institute of British Architects out of fifty-seven candidates. The Council have appointed Mr. Herbert G. Tayler as assistant secretary.

**The Late Mr. G. C. Schwabe**, whose personal estate is valued at 172,472*l.*, has bequeathed 1,000*l.* to the Artists' Benevolent Institution on the death of his wife.

**A Statue** of the late Paul Baudry, the French painter, several of whose works were illustrated in *The Architect*, was unveiled by President Faure at La Roche-sur-Yon on Tuesday.

**Dean Farrar** proposes to erect a new altar-rail in Canterbury Cathedral at a cost of about 2,500*l.* Representations of the implements of the Passion, the crown of thorns, the spear, &c., will be introduced, and also enamelled shields of all the Episcopate sees of the Empire.

**The Rev. W. F. Greeny, F.S.A.**, who brought out in 1884 a collection of rubbings of monumental brasses in continental churches and one of incised slabs in 1891, died on Sunday in his seventy-second year.

**Baroness Hirsch** has given 1,000*l.* towards the erection of a nursing home in connection with Guy's Hospital.

**A Monument** of wood has just been erected over the grave in which the casket containing the ashes of Mr. George Du Maurier was deposited in the Hampstead Churchyard after the cremation of his body at Woking. The corners of the structure at the head and foot of the grave are carved uprights in the form of ancient Celtic crosses. From the uprights runs a centrepiece, on which appears an inscription giving Du Maurier's name, date of birth and death, and the following words from "Trilby":—"A little trust that when we die we reap our sowing and so good-bye."

**The Sanitary Institute** have accepted an invitation from the Council of the city of Leeds to hold their autumn congress and exhibition in that city in September next.

**An Excursion Meeting** of the Northern Architectural Association will be held on Saturday next at Messrs. Wm. Harriman & Co.'s works at Blaydon. During the afternoon Mr. W. H. Allen will kindly read a paper on "Fireclay Manufactures."

**The New Musée** in the Invalides, Paris, will be inaugurated on May 1. It will be devoted to memorials of French warriors.

**M. Aimé Morot** is engaged on a large picture representing the Emperor and Empress of Russia after passing through the Arc de Triomphe on their entrance to Paris. It is to be placed in one of the galleries at Versailles.

**Dr. Rowand Anderson** explained the principles of construction of the M'Ewan Hall, Edinburgh, to the members of the Royal Scottish Society of Arts on Tuesday last.

**The Committee** of the American School of Classical Studies in Rome offer three fellowships for the year 1897-98, of the value of 600 dols., 600 dols. and 500 dols. The holders will have to work under the director for a period of ten months.

**The Ground** in Whitehall forming part of the site of Carington House has been let by the Department of Woods and Forests for the erection of a pavilion which will accommodate about 5,000 people on June 22. The rent is 6,500*l.* and the erection will cost about 5,000*l.*

**Dr. J. W. L. Glaisher, F.R.S.**, will read a paper on "Delft Ware" before the applied art section of the Society of Arts on Tuesday next.



# The Architect.

## THE WEEK.

A COURSE of four lectures on "Design in Lettering" will be delivered by Mr. LEWIS F. DAY, at the Society of Arts, on Monday evenings May 3, 10, 17, 24, in which the following points will be discussed:—Lecture I.—*The Alphabet*.—The alphabet as we know it—How it came about—The development and growth of its letters, from the beginning to the time when the printing press more or less fixed their form—The changes through which the shapes of the letters successively passed—The mark left upon them by history—The accidental character of the letters of the alphabet—What is essential in their form, and what, for practical or artistic reasons, may be susceptible of modification and improvement. Lecture II.—*Decorative Lettering*.—The alphabet regarded more especially from the point of view of design—Its inherently decorative character—How far it was eventually affected, and to what degree shaped, by considerations of beauty—The art of the calligrapher, his influence for good and evil—The relation of lettering to the implement, *i.e.* the point, the chisel, the brush, the pen, &c., with which it is written—Penmanship *versus* printing—What decorative lettering should be, and what it should not be. Lecture III.—*Ornamental Lettering*.—The alphabet turned to deliberately ornamental purpose—How far that has been done, and how far successfully—Initial letters, as found in illuminated MSS., in early printed books, and in the books of to-day—The latitude allowed to the artist in the design of initial letters and the like, and where he oversteps the bounds—Use before beauty—Ornament overdone—Legibility in lettering imperative—The exceptional cases in which the writer may mystify the reader—What we may do with the alphabet. Lecture IV.—*Lettering in Ornament*.—The place of lettering in the general scheme of decorative design—Its introduction inevitable—The universal use that was made of inscriptions, &c., in every form of decorative art, in all countries and in all but recent times—The loss thereby to ornament—The masterly use of inscriptions in Gothic and other design—The most beautiful use of them in Oriental decoration—Sham Arabic inscriptions in Mediæval art, a testimony to the decorative quality of mere lettering—Further possibilities of ornament in our own alphabet—The value of lettering in ornament, the opportunity for it, the scope in it.

THE technological examinations of the City and Guilds of London Institute reveal that students of building trades are not so intelligent as might be supposed. Taking the subjects as they appear in the report, we find the examiners in "Electric Lighting and Power" remark that "a very large proportion of the failures arise from the unreal nature of the information possessed by the candidates, and from the parrot knowledge which so largely does duty for an acquaintance with the subject. Candidates who cannot give simple answers to quite elementary questions in the technics of the subject, and waste their energies in calculating to many places of decimals numerical deductions from data having only three significant figures, cannot be regarded as qualified to receive certificates of efficiency in this branch of engineering." In "Plumbing" it is said that "very few of the candidates appear to possess any knowledge of the most elementary principles of hydrostatics," and "after a careful revision of the papers it would seem that the instruction mainly consists of learning by rote, and that the majority of teachers make little effort to encourage observation on the part of their students, or to verify by means of simple experiments the various principles underlying the work of the plumber." In some centres there are signs of an improvement in the answers given in the ordinary grade of "Carpentry and Joinery," but the written and graphic answers in honours are not equal to the standard usually attained. The candidates in "Brickwork and Masonry" seem to have no idea why they do certain things; only one was able to say why the ordinary method of striking joints is adopted by brick-

layers. There is a frequent use of difficult words, of which the candidates apparently do not understand the meaning. In no cases did candidates give definite rules for bonding brickwork. It would appear that in many instances the candidates have lacked good, practical, systematic teaching. If an investigation could take place, we are afraid it would be found that the competitors who are so weak formerly went through the processes of the schools of the Science and Art Department. The defects pointed out by the Institute examiners are exactly those which are recorded in Blue-Books as results of the official system of practical education.

THE question of apprenticeship has arisen in the Potteries district, and has had to be considered by Sir WILLIAM MARKBY, the arbitrator appointed by the Board of Trade. The master builders are somewhat uneasy since County Court Judge JORDAN decided that a master was almost as responsible for his apprentices as for his own children. A member of the Masters' Association has had to pay 400*l.* or 500*l.* as damages because one of his apprentices met with an accident. The National Association accordingly issued an indenture of apprenticeship so framed that it would free the master from such liability. The only question was whether it would be good in law. If it was, the masters would have no objection to bind apprentices. On behalf of the men Mr. R. WARD said they did not ask the masters to do the impossible. The arbitrator said he could not decide on the form of indenture to be used, but he should decide whether apprentices should or should not be bound. He should also alter the rule so that no new apprentices should be taken in excess of the number allowed, but that those who were bound should be permitted to remain even when the number of men had dropped below the stipulated proportion. It was agreed that if the arbitrator should rule in favour of apprentices being bound, the decision should not be acted upon until August 1, by which time the masters would know whether the form of indenture was good in law. The masters agreed in the meantime not to interfere with the present arrangement.

As was to be expected, HOLBEIN rules in the Tudor Exhibition, which is now open at the City Art Gallery, Manchester. There are several portraits by him, the most pleasing being the *Duchess of Milan*, which belongs to the Duke of NORFOLK. One of his most characteristic portraits is of the third Duke of NORFOLK. It is superior to the portrait of HENRY VIII. The king's head was one of those which are hard to paint on account of the excess of animalism and, moreover, the artist could hardly be at his ease before a subject who had so many ways of expressing dissatisfaction with a portrait. Another interesting portrait is Archbishop WARING. The Duke of DEVONSHIRE has lent some drawings which originally may have been as valuable as those in Windsor Castle, but they have suffered by the operations of a later artist.

THE annual general meeting of the Institution of Civil Engineers was held on Tuesday. The most important matter which occupied attention was the alteration of the by-laws so as to supplement the existing regulations by the introduction of a test, by examination, of the general and scientific knowledge of candidates for election into the class of associate members. A general conference of the Institution is to be held in London on May 25, 26 and 27, which it is hoped will satisfy a need that has been felt in an increasing degree with the expansion of the Institution. Including associates and students, the total number on the books at the end of March was 7,090. The year's income amounted to 22,285*l.* 8*s.* 10*d.*, and 15,417*l.* was received towards cost of new building. The expenditure of the year was 40,394*l.* 8*s.* 9*d.*, of which about one-half represents normal expenses, the balance being incurred principally in connection with the new building. It is anticipated that the final stage of the operations contingent upon the rebuilding of the premises will be reached during the recess, when the arrangement of the large and ever-increasing stock of publications and documents will be completed.



## ARCHITECTURE AT THE ROYAL ACADEMY.

THE contents of the architectural room in this year's exhibition of the Royal Academy corresponds in character with the exhibition if taken as a whole. There is, perhaps, no work of commanding attraction which cannot easily be forgotten; but, on the other hand, there are many which have much interest. Architecture as well as painting is above the average. The young couples who will use the room during the ensuing months have reason to feel indebted to the architects and designers who have been at so much expense to make the walls more agreeable to occasional glances. It is, of course, for the sake of those occasional and happy visitors that the hanging committee have introduced so many coloured examples of ancient architecture and modern decoration. The Academy is supposed to present examples of living art. On that account it would be considered very absurd to introduce copies of masterpieces in either sculpture or painting among modern examples. In the architectural room an irrational exception is always made. The committee would say we cannot expect our young visitors to exert themselves sufficiently and bestow attention on modern buildings; but about antiquity there is a hazy sort of romance which is in keeping with their feelings. It would be more advantageous for some of the artists if their drawings were found elsewhere. Mr. BREWER's beautiful pencil drawing of the Choir of Bamberg Cathedral should be seen in the black-and-white room. Mr. MALLOW's West Front of St. Gilles, Provence; Mr. H. C. CORLETTE's series from the Abbey Church, St. Savin; Mr. NICHOLSON's Portal, St. Saviour's, Dinan; Mr. HENDERSON's Italian Views, &c., would be more apposite elsewhere than where they are seen.

The modern buildings are varied, and it is not easy to group them. They suggest, in the first place, that Queen Anne is dying, if not already defunct. The tendency is to recur to English models of an earlier time, or to those in France or Italy. The number of churches indicates the efforts which are being made to elevate even the humblest classes; at least one-third of the drawings are ecclesiastical. The churches are mainly of an inexpensive kind, and there are very few among them which are not Gothic. Country as well as Metropolitan architects are represented. Dublin, Manchester, Liverpool, Birmingham, Leeds, Dundee, Nottingham, Aberdeen, Bath, Lancaster, Leek and other places can claim a share in the collection. We shall not attempt any classification, but glance at the drawings in the order they are presented in the catalogue.

We have first a few small but excellent churches by Messrs. G. H. FELLOWES-PRYNNE, E. M. BRUCE VAUGHAN, TEMPLE MOORE, and CLARK & HUTCHINSON, in which the simple rectangular plan is avoided, and there is nothing monotonous in any of them, yet all are cheap. The Hedgehog Inn, by Messrs. BREWILL and BAILY, which is their only contribution, is suggestive of cosiness by the windows, which are broader than long, and the well-sheltered porch. The Seaside Hotel in Cornwall, by Messrs. ROGERS, BONE & COLES, from its size must belong to some out-of-the-way village. The County Hotel, Salisbury, by Mr. E. DORAN WEBB, appears to be placed over a stream, and its position helps to increase its picturesqueness. The Granite Presbyterian Church, Putney, by Messrs. J. C. T. MURRAY & C. E. MALLOWS, resembles a village church, with the exception of the tower, which makes it suitable for its suburban position. The First Lodge, Lea Park, by Mr. PAXTON WATSON, has a gateway with rooms near it forming a group, and is very suitable for its purpose. Mr. THOMAS GARNER's new House at Hampstead is somewhat Elizabethan in style, the large porch being the most important feature. Mr. CUTLER's Vicarage, Epping Forest, resembles one of those pleasing houses which he introduced in his last published collection of designs. The new schools for the French Protestant Church of London, by Mr. ASTON WEBB, appear to be a private house or offices, but the inscription announces the purpose. The two cornices give shadow and the bell-cot imparts variety to the roof, while the pilasters remove the flatness of the front. From the position in which it is hung the view of Her Majesty's

Theatre, Haymarket, by Mr. C. J. PHIPPS, appears as if it must weigh down the lower storey. It is French Renaissance, and would pass as a work of a student of the Ecole des Beaux-Arts. The building is undoubtedly an improvement to the locality. It also suggests the advantage of competition in every department of architecture. The Royal Music Hall, Holborn, by Mr. ERNEST RÜNTZ, is an endeavour to impart good style to a kind of building in which vulgarity is supposed to be allowable. The contrast with its predecessor is remarkable. But in the Empire Palace of Varieties, Middlesbrough, the architect had more scope, and he has produced a building which is novel as well as graceful. The Artisan's Room, by Mr. BARRY PARKER, should be accompanied by an estimate of cost. We hope the London County Council will not be inspired by it to undertake new feats in building luxurious homes for their humble constituents.

The Passmore-Edwards Library, St. George's-in-the-East, by Mr. M. B. ADAMS, is more of a reading-room than a library, for in it the plan devised by PANIZZI has been followed on a small scale. The façade is remarkable for the extent in which curved lines have been used, and if compared with its severe neighbour, the vestry hall, it may be said to be alluring, which is an advantage in such a district. The church of St. Peter, Hornsey, is one of Messrs. J. BROOKS & SON's effective churches which have no towers. Two spirelets serve as belfries; the details are marked by much breadth, and there is no striving after novelty. The new nave and chancel of Yiewsley Church, by Mr. C. A. NICHOLSON, includes a rather remarkable tower. Mr. G. A. LANSDOWNE's mission building is very plain, but is redeemed by the large window. The design for a hillside church by Mr. C. L. BRIERLEY does not appear to be as suggestive as those prepared some years ago for the Bishop of CARLISLE by Messrs. PALEY & AUSTIN. Mr. LACY's screens and decoration for All Saints, Cambridge Circus, is rather indefinite in style, the architecture being subservient to the painting and inlaying. Mr. BRIGG's house at Quarry Woods, Marlow, has the advantage of a long balcony on which the bedrooms open, but on the ground storey it would have been advantageous if the drawing-room was not a repetition of the dining-room. In Mr. J. J. SHAW's bronze gates the figure is largely employed, and there is much richness in the composition. Mr. J. C. WATT's design for a mausoleum is neo-Grec in detail, although a dome is employed. Such a structure would be an interesting addition to a metropolitan cemetery. In the new church of St. Stephen, Nottingham by Mr. W. D. CAROE, flat curves have been employed for the window heads, and form a contrast with the bays of the nave, but we imagine the buttress introduced at the west end will be a disturbing element. The extensions, Panmure Arms Hotel, Edzell, by Mr. T. M. CAPON, with other drawings of northern buildings, will suggest that the peculiarities of the Scottish style are no longer in favour with architects or their clients. It is a good type of country hotel, in which an excess of repetition is avoided. St. Peter's, East Grinstead, is a small and severe Romanesque church, but the tower is so large as to suggest that Mr. WALTERS originally thought of making the building a tower. The Passmore-Edwards Settlement, by Messrs. SMITH & BREWER, is a very plain red brick building, but without any appearance of a prison or a workhouse. In St. Magnus, Bessingby, Yorkshire, Mr. TEMPLE MOORE combines a small low tower and spire of excellent proportion with the body of the church in a pleasing way. The houses at Hampstead by Mr. JAMES NEALE form a substantial group, with rooms that must be all well lighted from the capacious windows and are no doubt commodious. The design for church at Exeter by Mr. C. A. NICHOLSON has an excellent tower, which would probably look better in masonry. Mr. C. SPOONER has produced a quiet and suitable church without the aid of any tower. Messrs. SILCOCK & REAY's country house, Bath, is a very large Elizabethan building which should have a grand park around it. The difficulty is to some extent met by the introduction of a terrace with balustrades separating the ground from the public road, but there is apparently no point of view available from which the building would appear as it ought to be seen if judged properly.

(To be continued.)



## THE WATER-COLOUR SOCIETY'S EXHIBITION.

THE first glance at the exhibition of the Royal Society of Painters in Water-Colours is enough to show that new ideas are struggling against those which gave character to the art. There is possibly an error in suggesting that what now appear as novelties were unknown to the founders of the Society. The Council have prefixed to the catalogue a memoir of JOHN VARLEY, which is taken from Mr. ROGET's book. But it would have been more appropriate if they had introduced some of Mr. VARLEY's precepts instead of an account of his weakness in borrowing money at thirty-five per cent. That fine artist was not an advocate of stereotyped practices. He opposed all those who "too rarely consult their own original impressions of a subject, but rather depend on imitations of works which, though justly entitled to respect from their possessing many valuable qualities, have nevertheless faults in practice contrary to sound principles, and which, instead of avoiding, they often use as sanctions or authorities for their departure from the pure and simple impressions derived from nature alone." In these words we have an apology for Impressionism so long as it is of a pure and simple kind. Another of his recommendations was that landscapes must appear to be executed with despatch, for "while the deliberate progression of the painter in oil may be compared to Philosophy, the practice of landscape in water-colours must assimilate to Wit, which loses more by deliberation than is gained in truth." JOHN VARLEY's words might be taken as a warrant for novelties in practice. But can it be supposed he would approve of such a departure from precedent as Mr. ARTHUR MELVILLE's *Spanish Bull Fight*? We may compare it to a piece of music which depends for interest on its pauses. The blank space in the drawing exceeds the part assigned to figures; indeed, the blank becomes as it were more marked by the occasional introduction of a head or a hat. If the view represented the time prior to the fight when the best seats were empty, we could understand it; but it does not produce the sensation of a time when all thoughts have one direction; rather it suggests a drawing that was well commenced but was never completed. Nor can we believe that VARLEY would rejoice in Mr. CLARENCE WHAITE's *St. George and the Dragon*, in which the monster emits a body of flame that is enough to consume a troop of knights and princesses, or the *Lot and Two Angels*, by the same artist, which indicates that celestial robes are dyed in colours as hard as any extracted from coal tar. To our minds Mr. WHAITE's *The Wrong Path* is preferable, although evidently it was intended to produce the effect of an oil-painting on the gazer. Mr. ALBERT GOODWIN's *The Jumna and the Taj Mahal* is as sultry as can be desired, and it was daring to suggest that sky, land, water and buildings were alike inflamed. But why must he jeopardise the future of his delicate Swiss drawings by so persistent an employment of the scraper? It may be problematic whether water-colours fade, but a few days' exposure of the *Amsteg, St. Gothard* without glass would mar its effect. Mr. MARKS knows how to justify the title of a picture, as becomes so practised an illustrator; why has he found it necessary to employ large capitals in gold to indicate which is which of the two figures in his *Envy following Merit*? In all the preceding cases innovation does not signify improvement, and the majority of visitors are likely to enjoy the old-fashioned examples with more zest in consequence.

Sir JOHN GILBERT has another characteristic work, *A Standard Bearer*. It is all in opaque colours, and the buffs especially are very dirty. The blue standard is harsh and disagreeable, but the effect is striking. In VARLEY's time the difficulties of the draughtsman arose from the peculiarities and defects of the paper. Some credit is due to the maker of the sheet employed by the President, for it has to sustain a very heavy load of colour. Sir JOHN's *Cedric's Pledge*, from "Ivanhoe," recalls one of his drawings. As usual, he is indifferent to the archæology, for SCOTT certainly is silent about so large an expanse of white linen on the tables as appears in the drawing. The Deputy-President has wisely restricted himself to two small portraits of Mr. WATTS, R.A., and Mr. B. BRADLEY, which are as vigorous as if they were on larger scale.

Mr. CUTHBERT RIGBY has some drawings from the North of England lake district which are delightful, not only for their quietude, but from the success with which atmospheric effects are represented. Mr. S. J. HODSON has evidently painted his three subjects on gloomy days, and in consequence the buildings in Goslar and Hulberstadt appear heavier than is usual with this painstaking artist. Mr. WALTER FIELD, in his *Way to Borough Marsh* and *Hampstead Heath*, also shows the influence of the weather and the absence of sunlight. The Heath, in consequence, is hardly recognisable, it is so sombre. Mr. WILMOT PILSBURY this year paints landscapes only, which are very careful in all their details. The three drawings by Mr. BIRKET FOSTER are welcome additions. There is less conventionality than usual. Mr. W. CALLOW in productiveness has surpassed the other members. Objections may be raised against his system of outlining with a pen, and the colours employed seem occasionally to have been put in from recollection, but in suggesting the character of foreign buildings he comes nearest to PROUT. This year there is no abatement of dexterity. Official duties do not seem to have made Sir E. J. POYNTER's hand more light. On the *Lake of Geneva* is an honest endeavour to be accurate, but the landscape forms are too severe. They are apparently as puritanic as the citizens. Mr. M. HALE's *Winter Twilight* is a difficult subject, for it shows a street with the shops brilliantly lighted. The *Italian Landscape* by Mr. R. LITTLE is of course spotty, but the colour is fine, and there is a suggestion of the Southern atmosphere. Once more Mr. J. W. NORTH has an autumn scene, *King Arthur's Pool*, but with the variation of a waterfall. The colour, we need hardly say, is splendid. Mr. H. S. HOPWOOD has three interiors, the most successful being *A Whittly Jet Worker*, a man in a garret lighted from the roof working at his lathe. Mr. T. M. ROOKE's church buildings will be preferred to his *Clytie* and *Daphne*. He is one of the best of the Society's architectural draughtsmen. Mr. W. COLLINGWOOD is in force this year with Alpine scenes. Mr. H. M. MARSHALL is competing with Mr. WYLIE in below-bridge scenes; the best of them is the *Old Essex Wharf, Limehouse*. There is some novelty in Mr. S. P. JACKSON's *Stonehenge*, for the ground seems covered with hoar frost and there is a warm sunset at the back. Mr. TOM LLOYD has two winter scenes showing a house lighted up from within. His *Waterlilies* and *Primrose* are, however, in the style which his name recalls. Mr. NAPIER HEMY, as usual, has some excellent fishing-pieces, of which *A Gale, Scilly*, is the finest. Miss MILDRED BUTLER's *Banquet*, showing a number of pigeons collected around some golden grain, is a spirited drawing. Her *Toll from the Turnip Cart* and *Shine and Shadow* are further evidence of the lady's importance as an addition to the Society. Mr. JOHN PARKER has abandoned his village maidens and his pair of mediæval poachers in *Who Comes? Burnham Beeches in the Olden Time* is the most effective drawing he has produced of late years. But the outlaws are only accessories to the splendid trees. Mr. CARL HAAG's *Nubian Harper* is represented with his customary precision, and is novel in appearance. Mr. E. F. BREWTONALL has attempted a most difficult subject in the *Fisherman and the Genie*, which is an admirable illustration of the Arabian Nights. The artist is no less successful in his landscapes. The two Scotch views by Mr. COLIN B. PHILLIP, *The Iron Road* and *The Island of Rum*, will bear comparison with any similar scenes which have appeared in the Gallery. He is a strong rival of Mr. R. W. ALLAN, whose *Fresh from the Sea* is true to nature. Mr. GEORGE CLAUSEN has one drawing, *Earth and Sky*. The earth is true enough, but the puffy clouds in the sky seem to be only a transient phenomenon. Mr. WAINWRIGHT's *Here's a Health to the King* is not happy, but with a different face the costume and accessories would pass. Another disappointment is Mr. GLINDON's *Monastic Dinner*, which is commonplace in subject, and the figures have not the characterisation which the artist has so often displayed. Miss C. MONTALBA has three views in Venice in her usual style. Mr. A. R. HUGHES should be represented by more than one drawing. His bust, *Jacques*, a Shakespearian study, is not enough to satisfy the artist's admirers. Mr. A. E. EMSLIE is more vigorous than usual in his view of *Barnet Fair*.

The Water-Colour Society labours under the disadvantage of having no real competition. Every member is



supposed to have a field of his own which he can cultivate without any disadvantage to his neighbours. Some members are so familiar with their subjects, we often wonder it is not announced they have made their drawings with their eyes closed; that result must be expected so long as the Society is a close corporation without any expectation of reform. If we remember these facts and make allowance for them, the quality of the Society's exhibition will not appear to be so dubious as it would be to those who were not aware of the happy position which the members possess.

## STREET LIGHTING BY ELECTRICITY.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

THE subject of the better illumination of the streets is now receiving the careful consideration of borough surveyors. The actual benefit of an increased illumination can hardly be estimated, but it is undoubtedly very large in important thoroughfares, and the difference between well-lighted streets and poorly-lighted ones may make all the difference in the trade of a town. What really is required is a fairly equal distribution of light. This fact is being realised at the present time, and attempts are being made to increase the illumination, retaining often the gas lighting also. The object of this article is chiefly to show that, as the standard of illumination is increased, electric lighting comes to the fore as the cheapest and most satisfactory.

In order to obtain a satisfactory result, several points must be taken into account. It cannot be stated that a lamp of a certain candle-power will afford sufficient illumination for a given length of street or a certain area. The conditions as to the nature of the walls of buildings on either side, the width of the street and its course, whether straight, curved or hilly, the height the lamp is to be placed, and its appearance, must all be considered very carefully; but, given the same street, a comparison may be made between two methods of illumination.

Referring to the positions of the lamps, we find the lamps in some cases in the centre of the road, in others alternately on either side, and often a combination of the two.

As a basis of illumination, it may be taken that the illumination given by bright moonlight is the least that ought to be allowed as good. Mr. A. P. TROTTER found that this illumination is one-thirtieth of that given by a standard candle at a distance of 1 foot (the candle-foot).

The use of incandescent electric lamps is not appreciated, especially in main streets. The reason for this is that when electric lighting is introduced into a town the inhabitants expect a more powerful light, and are disappointed at the result when incandescent lamps of comparatively low candle-power are used. It is, however, often advisable to use them in side streets, and especially when the contract with the gas company is being ended, as in this case and others where the mains are laid in residential and side streets a great saving can usually be effected if the local authorities are the owners of the works. In any case, the lamps must be neatly and carefully erected, and scientifically shaped reflectors and diffusing globes should be used. The mere placing of incandescent electric lamps in ordinary gas lanterns is apt to look ridiculous. With lamp standards already fixed, the distribution of light would be the same practically with an electric incandescent lamp as with a gas-jet of equal power. For lamps burning all night electricity can be supplied at a rate unapproachable by gas, as the cost of producing electricity under these conditions is extremely low, while the cost of gas is not affected by the time of burning to any large extent.

The comparisons hereafter made refer to continuous current arc lamps, as they are preferable for street work. An alternating arc is in the first place less efficient, and secondly, the light is distributed in an unsuitable manner, half of it being thrown above the horizon, whereas with continuous currents nearly all the light can be thrown below the horizon. It may be taken that with alternating current lamps the cost of lighting will be about 50 per cent. above that with continuous. When a high standard of illumination is desired, a fair comparison may be taken

between a lamp taking 50 cubic feet of gas per hour, and giving a mean spherical candle-power of about 150, and an electric arc lamp taking 10 amperes, and giving a mean spherical candle-power of about 1,150.

The 10-ampere arc lamp can be kept in order and supplied with carbons and current at an annual charge of 26% if run all night, *i.e.* 4,300 hours per annum. The gas lamp will cost about the same per annum, assuming gas at 2s. 2d. per 1,000 cubic feet, and allowing 2d. per annum for cleaning, &c.

In comparing the illumination produced on the ground, or on a plane say 5 feet 6 inches above the ground (the average level of the eye, which is the one required most often) by these two forms of illuminants, there are several terms which must be defined. The unit of candle-power is the intensity of the light given out by a definite candle measured at, say, 1 foot from the source. The candle-power of any source of light at any point varies inversely as the square of the distance of the source from the point. The unit of illumination on a surface is the illumination produced by a standard candle placed at unit distance, say 1 foot, from the surface. This unit is called the candle-foot. The difference between candle-power and illumination (candle-foot) is that the former is practically the illumination which would be produced by the lamp at a fixed distance (1 foot), and the latter the candle-power of a lamp which, if placed at a distance of 1 foot from the surface, would produce the same illumination as that to be measured. For instance, 1,000 candle-power lamp 100 feet (direct) from the surface produces an illumination of

$$\frac{1,000}{100^2} = \frac{1}{10} \text{ candle-foot, a very small amount for such a large lamp, it may be said.}$$

Returning to the particular case. It will be found that a 10-ampere arc lamp, placed on a post 18 feet high, will produce  $\frac{3}{4}$  a candle-foot maximum illumination; hence the candle-power in this particular direction is about 400. The candle-power is much higher in a direction corresponding to a further distance from the post, but the illumination does not increase with the candle-power, owing to the rate at which the actual distance of the spot from the lamp is increasing. With the gas lamp the candle-power is practically uniform in all directions, and consequently the maximum would be near the post, which would be about 12 feet high. Therefore the maximum illumination would be higher than with the arc, *i.e.* one candle-foot. This is due to the post being shorter. At a distance of 100 feet from the foot of the post the arc will give an illumination of .023 candle-foot, while the gas lamp will give about .014 candle-foot, or less than half, while at a distance of 30 feet the arc will give .67 of a candle-foot, while with the gas only .13 candle-foot is obtained. In fact, the illumination diminishes very rapidly with the gas lamp, and less rapidly with the arc. It will be found that from two to three gas lamps of this description (depending on the nature of the street) can be replaced by one 10-ampere arc. Taking the figure 2, then, to get the specified minimum illumination ( $\frac{1}{30}$  candle-foot, moonlight), the same average illumination and approximately the same maximum, in the case of arc lamps they would need to be 120 feet apart, and in the case of gas lamps they would be 60 feet apart; in fact, the cost of lighting the area to approximately the same level (a high one) would be 72% per annum in the case of gas and 36% in the case of an arc lamp. If the gas lamps were of lower power, and more of them in the area, the arc lamps would replace them in the same proportion for the same average illumination. For example, one 10-ampere arc would replace two 150 candle-power, four 75 candle-power, six 50 candle-power, and twelve 25 candle-power gas lamps. With the lower candle-power gas-burners, more evenly distributed, the minimum illumination would be higher and the lighting more uniform; but the lower efficiency of the smaller burners and the increased capital outlay, cost of cleaning, &c., balances this advantage, and the cost would be in the same ratio, *i.e.* the cost of gas-lighting at least twice that with continuous-current arc lamps.

If the lamps are placed further apart, the arc lamps must be raised considerably, in order that the parts further from the lamp shall receive some light.

If the streets are wider than half the distances between



the posts (60 feet for arcs and 30 feet for gas), it will be necessary to place lamps in the middle of the street, so that the minimum shall not fall beneath the limit imposed (moon-light). With lamps of lower candle-power it is necessary to place the lamps nearer together to obtain a reasonably high minimum, and the average is consequently more uniform the maximum being less.

The fact that an arc lamp gives very much less light near the horizontal than below it handicaps it for this work, *i.e.* large centres of light at considerable distances apart, as the minimum becomes so low, and the solution of the difficulty will undoubtedly be found in smaller lamps placed nearer together. Two 5-ampere lamps would be much more effectual from this point of view than one 10-ampere lamp, although the average illumination would probably be less. Lamps of less than 5 amperes are never used for street lighting, as they are not reliable, and this limits the extent of the use of arc lamps to fairly high illumination work, where they can be near together.

If small arc lamps of about 100 candle-power could be made, burning a long time (to reduce attendance), to work satisfactorily, gas lighting would be at once doomed, for in that case the electric arc light could be used for a low illumination such as is required in most cases. The arc lamp is, light for light, only one-third as expensive as gas or incandescent electric lamps to run, assuming the average costs for gas and electricity, and would naturally supersede them; it is the low illumination between the posts when they are far apart that restricts its use. There are at the present time several attempts to produce such lamps, and no doubt they will be obtained in time, and then electric street lighting will be as much cheaper in our small towns, compared with other illuminants up to the same standard, as it is now in our cities.

The difference between the distribution of light with an arc lamp and an incandescent electric or a gas lamp is that with the two latter the candle-power is uniform in all directions, and with the former the distribution is roughly as follows, assuming the maximum candle-power to be 1,000:—

Angle with the Horizontal.	Candle-power.	Angle with the Horizontal.	Candle-power.
0 deg.	200	40 deg.	1,000
10 "	400	50 "	800
20 "	600	60 "	457
30 "	875		

The original practice was to place arc lamps very high when the area illuminated had to be large, so that the furthest point should be brought at a greater angle from the horizontal, where the candle-power is greater. This practice is now going out and steps are being taken to increase the candle-power in the more horizontal portions. This is done by lengthening the arc and increasing the voltage, and by the use of reflectors and diffusing globes to alter the distribution of light.

In narrow streets the lamps are often suspended from the houses on either side, and often light arched girders are used to support the lamp and to allow of its being cleaned by drawing it to one side without interfering with the traffic. This latter is done in the City of London and at Brighton.

Respecting the relative capital cost of erecting gas and electric lamps there is very little difference, and for high candle-power lamps the cost is less with the electric arc, and with the low candle-power lamps the cost is about the same, whether gas or electric are employed.

Incandescent gas has not been considered in this article for the reason that although the cost for gas with the same illumination might be less, the cost of renewals to mantles, the increased capital cost and the extra attention required will bring the total cost to about the same level as with ordinary burners. In many places where it has been tried the amount of attention required and high cost of renewals due to vibration and wind have proved against it. Even at its best it cannot compare favourably with arc-lighting for high illuminations, and incandescent electric lamps will replace incandescent gas burners in street lamps with a saving for the lower illuminations.

In conclusion, it should be remembered that the efficient lighting of the principal streets will give greater satisfaction and receive more general approval than the lighting of a large area in an inadequate manner.

## HOT-WATER HEATING.\*

IN a great many ways the Americans are proud to keep up English institutions, but it looks as if one of the most sacred—the English fireplace—is to succumb to their inventions. "My own fireside" is supposed to be as peculiarly English as the word "home." Generations of schoolboys can always understand, more clearly than most other incidents related in English history, the comparison which the old Thane made before PAULINUS in the reign of King EDWIN, when man's life was said to resemble the passage of a bird through a hall, and which had been attracted by the blazing fire on the hearth. Even beasts and birds were supposed to appreciate the open fire. We need hardly say that the character of English buildings has been affected by the necessity of providing open fireplaces and big chimneys. In copying Greek and Italian models; it has been difficult to introduce chimneys that will be in keeping with the rest of the design, but although they were made to assume the forms of vases or ornamental appendages, it was compulsory to avoid the omission of them. A change in that respect appears to be inevitable. According to Mr. DYE, "The day cannot be far remote when the majority of residences of fair size will have a hot-water heating plant in them, and the saying about an Englishman's love of an open fire and its cheerful blaze will be extinct." As a consequence, we must expect modifications in chimneys. Smoke pipes will be often substituted for them, and, as our author suggests, "will bear tasteful decoration in light water-colours," which last and keep in satisfactory condition. We may even have underground flues. We must, therefore, expect a revolution in planning, unless old-fashioned arrangements are preserved for the sake of effect. In one place we are told about a "well-known engineer in London who, whenever he can, carries a distinct flow and return from the boiler to each floor, and the practice insures excellent results, but is not usually possible for various reasons, such as cost, the appearance of the stack of pipes, &c. No one, however, could find fault with the way in which the apparatus would work." But as the public are beginning to consider that comfort is of far more importance than appearance, it may be assumed that the stacks of pipes and the various appliances for heating by hot water will become the ruling elements, for which, whatever the sacrifice entailed, provision must be made.

Although warming by the aid of hot water is now one of the most essential industries of our time, it is of comparatively recent origin. It was not, we believe, considered of sufficient importance to be represented in the International Exhibition of 1851. In 1859 only three varieties were known to experts, *viz.* KEWLEY'S, the Marquis DE CHABANNES'S, and PERKINS'S. They were not very elaborate in arrangement, as will be evident from the following description:—

The hot-water apparatus, in its simplest form (Kewley's), is on the principle of a syphon. It consists of a long pipe coiled about in the rooms to be heated, and having two legs of unequal length passing down into an open kitchen boiler; the short leg dips just under the surface of the water, and the long leg passes to the bottom of the boiler. As the water becomes hot it rises in the short leg and circulates to the coils in the upper level, where it parts with its heat, and then descends in the long leg to the boiler. The apparatus is not adapted for any great height (not above 14 feet), and the water cannot be heated above 180 degs. because of the tendency to a vacuum.

The second form of the apparatus is that contrived by the Marquis de Chabannes. It consists of a closed boiler, with the two legs of the syphon communicating with a cistern at a high level. These are filled with water, and when the fire heats the contents of the boiler, the hot water rises at once to the cistern, whence it is distributed by coils to the rooms to be heated, and then it descends to the boiler. By this arrangement the temperature may be raised to 212 deg., and the water conveyed to any distance.

The third and only other form of the apparatus is the invention of Mr. Perkins. It is a closed circuit of comparatively small pipes filled with water. About one-eleventh part of the whole tube is coiled in a suitable manner and placed in a furnace at the lowest level. From this a straight tube passes to the top of the building, and thence the pipe descends to the several rooms to be warmed, where it is coiled so as to expose a large radiating surface; from these it returns to the coil in the furnace. An expansion or safety tube is placed at the uppermost part of the apparatus to guard against danger from the too great expansion of the heated water. The temperature of the water in the

\* *A Practical Treatise on Warming Buildings by Hot Water, and upon Heat and Heating Appliances in General.* By C. H. Hood, F.R.S. Rewritten by F. Dye. Third Edition, Revised. London: E. & F. N. Spon, Limited, 125 Strand.



furnace coil may be raised to 400 deg., but the circulation and cooling in the return coils is so great that the water soon falls to 200 deg.; in fact, when the return coils have a radiating surface about ten times as great as that of the furnace coil, it is hardly possible to maintain a temperature above 200 deg.

A glance at our advertisement pages is almost sufficient to suggest how numerous and perfect are the appliances which are now available. The demand would not be even so general as it is at present if there were not benefits obtainable from hot-water heating which can compensate for the sacrifice of the associations connected with the older systems. There are, however, some obstacles which are more difficult to overcome than the loss of the open fireplace. One is the prejudice about the unhealthiness of coils and radiators. It may as well be admitted that almost every element of a house can become injurious to health if there is negligence. Windows and doors are agents in creating colds and other chest diseases. Chimneys and fireplaces may not aid in drawing off with sufficient celerity the dangerous elements which are set free in burning coal. Pipes may turn water into poison, drains can emit deadly gases. In fact, carefulness is required from the occupants of houses, and all parts of the building, from foundations to roof, should be regularly observed if the possibilities of risk to health are to be diminished. If a hot-water apparatus is neglected by those who use it, or if it is set up by incompetent men, there is no reason why it should become an exception to the universal law which makes discomfort and other evils appear as the penalties of indifference. Heat can be controlled, and the interior of a house kept at a uniform temperature by the apparatus. A blessing of that kind would be worth some minor sacrifices, but people who have employed hot-water heating have failed to suffer in any way. Another obstacle is the appearance of radiators. They are not always in the best taste, and some which are supposed to be ornamental are the least satisfactory. But that is a weakness which seems common to many varieties of metal-work. When we see costly bridges which do not gratify the eyes of spectators we must not bear too hard on the makers of apparatus. They have to work under disadvantages. So far as experience goes, radiators cannot be concealed without loss of efficiency. Then there is vigorous competition, which is never favourable to the production of works of art. But it is evident that efforts are made to improve the appearance of radiators. Mr. DYE is surprised that brass is not used, which is so well adapted, and he says he has some in progress which he anticipates will "do much to make hot-water heating more favourably looked on in well-furnished houses, and there is also a probability that other manufacturers will be induced to follow the example set them." Any change of that kind will facilitate the introduction of radiators into private residences.

For hot-water heating in public buildings and houses there is a sort of experimental region such as is not to be obtained in most applications of science, viz. horticultural works. Economy and simplicity have to be studied and the spaces to be heated are not always in the same condition. Mr. DYE has therefore devoted a large part of his book to the peculiarities of heating horticultural buildings, and the subject is worthy attention, although the student may never be called on to design conservatories. In ordinary buildings there can be a choice of apparatus, but they all exemplify the low-pressure or high-pressure systems. Each system has its advocates, but it rests with the architect to make the choice. It is an advantage of Mr. DYE's book that there is no endeavour to bias the reader's judgment. He has apparently carried out a variety of works, and he gives to all the benefit of his experience in a manner that must be considered impartial. For example, in describing his work in a large bank he says the mains were carried along the ceiling of the basement (the radiators were in a crypt below), which was not absolutely necessary, as there was a space between ceiling and floor in which they could be placed. But the architect wished to have all the pipes visible, on which decision Mr. DYE remarks:—

It is certainly desirable to carry pipes, when the length and quantity is considerable, so that they are always visible, for with the best work leakages will occur. The leaks that may show themselves at first testing are of course remedied there and then; but small leaks may develop themselves for possibly a month afterwards—not as a rule, perhaps, but it certainly does happen so occasionally. If a large

apparatus is finished and tested in the summer time, a leak or two may reasonably be expected when the apparatus is set to regular work later in the year. Leaks do not occur perpetually, however, after the system has once been overheated and subject to the trials that a new apparatus is liable to, with probably an unskilled attendant at the boiler.

But there is another aspect of the case, for with exposed mains there is generally a loss of heat, which is an important consideration. Mr. DYE therefore says:—

It is very desirable that the mains be covered, to conserve the heat within them. If this is not done, more trouble and expense is incurred than appears at first thought. Mains are seldom carried in the warmest situations—that is, situations naturally warm—so that they lose a deal of their heat. The flow main, of course, has the hottest water within it, and consequently is in a condition to lose heat the fastest when surrounded by cold air. The loss can be easily calculated, and will be found commonly equal to six radiators doing good work. This means waste of fuel, as a rule, and always delays results when heating up; but most importantly it means serving radiators with water that has been reduced in temperature. When mains are uncovered, or merely encased without packing material, they must be calculated as radiating surface when arriving at the size of boiler to work the apparatus. This may make an extra expense in the boiler greater than the cost of covering the pipes, apart from the better general results the covering ensures. By covering the pipes it is not meant that they have to be totally hidden in cases beneath floors or plaster-work. There are coverings now made that can be put up very rapidly, are as neat in appearance as the pipe itself, and which admit of any part of the pipe being exposed in less than a minute.

The high-pressure system which was introduced by PERKINS in 1845 is not as generally employed as its rival, and its title may have something to do with the difference. In drying-rooms, japanning works and for various other industrial purposes high-pressure heating is almost indispensable. But wherever used the rule in the Building Act must be observed:—"A pipe for conveying hot water shall not be placed nearer than 3 inches to any combustible materials." The restriction does not now apply to pipes conveying steam or hot water at low-pressure, the latter being supposed whenever the pipe is provided with a free blow-off or open expansion pipe. The distinction is enough to increase a prejudice against the high-pressure system, although as the primary purpose of the Building Act is to remove all chances of fire, the precaution is not excessive. The 3-inch limit, however, does not compare favourably with the liberty conferred by the Act in authorising the fixing of a pipe for conveying smoke or other products of combustion at no greater distance than 9 inches from combustible materials. Mr. DYE says the limit is decidedly insufficient with horizontal pipes carried beneath ceilings, especially match-lined ceilings. There is no rule about sweeping, and the pipe, if of sheet-iron, might become red-hot, while earthenware flues are when foul liable to fracture. To increase the security of both hot-water and stove pipes Mr. DYE considers there is nothing better than silicate cotton. He refers to an experiment made "with a thickness of silicate cotton of 1 inch, rather tightly packed, placed tight against a surface at bright red heat, about 1,550 deg., for thirty minutes; at the end of that time the outer side of the material was only about 180 deg., almost bearable to the hand; no currents of air existed to have a cooling influence."

The heated-air system is likewise described in the book. There is no reason to suppose that air becomes deteriorated by the contact with stoves or radiators. The dryness which some people dislike is easily removed. In the Gurney stove, for example, the lower ends of the gills are provided with water troughs; they form an effectual remedy. Mr. DYE considers that "perhaps the most complete appliance for warming air in a central chamber (for distribution by gravity, and not mechanically) is GRUNDY'S 'Calorifer,' and with it humidity is insured by means of an evaporating trough. The advantages of the calorifer have been tested by employment under the most varying conditions, and in all circumstances it has given satisfaction. The Blackman Ventilating Company, by their "double duct" system, are able to supply a volume of warm and cold air which can be regulated to any temperature, and therefore an interior need not be affected by the variations of the external atmosphere in our most variable climate. The number of other eminent firms that have taken up heating is a guarantee of continuous improvement. When it is remembered that there are specialties in the market by MACFARLANE & Co., the Coalbrookdale



Company, HARTLEY & SUGDEN, FLETCHER & RUSSELL, JONES & ATTWOOD, MESSENGER & CO., THE THAMES BANK IRON CO., LUMBY, SON & WOOD (Bellamy), MÜNZING, SHORLAND BROS., KÖRTING BROS., YATES, HAYWOOD & CO., KITCHEN & CO., AMERICAN RADIATOR CO., GENERAL IRON FOUNDRY CO., and many others, we may assume that this country will, in heating apparatus, hold its own against rivals. Mr. DYE's book is so ample in its information as to enable the reader to realise what can be accomplished for increasing the comfort of buildings.

### GENERAL GRANT'S TOMB.

IN the April number of the *Century Magazine* there is an interesting article from the pen of General Horace Porter, president of the Association organised for the completion of the fund necessary for the construction of the monument to General Grant. From the article we learn that, after considering various measures for providing a proper sepulchre, a number of prominent architects were invited to submit competitive designs for a monumental tomb. In September 1890 the Association adopted the plan furnished by Mr. J. H. Duncan, of New York City, for a structure to cost between 100,000*l.* and 120,000*l.* A contract was made for building the foundations, and the ground was broken with elaborate ceremonies on the anniversary of General Grant's birthday, April 27, 1891. General Porter then details minutely the various steps taken to raise funds, and the requisite amount was rapidly subscribed. The work of erecting the tomb was then proceeded with, and the whole is now entirely completed. The event was celebrated with great pomp. As General Porter says:—"Since the transfer of Napoleon's remains from St. Helena to France, and their interment in the Hôtel des Invalides, there has been no similar function that will equal in solemnity and in importance the dedication of the tomb in Riverside Park."

After a diligent search for a suitable stone of light colour, entirely flawless and durable in quality, a granite singularly well adapted for the purpose was found in North Jay, Maine, and this stone has been used in completing the structure. Another difficult matter was the selection of a material suitable for the sarcophagus, and ultimately a porphyry of fine texture and brilliant reddish colour from Montello, Wisconsin, was chosen as most appropriate. To comply with the frequently expressed wish of General Grant that his wife should be laid to rest by his side, a sarcophagus, the exact duplicate of the one now finished, will be provided. The lower portion of the tomb is a square structure of the Grecian Doric order, and measures 90 feet on a side. The entrance is on the south side, and is protected by a portico formed of double lines of columns, and approached by steps 70 feet wide. The square portion is finished with a cornice and a parapet, at a height from grade of 72 feet, and above this is a circular cupola 70 feet in diameter, of the Ionic order. This again is surmounted by a pyramidal top, terminating at a height of 150 feet above grade, or 280 feet above mean high water of the Hudson River. The interior is cruciform in plan, 76 feet at the greatest dimension, the four corners being piers of masonry connected at the top by coffered arches, the crowns of which are 50 feet from the floor level. On these arches rests an open circular gallery of 40 feet inner diameter, culminating in a panelled dome 105 feet above the level of the floor. The surfaces between the planes of the faces of the arches and the circular dome form pendentives which are decorated in high-relief sculpture, the work of Mr. J. Massey Rhind, and emblematic of the birth, military and civic life, and death of General Grant. The sarcophagi will be placed in a crypt directly beneath the centre of the dome. The approach to the crypt is by stairways which give access to a passage encircling the space dedicated to the sarcophagi, which space is surrounded by square columns supporting panelled marble ceilings and entablature. A circular opening in the main floor gives an unobstructed view of the sarcophagi from that floor and from the gallery.

On the death of General Grant there was a widespread desire to have his remains interred at Washington, either in the National Cemetery at Arlington, in the park of the Soldiers' Home, or in the crypt of the Capitol. As every previous President had been buried in the State of which he was a resident, there was an earnest plea put in by the people of New York urging that the place of burial should be the nation's metropolis, the city which the General had selected as his permanent home. The mayor of the city, the Hon. William R. Grace, proposed to the family that if the burial should take place in the city of New York, a suitable location would be provided either in Central or Riverside Park. A week or two before the General's death he expressed some views to his son, Colonel Frederick D. Grant, in regard to his burial. The disease had made such progress that his power of articulation had almost ceased, and it was only by a supreme effort that he could whisper articulate words; he therefore used a pencil and paper

to communicate with those about him. When he began to write, his son, who had remained by his bedside for many months and whose filial devotion had never relaxed, bent over his father to see what he was writing. The General named Galena, Illinois, his old home, then paused and shook his head. He then wrote West Point, but expressed the fear that the rules governing interments there would prevent the burial of Mrs. Grant by his side. He finally referred to New York, where he had found such kind and devoted friends, but added that he wished no place selected where his wife could not be buried by his side. He was apparently attempting to write more, but a paroxysm of pain seized him and the subject was not renewed. As New York was the last place he had indicated, the fact created a sentiment in favour of that city, as it had been apparently the General's final request. The family expressed a preference for New York, as it was their home; and with their assent the site of the present monument in Riverside Park was selected. It furnished an ideal location for the erection of a monumental tomb, the ground being on the bank of the Hudson, one of America's noblest rivers, at a height of about 130 feet above the water. It was seen that a monument of suitable height would be visible from prominent parts of the city and from points many miles up the river.

### DUNBAR PARISH CHURCH.

THE parish church of Dunbar, which has just undergone extensive alterations and improvements, was built seventy-seven years ago and was opened for public worship on April 20, 1821. In external design it is a very fair example of what could then be accomplished at that early period of the revival of our ancient Gothic architecture. But the moment one passed into the interior it was thoroughly disappointing—a large square space with a gallery all round. That, however, was the fashion of the time, and was, indeed, accepted by many as characteristic of Presbyterianism. As a better knowledge of ecclesiastical architecture spread it was felt more and more that the interior of the church was quite out of keeping with its beautiful exterior, and as a result of this more enlightened view the whole of the interior has been removed and the area subdivided into nave and aisles by means of stone arcades of five arches each. A semi-octagonal apse has been thrown out at the east end, opening into the nave with a chancel arch of moulded stonework, having a minister's vestry on one side and an organ chamber on the other. In the apse are three large windows, the two from the old church being of stained-glass to the memory of the late Admiral Hay, of Belton, and the late Mr. Drysdale, of Castlelaw. The third is about to be dedicated to the memory of the late Dowager Duchess of Roxburghe. The nave ceiling has been raised, bringing into view a part of the carpentry of the main roof. The tracery front of the old gallery has been worked into the front of the new one at the west end of the church, and the steps of the old stairs have been worked into the gallery staircases contrived in the two western turrets, where doors of egress are also provided. The fine old pulpit of the church has been retained, and placed against the south jamb of the chancel arch, the baptismal font occupying a corresponding position at the north jamb, with the communion table between on the centre of the apse. The splendid Dunbar monument now stands on the floor level of the church, against the east wall of the north aisle, completely restored, and has never been seen to such advantage since the day of its erection 270 years ago. All the windows have been double glazed, the inner glass in quarries of a light amber tint. Gas has been introduced, the nave being provided with eight corona lights, and a large one of burnished brass hangs from the apse ceiling over the communion table. The whole of the work has been executed from the designs and under the supervision of Messrs. W. & J. Hay, architects, of Liverpool. The contractors for the mason and joiner-work were Messrs. Robert Hall & Company, Galashiels; for the slater and plaster-work, Messrs. Archibald Aitken & Son; for plumber, gasfitting and heating apparatus, Messrs. Melville & Son; for painting, Mr. Mackenzie—all of Dunbar; and for glazing, Messrs. George Lindsay, of Edinburgh. To Mr. W. G. Stevenson, sculptor, R.S.A., was entrusted the important work of taking down and reconstructing the Dunbar monument. The two stained windows were taken out and replaced by Messrs. Ballantine & Gardiner, of Edinburgh. In place of the old cracked bell, one of nearly double its weight has been provided by Messrs. Bryden & Son, of Edinburgh. The cost of the whole work will be somewhere about 4,500*l.*

**The Next Ordinary Meeting** of the Society of Engineers will be held at the Royal United Service Institution, Whitehall, on Monday, May 3, when a paper will be read on "Automatic Gas-station Governors," by Mr. Henry O'Connor, vice-president.



## NOTES AND COMMENTS.

It is not known to all Parisians that at least one-third of Paris is built over caverns which were formed by the removal of the fine building stone which was afterwards employed for the construction of the city. It becomes a serious question whether the stability can be maintained continually. As one means of obtaining definite knowledge on the subject, the Prefect of the Seine has given instructions for the preparation of a plan of the former quarries. The precautions are of old date. In 1770 several buildings sank into the cavities, and officials were then appointed by Louis XV. to watch all signs of weakness. There are no less than five groups. The first is under the ground where the Arc de Triomphe stands. In the old quarries several massive piers have been erected in order to increase the strength of the strata. The second group is on the left bank of the Seine, and among the establishments which have to be supported are the Jardin des Plantes and the Halles au Vin. The third group passes under the Boulevard de l'Hôpital. The official information about those quarries was burnt in 1871 in the Hôtel de Ville. There is less confidence about the stability of the strata than in other parts. The fourth group extends from the Bastille to the Forest of Vincennes. In this group no less than 2,520 piers have had to be set up. The fifth group stretches beneath Montmartre, the Buttes Chaumont, Pere-la-Chaise, and into the country. The piers are countless in this part. It is fortunate that Paris is not subjected to terrestrial disturbances, or there would be endless work for builders. A great many inspectors are employed to perambulate the galleries, and they are paid at the rate of five francs a day.

Mr. WHISTLER loves a joke, as becomes so wise a man, but we do not think he contemplated the production of one when he proposed to send three paintings to the Salon du Champ de Mars, having for titles *Green and Violets, Rose and Grey, Blue and Gold*. In the catalogue they are numbered 1,257, 1,258 and 1,259, but on the opening day of the exhibition they were not to be discerned. According to one critic, the paintings were described as exquisite; while another objected to the artist's persistence in employing greens, violets, roses and greys. The descriptions were no doubt prepared after visits to the artist's studio. If they do not appear in the exhibition, the public will be the losers rather than Mr. WHISTLER, who is one of the few men who can be as independent of the Champs Elysées as of the Champ de Mars.

THE report to the Governors of the City and Guilds of London Institute for the past year's work has appeared. One of the most encouraging sections of the Institute's work is the South London Technical School. As some indication of the influence which the modelling department of the school has exercised and is exercising on plastic art, it may be mentioned that in the sculpture section of the Royal Academy exhibitions last year, no fewer than twenty-one of the exhibitors were past or present students of the South London School. In the competition for the Institute's Sculpture Studentship, open to students who have attended the modelling classes regularly for three years, seven designs were submitted, and six of them were of high excellence, so much so that the judges, who gave an exhaustive criticism on each, came to the conclusion that some special recognition should be made of the competition. On the recommendation of the judges, the committee have further determined to offer for competition among the past holders of the Sculpture Studentship a Travelling Studentship of 60%, to enable the winner to see the best works of architectural decoration in Belgium and France. The modelling classes have been attended by thirty-one students. The course of instruction in the house decoration class includes the treatment of walls and ceilings, panels, friezes, dados, graining and marbling, and other sections of the decorator's art. This department of the school was attended by thirty-two students. Owing to the growth of local technical institutes in the Metropolis, the attendance at the art classes of the Finsbury College has fallen from 207 in 1894 to 146 last year. The diminution is mainly among students connected with the lithographic and printing trades. The classes for study of the life, enamelling and modelling still attract as many students. But

until the studios can be located in a more suitable environment than is afforded by the basement of the Cowper Street Schools, no considerable development of this department as a whole will be possible.

It was a blunder to allow the English canals to be neglected through fear of their becoming rivals to railways. There is a need of both means of communication, as the French have demonstrated. An effort is now being made to put canals into a condition that will allow them to meet more modern needs. Mr. G. D. MARTEN, the engineer to the Severn Commissioners, has been asked to report upon the Staffordshire and Worcestershire Canal, which has a waterway of about one hundred miles in length. After a thorough examination, Mr. MARTEN has recommended the following works:—(a) The widening of the bottoms of the three locks on the Severn to 19½ feet; (b) the improvement of the Staffordshire and Worcestershire Canal from Stourport to the junction of the Birmingham Canal at Aldersley, near Wolverhampton, so as to accommodate the class of vessel now required; and (c) the construction of a transshipping basin or dock at Aldersley Junction, so that goods collected at the various works lining the Birmingham Canal in Wolverhampton and the surrounding district, and brought thence down the latter canal in small boats, may there be transhipped into the large-sized vessels, which would then convey them along the improved navigation to Bristol or elsewhere. The total cost of the scheme (including the transshipping basin, the small alteration of the Severn locks, and an ample provision for all ordinary parliamentary proceedings, is estimated at 360,000*l.* One advantage of the proposed arrangement is that the works can be carried out without much disturbance of traffic. There are, however, certain works for which it would be necessary to run the water out of the canal. In the town of Kidderminster, for instance, no deepening of the canal could be put in hand until certain large buildings had been securely underpinned. Again, the canal under most of the bridges is of less width than would allow of a boat of 19 feet beam passing through, so that in addition to the rebuilding of the bridges the old masonry foundations would have to be removed. With proper organisation the whole of the works for which a stoppage of traffic would be required could be carried out in at most two periods, each commencing at the beginning of the Easter holidays and terminating at the end of the Whitsuntide holidays.

A MUSEUM of African antiquities and the art of the Mussulman has been opened in Algiers by the Governor-General. An immense number of Roman inscriptions, sarcophagi, statues and mosaics have already found a place in it. It is flattering to Frenchmen to find themselves the successors of the Romans, and the building is a tribute to their predecessors in organisation. The museum is in one of the most beautiful of the public gardens, in a position which can hardly be surpassed. The French Government have decided to have many more explorations undertaken, and the existence of the museum is also likely to inspire private collectors with a desire to enrich the galleries.

THE huge pavilion to be erected for the Diamond Jubilee Celebration by Mr. J. N. MASKELYNE in St. Paul's Churchyard, on the site now occupied by Messrs. JAMES SPENCE & Co.'s premises, has been designed by Mr. J. G. BUCKLE. The pavilion will consist of four tiers, and will seat about 2,000 persons. A distinguishing feature will be the substitution of inclined approaches to the tiers in lieu of the usual steps. The pavilion has also been designed so as to permit of the several parts being prepared away and brought upon the site ready for fixing. There will be ladies' retiring-rooms at each tier level, and refreshment saloon, lounge, smoking-room and lavatories in the basement. The cost, including decorations, will be about 4,000*l.*

## ILLUSTRATIONS.

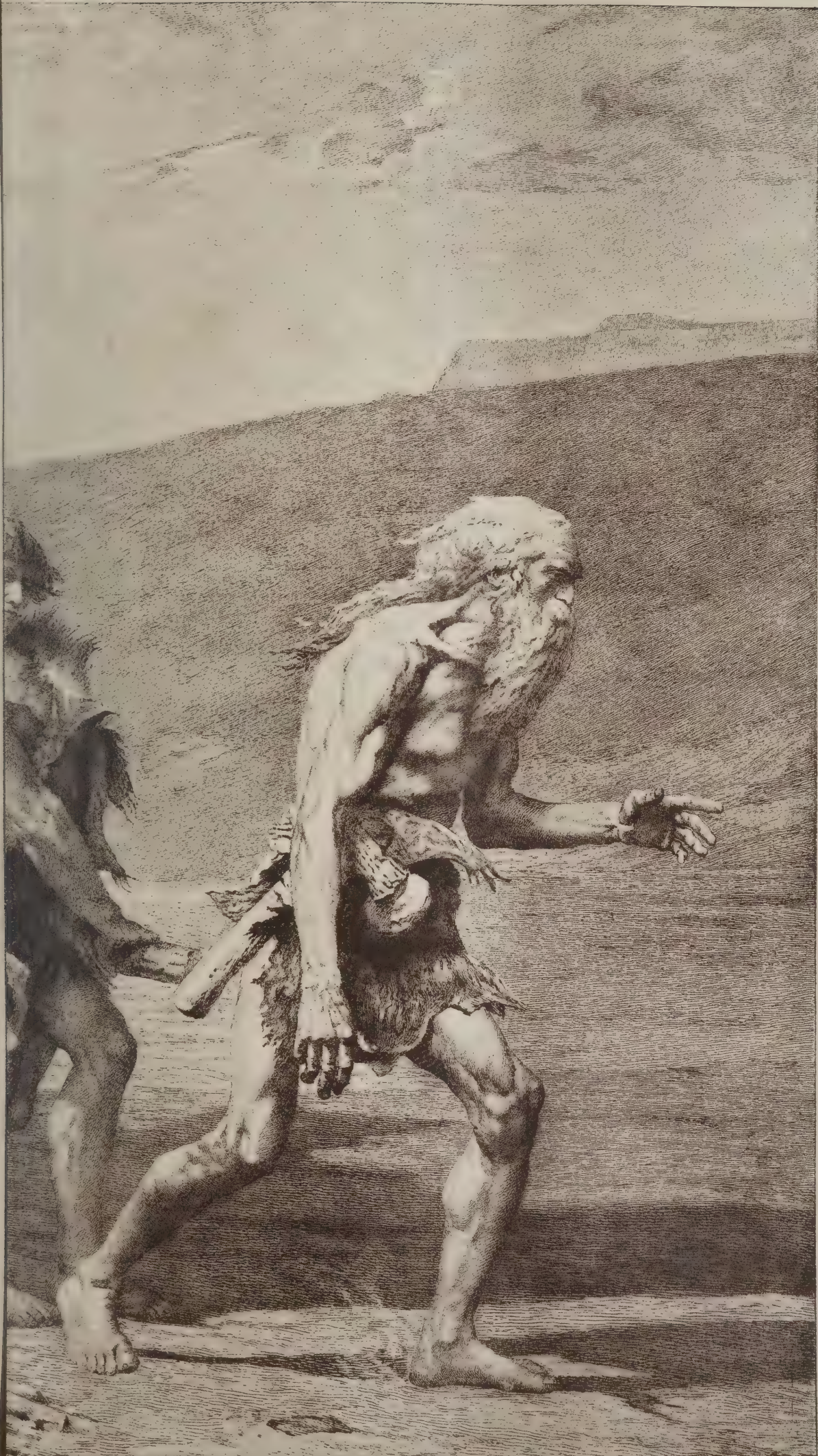
CAIN AND HIS FAMILY.

CATHEDRAL SERIES.—SALISBURY: NORTH CORNER OF WEST FRONT.

THE CHURCH PORCH, CLEY-NEXT-THA-SEA.

ENTRANCE HALL FOR MESSRS. FOSTER &amp; COOPER.









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CAIN & HIS FAMILY.

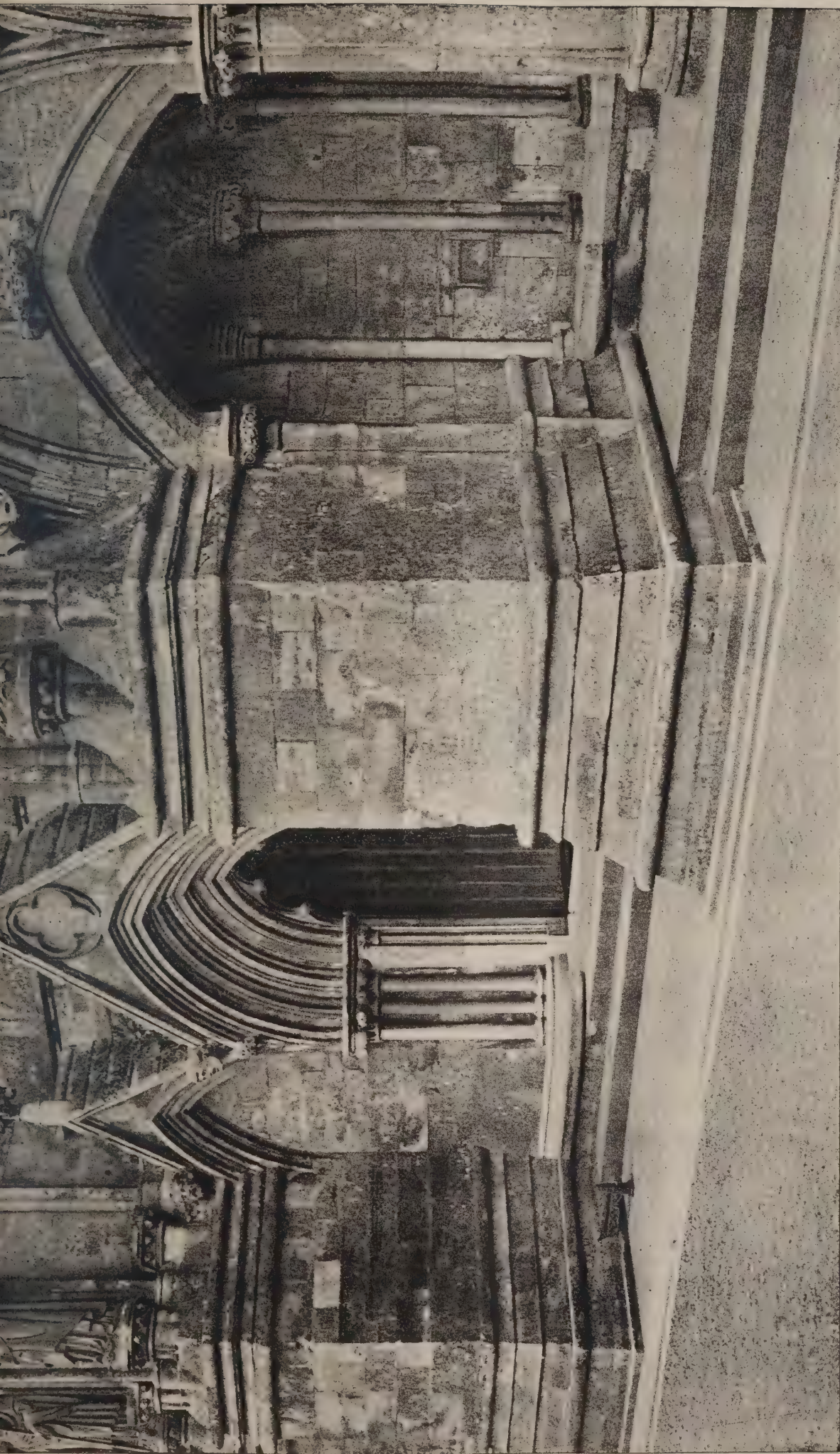












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CATHEDRAL SERIES, No. 30.—SALISBURY: NORTH CORNER OF WEST FRONT.





















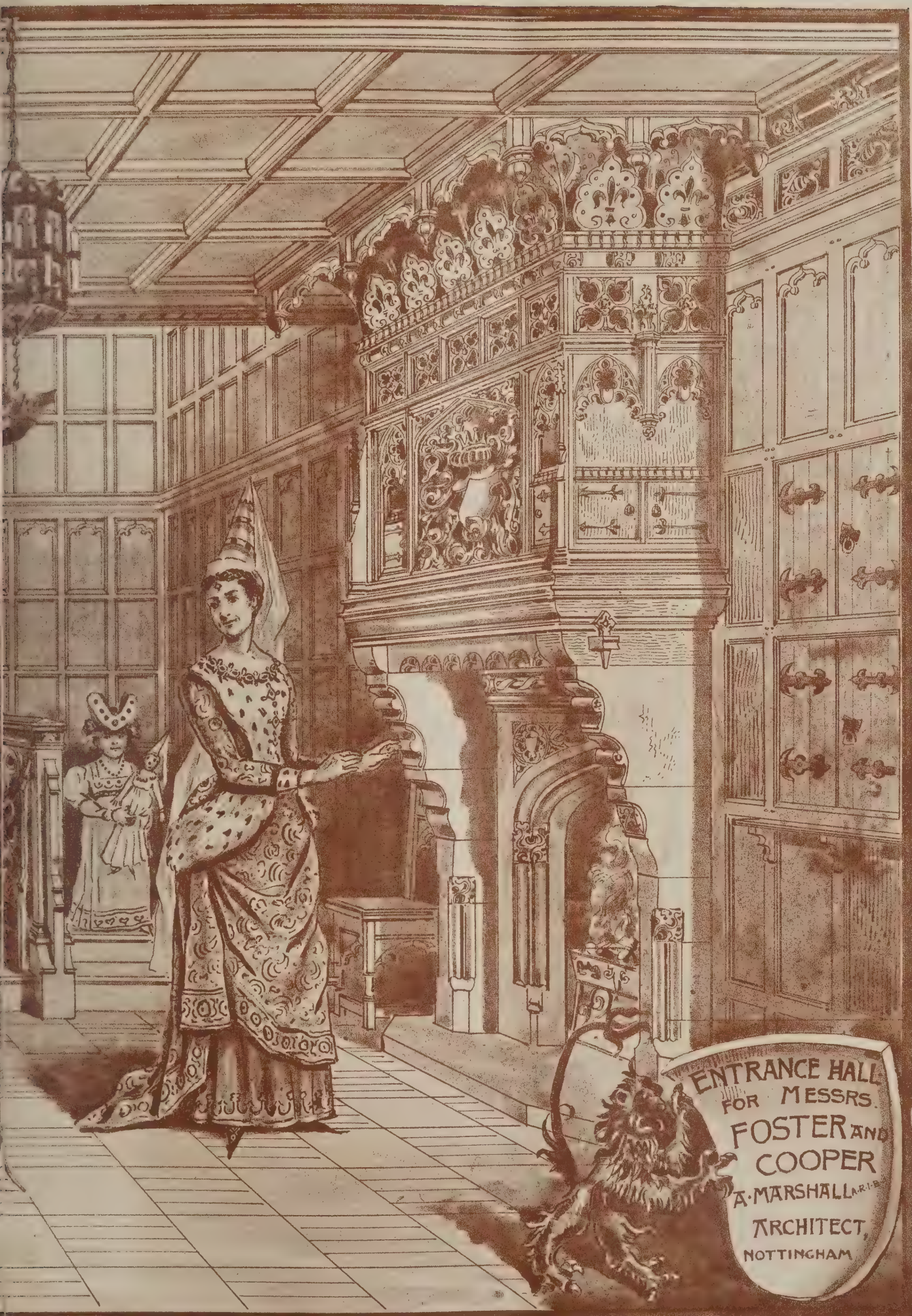












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ARCHITECT,  
NOTTINGHAM







## FIRECLAY MANUFACTURES.\*

YOU are all, or will be, extensive users of fireclay manufactures, more especially of sanitary pipes and specialties, glazed-bricks, scullery sinks, white channel bends, closets, &c., and I feel sure that you will be interested to know of what they are made and the process of their manufacture, which is the purpose of the present paper to describe.

First, then, let me speak of the raw material, fireclay. Fireclays abound in the coal measures of Great Britain, and particularly in the two northern counties of Northumberland and Durham. It is found most frequently as the floor or understratum of seams of coal, in layers varying in thickness from 12 inches to 5 or 6 feet. In colour it is akin to a slate grey shade. A good fireclay should have a uniform texture, a somewhat greasy feel and be free from impurities. Silica and alumina are the chief substances of which fireclay is composed. The proportions of these two substances vary very much in the clays obtained in these two counties. But I should consider a fair average to be as follows:—50 to 55 per cent. of silica and 30 to 27 per cent. of alumina. The great bulk of the clay raised is used in the manufacture of firebricks for heat-resisting purposes, but this class of manufacture I do not purpose further to refer. There is a fireclay of very fine quality and in many respects different from that of which I have just spoken. This clay is found apart altogether from the coal-measures. It is also different in colour, being of a reddish-brown tint instead of the slate grey before named. It possesses a very dense body when burned, similar to that of stoneware. The outcrop of this clay is found and worked a little to the north of Corbridge.

I will next speak of the treatment of clay. It is delivered out of the pits mostly in large hard pieces, and has to be ground into a powder of varying degrees of fineness or roughness, according to the article into which it is to be manufactured. If for heat-standing purposes, it has to be ground what we term "rough;" if for treatment for salt-glazed goods it has to be ground finer, and if for white or cane goods it has to be ground finer still, and for this latter purpose carefully selected so that no nodules of ironstone may be left in the clay, as in that case it would fuse at the great heat in burning, and spoil the goods. The modern method of grinding is as follows:—The lumps of clay are tipped into a perforated pan-mill some 8 to 9 feet in diameter. This pan revolves, and revolving within this pan are two metal rollers. The clay is carried under the rollers by the revolutions of the pan, and is thus crushed by degrees into powder, which gradually finds its way through the perforations in the bottom of the pan. Underneath the perforated bottom of this pan is a cast-iron saucer, which receives the powdered clay thus passed through the perforated mill. It is then carried round by an iron arm, so arranged that all the ground clay is forced into a well or huge pocket a little below and at one side of the foundation of the mill. Working down into this are the elevators which fill themselves with the ground clay, and carry it up to a higher storey any height that may be required, and then empty themselves into a shoot, which conveys the clay into a riddle. This riddle is hexagonal in form, say 7 or 8 feet long and 3 or 4 feet in diameter. This is kept revolving, and its action in so doing allows the fine clay to pass through the wire forming the riddle into a further shoot, which in its turn delivers the clay of the required degree of fineness to wherever it may be wanted. The wire of these riddles is of varying degrees of fineness, in some cases 15 meshes to the inch, in others only 5 meshes to the inch.

Whatever particles of clay are too large to pass through the riddle or sieve (for practically the riddle is only a large sieve) are returned to a separate shoot; that, in its turn, conveys the rejected particles of clay back to the pan-mill to be reground. The clay that has been passed through the riddle and delivered to its destination is now ready for mixing. For this purpose it is put into a pan-mill with a *solid* bottom. This pan-mill also revolves, and has within it two revolving rollers. A sufficient quantity of clay is put in, and as this is being done water is added to reduce it to a plastic condition. The metal rollers passing over this wet clay kneads, prepares and gives it body, the required stiffness being regulated by the supply of water to the clay. The men in charge of this mill can tell by experience when the clay is ready for the machine or mould. It is then taken out and ready for manufacture.

There are other methods of preparing the clay, but the foregoing is the most modern and, I believe, the most effective. In the manufacture of all the varied articles made by my firm the clay is prepared up to this stage for every one of them in the same way, rough, medium, or fine clay going through the same process, but not through the same riddle.

I have now to describe how the various goods are manufactured from the prepared clay. Firstly, I will take the process of manufacturing sanitary pipes. These are all made by a properly constructed pipe machine, which consists of

(1) a steam cylinder, (2) a clay cylinder, (3) a contrivance for forming the inside of the pipe, (4) another for forming the outside of the pipe, and (5) one for moulding the inside and the outside of the sockets. The steam cylinder stands on a metal frame placed on the strong beams or girders of the first floor. Immediately below this floor is placed the clay cylinder; between the steam and the clay cylinders is a space of about 18 inches, through which the prepared clay is thrown into the mouth of the clay cylinder by boys. Attached to the piston of the steam cylinder is a metal disc, termed a plunger, which works through into the clay cylinder and forces the clay down until it forms a pipe. At the underside of the clay cylinder an apparatus is fixed for shaping the pipe. This consists, firstly, of a cone or core, which is attached to the end of a strong rod passing down the centre of the cylinder. These cores are the exact size of the internal diameter of the pipe to be manufactured. This, you see, determines the inside size. And, secondly, a large square cast-iron plate, with a circular piece cut out of the centre, equal in size to the diameter of the outside of the pipe, regulates the thickness of the pipe. This we term the die-plate, and it is fitted on to the framework of the lower and outside portion of the clay cylinder. These die-plates correspond in every case with the size of the before-named cores, so that when the core and the die-plate are both accurately fitted into the bottom of the clay cylinder you have an open space through which the clay emerges, equal to the section of the pipe to be manufactured. But before the pipe can be manufactured, the socket of the pipe has to be formed, and, small though the socket may be in proportion to the pipe, it is much more difficult to manufacture, and takes a much higher power to press than the pipe itself, inasmuch that you have to press the thin wall of clay round a corner, so to speak, and then down the length of the socket. Separate moulds are provided, internal and external; the internal mould is a thick ring, in shape the exact reverse of the inside of the socket. This is placed directly under the core previously described, and held there until securely locked. The external mould is made in two halves, and obviously the exact reverse of the internal mould. These are worked in grooves attached to the underside of the die-plate, and are brought together by a lever. The contrivance holds all the mould, internal and external, together. When the socket-moulds are in position, steam is applied by a lever, and the clay is forced down the clay cylinder, through the space between the solid core and the circular edge of the die-plate, right into the socket-mould. When this socket-mould is filled, the two halves forming the external mould are released, the internal mould remains. Steam is applied again and the pipe is delivered to its required length, then cut off with fine wire. There is no joint whatever between the socket and the body of the pipe, the supply of clay being continuous; it is then carried away by the men to the flats to be dressed, dried and made ready for burning. Every size of pipe requires its own size of core, die-plate and socket-moulds.

Out of the pipe machines such as I have described any sized pipe 2 inches to 24 inches in diameter can be made, some fifteen or sixteen different sizes. Special machines are constructed to make pipes up to 36 inches in diameter. Pipe-machines are largely constructed in Leeds, Messrs. Pullan & Mann of that city being the best known manufacturers here. When the pipes are what we term "white" or "bone-dry" they are set in the kilns. We have found the best kind of kiln for burning pipes to be the circular kiln. These have fires all around them, so that there is every chance of the whole kiln getting equal heat. The pipes are protected from the flash of the fire by an internal wall running up 1 or 2 feet above the fire. The top of the wall all round the kiln is utilised for setting goods on to be burned, excepting the portion directly in front of the fire. These kilns are known as down-draught kilns; the heat ascends to the top of the kiln, but as there is no outlet there it is drawn by the draught of the chimney down through the pipes and through the bottom of the kiln (the arrangement of which is known as a riddle bottom) to a central well, and thence through underground flues to the chimney. When the kiln is as full as possible the door-gap is built up, the fires are lighted and the heat got up very slowly. In the course of three or four days the kiln comes to its full heat, which is so intense that looking into it at this stage you can see every part of the kiln with startling clearness.

And now comes one of the most interesting events of all the process of the manufacture of a pipe, that is, the imparting to it of the brown gloss or glaze with which you are all so familiar in a sanitary pipe. This is done by throwing into the kiln at almost its greatest stage of heat a few barrowfuls of common salt. The temperature of the kiln is so high at the "burning off" that the volatile salt is at once converted into vapour which completely surrounds all the exposed surface of pipes, &c., in the kiln, and there is consequently a reaction of the vapour on the silica of the clay bodies. The agent which promotes the action of the silica and common salt is the aqueous vapour which is always present in the flames of the furnace. The oxygen of the water produces soda with the

\* A paper read before the Northern Architectural Association by Mr. W. H. Allen on April 24.



sodium of the common salt, while the hydrogen combines with the chlorine and is evolved as hydrochloric acid. The soda then enters into combination with the silica and forms the glaze. This may be termed a coat of soda glass; or, in other words, the salt, subject to the great heat, instantly vapourises and covers every particle of exposed surface. The first application puts on to the articles in the kiln a preparatory coat of glaze, and successive charges at different periods add to the thickness and lustre of the gloss until sometimes we get what is almost equal to a coat of glass. After the last application of salt the kiln is finished as far as the burning is concerned. All air inlets are closed up and the kiln is allowed to cool down very carefully. Some idea of the time occupied in this process may be of interest to you, so I will give you a fair average of same.

Time of drying on flat . . . . .	2 days.
Time from lighting the kiln to setting it off full fire (termed soaking) . . . . .	2 "
Time under full fire . . . . .	1 day.
Time for cooling . . . . .	2 days.
Total . . . . .	7 "

This average applies more particularly to our own case; other manufacturers generally require more time, according to the nature of the clay.

Before leaving the manufacture of pipes let me say that they are made in two different thicknesses, viz. 1-10th and 1-12th of the internal diameter, the former to meet the requirements of certain engineers who regularly specify them, and the latter for general use where not otherwise specified. Bends are made from the pipe machine. Junctions are formed by sticking the size of junction required on to the pipe. Very quick bends, traps, interceptors and specialties are made from plaster moulds.

#### *Glazed Bricks.*

We will next speak of the manufacture of glazed bricks. The clay for these is prepared as previously described, then delivered to a moulder, who moulds them from a brass mould in the usual way; as soon as they are sufficiently stiffened they are pressed in a hand or steam-press, laid on the flats to dry, and when quite dry are put into the kilns and burnt to what is known as biscuit heat, or only a moderate degree of hardness; they are then brought out of the kilns again to be prepared, dipped with body and glaze and made ready for the final burning. As very few have any idea of the number of times these bricks have to be handled before they finally emerge from the kiln fit and ready for sale, I will describe the method fully. Up to this time each brick has been handled in the process thus described about ten times, and they have in the following to be handled a further ten times, so you have for a total, say, twenty times for each brick to pass through a workman's hands. The bricks are now sorted, brushed clear of all dust, and put on to a long board in patches of four or five in close contact; a boy dips a brush in water and rubs over the face or other portion to be afterwards glazed; another boy follows with a brush dipped in a certain preparation termed "tint," and brushes the bricks to fill up the pores and form a groundwork for the next process, which is the dipping of the brick in the first tint (a mixture of ball clay, &c.) of the consistency of something like cream; this is of a very tenacious and adhesive character, and completes the groundwork. It is then dipped in a mixture of about the same consistency named "body," which determines the colour of the brick; this largely consists of china clay, which gives a dead-white colour. The brick now receives its final dip in the glaze itself (a preparation of felspar, Cornish stone, &c.). But with these repeated brushings and dips there is a superfluous substance on both sides and ends of the bricks that has to be removed, or otherwise the bricks would stick together in burning, or if they did not you would have an edge that would be highly objectionable. This has to be cut patiently off every brick before it can be set in the kiln; this being done, the kiln is filled and burnt again. It takes about five or six days to burn the kiln off, and then a further week to cool it down. Quick cooling is apt to cause crazing. The whole process of glazed brick-making requires the utmost care. The proportions of the different minerals of each of the three preparations forming the tint, the body and the glaze have to be most accurately weighed out; a mistake in any one of these would be serious. The raw materials forming these are put into tanks containing water to steep, then the whole mixture has to be sieved and resieved through gradually finer sieves until a very fine liquid is obtained. Further, the consistency of this has to be regulated by weight, viz. 27, 28, 29 or 30 ounces to a pint. One of these weights will be fixed according to circumstances; half an ounce heavier or lighter will have a disastrous effect. Take the case of the glaze; if it is the slightest degree, or say half an ounce heavier than the fixed weight, the bricks may come out crazed. If it is half an ounce lighter, there will be little or no glaze on the brick.

To get coloured glazed bricks we use prepared stains to produce the required colour; some of these are applied to the body, as in blue-glazed bricks; some are applied to the glaze, as in chocolate or brown bricks.

I will next describe the manufacture of cane and white glazed kitchen and scullery sinks. These are made from moulds. After they are out of the moulds, they are squared and dressed up, and when they are required to be made white, the body determining this is brushed on with specially made brushes. It will take five or six coats of this white body to cover the clay perfectly, and give the necessary tone of whiteness, but you cannot apply more than two coats per day. The sinks must be made quite dry, or, as we term it, "bone dry" before the glaze can be applied. There are two systems in the trade for glazing sinks. One system is by twice firing or biscuiting, then glazing, as in the case of the bricks; in this case the glaze is thrown on to the sink in its biscuit stage, and then reburnt and glazed, or in some works the glaze is applied by immersing the sink in the glaze, and then burnt. The other method is by one burning only. We adopt this latter system. In this case the glaze is brushed on in a similar way to the body. Every particle of moisture has to be expelled before putting them into the kilns. Each system has its own advantages and its drawbacks, and you have to be guided by local circumstances as to which to adopt.

In the matter of kilns, sink-kilns are quite different from the well-known Newcastle or the round kiln; they are termed muffled kilns, and are constructed so that no flame may reach the contents. The heat goes all round the kiln between the outer and inner arches and gradually, but effectually, penetrates through the walls and floor of the inner arch. The utmost care has to be exercised in the burning of these kilns, first of all to apply the heat very gradually, and then to determine the exact moment when it is burnt sufficiently. Just as we are assured "There is a tide in the affairs of men which taken at the flood leads on to fortune," so there is a moment in the burning of sinks which, if seized, crowns the effort with success, or missed, ends in partial or complete failure. To enable us to attain this much desired end, small trial pieces are inserted in the kiln with the sinks, and drawn out from time to time until the crucial moment arrives, when it is declared to be finished. The kiln has then to be cooled down most carefully, which takes about six or seven days.

Channel pipes and bends, for which a great demand has arisen in late years, are made out of plaster moulds; the number of moulds required is enormous. The body and the glaze in the case of these articles can be run on; they are dried and burnt with the sinks. Fireclay water-closets, the latest development of my firm, are made in plaster moulds, accurately fitted together, the body and glaze applied as in the case of sinks and bends, and are also burnt in a similar manner to sinks. Majolica glazed bricks differ from ordinary glazed bricks in their manufacture in one or two particulars:—1. The body beneath the glaze is for the purpose of obtaining a fine surface, not so much for determining colour. 2. The glaze is very soft and runs at a much less heat. 3. There is no waste to be cut off the edges of the bricks, it overlaps without interfering with the utility of the brick. 4. Each brick has to be set face up and burnt independently of the other, and also in a muffled kiln.

#### THE FORMAL AND INFORMAL IN ARCHITECTURE.

AS the picturesque is the not unfrequent concomitant of decay or ruin, the temptation has been great among theorists on this subject to make associations of decay and ruin an element in its definition; in other words, to make the principle of the picturesque consist in the eccentric, the abnormal and the distorted, and thus by a curious inversion to discover in it a deflection from the true type of the beautiful rather than a fulfilment of it. Mr. Ruskin, for instance, finds the key to the picturesque, as may be supposed, in a theory of association, but he defines it to be "parasitical sublimity," and in explanation of his meaning gives the instance of a Swiss chalet, with the large and irregularly-shaped stones set, as usual, upon its roof, to secure it from the violence of the weather. These stones, he says, are the source of its picturesqueness, and are such, not in themselves, and as they stand on the cottage roof, but by virtue of an intellectual process in the mind of the beholder, who first associates them in thought with the adjoining mountain from which they are taken, and then mentally invests them with the sublimity attaching to that mountain. Association and romance may add poetical interest no doubt to the picturesque object, but if they may reasonably be excluded from any part in the theory of the beautiful, so also may they safely be rejected from that of picturesque beauty.

The picturesque, then, as its very name indicates, must be referred for its ultimate explanation to the art of the painter. It must be realised, that is, in one or both of the two elements of



form and colour. So much, if the principle of association be set aside, as just said, may be taken for granted. Moreover, it being impossible to have colour in a pictorial composition apart from form, whilst of course it is possible to have form without colour, as in an engraving, a photograph, or at any rate in a mere outline, we shall be simplifying our subject as well as adhering to the essential and disregarding the non-essential in setting aside the consideration of colour and confining our attention entirely to that of form. If the picturesque, then, be reducible to the general head of the beautiful in form, and if the beautiful in form be reducible, like the beautiful in colour and the beauty of motion to the head of harmony, we can hardly go astray in pronouncing the essence of the picturesque to be dependent, directly or indirectly, on what is called symmetry; inasmuch as harmony in the arrangement of lines is symmetry.

What, then, is the symmetry which distinguishes picturesque beauty from beauty in general? Here it will be convenient to recur to the illustration of the beautiful proposed by the ancient philosophers—the triangle. There are three forms of the triangle: the scalene, of which the sides are none of them equal to each other; the isosceles, of which two are equal and one is unequal; the equilateral, of which all three are equal. The scalene, then, is wholly unsymmetrical; the isosceles, imperfectly symmetrical; and the equilateral, perfectly. The scalene also is certainly not beautiful, whereas the isosceles and the equilateral both satisfy the eye, and by reason of their regularity, and though dissimilar to each other, can neither of them submit to be set aside as not beautiful. There is a difference, however, between the two, and that an important one.

The equilateral triangle, in consequence of the very perfection of the symmetrical harmony of its component parts, has the character of formality. So it is with flowers; they are beautiful, abstractedly from their colours, with a geometrical beauty, their effect, generally speaking, being produced by the systematic disposition of their petals, which are the repetition of each other round a common centre. So it is in like manner with the kaleidoscope, that instrument, by the mere power of a symmetrical multiplication, converting a chaos of disorder into magical beauty—still into beauty of a limited range only, as being by the necessity of the case always formal. The isosceles triangle, on the other hand, is saved from being formal at the expense of being less completely symmetrical, and its third side, which is irregular or unsymmetrical, as compared with the other two, is of the nature of a discord in music, as employed by a great master. It tempers a harmony which would otherwise be too perfect to be quite symmetrical.

Here, then, we get a glimpse of the true reply to the question above put, viz. What is the symmetry which distinguishes picturesque beauty from ordinary beauty? for the most cursory consideration of all that is generally included under the name picturesque, will lead us to see that its chief characteristic is a certain irregularity: formal it assuredly is not, whatever else it is. We may accordingly distribute all beauty into formal on the one hand, and picturesque on the other. And, speaking broadly and generally, we have the types of these two divisions of the beautiful in the two triangles just mentioned, viz. of the formal in the equilateral, and of the informal or picturesque in the isosceles.

For the more complete illustration of the distinction here drawn, let us now place ourselves in imagination in the presence of any particular masterpiece we please of Classical architecture, only supposing it to be as perfect as on the day when it was originally set up by Pericles at Athens or by Augustus at Rome. It may be the front of the Parthenon, or the portico of the Pantheon, or the Maison Carrée of Nîmes, or that imitation of the antique, the Madeleine at Paris. Anyhow we shall have before us a range of columns, Doric, Ionic, or Corinthian, as the case may be—perfect in their parts, their heights, their proportions, their inter-columniations. Above these the horizontal entablature, adorned with its appropriate decorations according to the style of the architecture; and above this again, and crowning the whole, the pediment, with its obtuse-angled triangle, forming at once the termination of the roof of the temple and the frame of a series of exquisite representations in sculpture arranged within it. Now, such a creation as this is emphatically and by universal consent beautiful—as beautiful in its particular department as anything that can be named; yet assuredly it is no subject for the painter. He might do his best, indeed, were he compelled to design it, in the way of adapting it to a picture, whether by taking it at an angle, or by setting it on the summit of some rugged and commanding rock, as the Parthenon on the Acropolis; or by relieving it with the undulating lines of trees and clouds; or by breaking up its uniformity in casting upon it broad lights and irregular shadows; but were he to draw the front of the building as we have described it, and, apart from such accessories or details as we have just been imagining, he would produce, not a picture, but an architectural elevation. The result, in fact, though perfectly beautiful in its own way, would

be irremediably formal; and where is the spell that shall evoke a manifestation of the picturesque from materials so unpromising?

In Sir Walter Scott's "Bridal of Triermain" we read of a knight who, weary of continually watching before a pile of rocks, which remained nothing but rocks, though a magical castle was said to be concealed within them, at length flung his battle-axe at the cliffs which rose above him, and splintered off a fragment of the mass in so doing, when, the charm being thus broken, the enchanted fortress immediately burst upon his view in all its reality. Now we may try a somewhat similar experiment in the present instance with equal success. For the castle rocks of St. John, which Sir Roland struck, let us substitute the façade of the Classic temple just imagined, and let the blow of the battle-axe be represented by some partial disturbance of the severe regularity of the outlines which bound the structure; let the pediment be somewhat broken away; let one or two of the pillars be displaced or broken off short at different elevations; let the continuity of their fluting be disturbed, let them be eaten into by the weather, and overhung and tufted in places with creepers or wild flowers; let the monotony of their marble be diversified with moss and lichen; and let the ground at their foot be broken and heaped up in hillocks, and behold a nobler creation of the beautiful than we had before—*dum moritur resurgit*—from the prison of the formal has come out the beauty of the informal, for in the ruin we have the subject of the pencil, the delight of the artist, the material for the sketch-book, in short, the very embodiment of the picturesque in all its perfection.

We repeat that we have here given what every one must admit to be a specimen of the picturesque, true, adequate and complete, *omnibus numeris*, and the principle of the picturesque may now be easily deduced from the consideration of it. It is, in fact, a disturbed symmetry, and where it is realised most completely will be found to be a pretty accurate equilibrium of the symmetrical and the unsymmetrical, neither absolutely preponderating to the disadvantage of the other. Hence, while the modes in which it admits of being exhibited are very various, the essence of every such exhibition will be always this, all that is possible in regularity short of formal arrangement, and all that is possible in freedom short of no arrangement at all or mere disorder. There must be an interpenetration, so to express it, of the formal by the informal; there must be at once correspondence and diversity, harmony and contrast. This, and this only, is the picturesque; and of this the isosceles triangle, as before said, is the simplest manifestation.

Should anyone yet hesitate to acquiesce in this definition, under the feeling that after all it may be still association which is the charm of the ruin, and not the form of it, let him return again to the supposed temple and consider what would be the effect of an entire abolition of those proportions which he is so little disposed to identify with its picturesqueness. That in its formal or complete state the piece of architecture in question is unpicturesque has been made evident already; now, on the other hand, that an utter absence of form or simple disorder and confusion is unpicturesque also, may be proved to demonstration by pursuing to its limits that same process of demolition by means of which we rendered the temple picturesque in the first instance. Carry on, in fact, the supposed disintegration of the building little by little, and you will find that at a certain stage of the proceeding you reach a critical turning-point, beyond which every step in advance ceases to be a creation of the picturesque, and becomes the corruption of it; till at length, when column, pediment and entablature lie in shapeless confusion on the ground, corruption has become absolute dissolution, and the picturesque has vanished. It has come, it has been seen in its perfection, it has passed away and has been destroyed by the identical process by which it has been erected; as if the conditions of its existence were those of the White Lady in the romance, who then first became visible when the fortunes of the "house of Avenel," with whose destiny her own was interwoven, had fallen into decline; whose zone gradually dwindled as the ruin proceeded, and who was fated to perish altogether at the moment of its consummation.

The picturesque then is, in its essence, a due combination of the formal and the informal, and it is important to observe that this is the definition, the most natural and antecedently probable in a philosophical point of view, of any which could be given; for the discernment of likeness and unlikeness, which are only other names for that system of symmetry and interruption, of correspondence and contrast, which we recognise in the picturesque, is an elementary power and necessity in the human mind: hence it is a principle of universal application; *latissime patet*. "The perception," it has been said by Wordsworth in his preface, "of similitude in dissimilitude is the great spring of the activity of our minds and their chief feeder. . . . It is the life of our ordinary conversation, and upon the accuracy with which similitude in dissimilitude and dissimilitude in similitude are perceived, depend our taste and our moral feelings." Thus it is the secret, for example,



as others have pointed out, of the reason why we prefer the marble statue to the more perfect imitation of the human form which may be made in waxwork. Thus in poetry, again, it is the ultimate principle of the entire scheme of metre, versification and rhyme, and of the system of parallelisms which constitutes the versification of the Hebrews; of metre, for it is here the similitude and dissimilitude of time or measure; of rhyme, for it is here the similitude and dissimilitude of recurring sound; of parallelism, for it is here the similitude and dissimilitude of mental conceptions. It is the main principle, in short, of the charm residing in all imitation of whatever kind.

This law, then, of our condition, that we should be incessantly comparing and contrasting, contrasting and comparing, and finding pleasure in the recognition of the like in the midst of the unlike, being identical, in fact, with the law which constitutes the picturesque, we may naturally expect a principle so universal to admit, even in the particular province of the picturesque, of extensive application; and, in truth, it is hardly too much to say that according to the variety of the employment of it is the success, the beauty and the perfection, so far as form is concerned, of a pictorial composition. Thus, an object may be picturesque, for example, in itself, according to the definition of the picturesque above given; or, on the other hand, it may be picturesque only or mainly when in juxtaposition with a second object, partly resembling the first and partly differing; it being just this union of resemblance and difference which constitutes the picturesque. Or, again, each of the two objects may be properly picturesque in itself, or taken separately, and the two may also create the picturesque when taken conjointly. An oak, for example, if well grown, is a picturesque tree. Its stem is just a sufficient departure from a straight line to save it from being formal, and its foliage groups into masses corresponding one to another in character, yet not rigorously uniform—repeating one another with variations and perpetually suggesting a symmetry which they stop short of completing. If a tree, then, such as this, be introduced into a picture alongside of a piece of architectural ruin of the kind before mentioned, the one, to use the common expression, will set off the other in a manner and to a degree in which neither one tree would set off another tree, nor one ruin another ruin; or, in other words, owing to the character of their outlines, there will be at once a certain difference in the opposed masses and a certain correspondence, and the picturesque will be the result.

It would be easy to continue these illustrations almost indefinitely. What, for example, is the secret of that picturesqueness of the Swiss chalet which Mr. Ruskin mistakenly attributes to "parasitical sublimity"? It is simply that the rough masses of irregular stone with which the roof is studded interrupt what would otherwise be the over-formality and regularity of the lines of the building. Why is it, again, that the painter, who has a picturesque object to copy, avoids giving it a place in the exact centre of his paper? It is the fear lest, by consequently dividing his paper into equal parts he should give an air of formality to his drawing, which would destroy its picturesqueness. Or, again, what makes him prefer taking his building, be it castle or cottage, at an angle, in preference to a front view of it? It is obviously the feeling that the slanting lines thus produced by the necessity of the perspective tend to mitigate that decided formality which would be the consequence of a front view. Or, again, why is he so fond of balancing the two sides of his picture? Why will he put a small tree on the left hand over against a large one on the right, a large rock on the right to balance a small one on the left, unless always with the intention of producing a certain correspondence without formality? In the case of a historical picture, as distinct from landscape, the introduction of the same principle of arrangement is more remarkable still, for there, if anywhere, the dignity or the interest attaching to the exhibition of human action or passion, to expression in countenance and feature, and to animation in form, might seem enough in itself for the highest purposes of the artist, without the addition of the particular element we are here treating of. Yet it presents itself, in fact, in what are called the "forms of composition" employed by the great masters. In other words, some regular figure, whether the triangle, the circle, the oval, the figure of eight, the St. Andrew's cross, or any other, is made the basis of the composition or grouping of the different personages which are the subject of the picture; not, however, in such a manner that the employment of the figure in question becomes prominently conspicuous; but here is again that peculiar intermingling of the formal and the informal which constitutes the picturesque. The severe regularity of the figure is just so far discernible as to give harmony and repose to the irregular life and action out of which it is created, and is so far indiscernible as only to regulate a freedom which it would otherwise imprison.

(To be continued.)

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## NEW CUNEIFORM TEXTS.

THE records of Bible archæology have during the last few years been largely increased, says a correspondent of the *Glasgow Herald*, by the discoveries made among the ruined cities of Assyria and Babylonia. Their treasures seem inexhaustible, and one can only long for the time when the heavy hands of Turkey will be lifted from them and the spade of the explorer permitted free play. One of our most accomplished Assyriologists, Mr. Theo. G. Pinches, of the British Museum, has been working out from the cuneiform texts the details of the times of Chedorlaomer and his allies who are referred to in Genesis, chap. xiv. The invasion of Palestine recorded there was only one of the episodes suggested by the annals, which are now known to be admirably illustrated by it. For this reason—along with others—Mr. Pinches deserves the thanks of all interested in such researches for his laborious and painstaking services, which in this case have turned out so successful. He is now having a paper printed giving full particulars, which tend well to lighten up the early history of our race, so that one may well say with him, "the dark places of history are indeed disappearing."

One point is put beyond doubt by these texts—the personages mentioned in Genesis xiv. as invading Palestine turn out to have been historical, though this was disputed a few years ago—and not only so, but they are described as a compact group, such as are recorded in the history of Abraham. This was recognised several years ago when Professor Sayce was led to assert in 1892:—"So far as the historical arguments are concerned, the cuneiform inscriptions show that it is the critic and not the Book of Genesis that has been at fault."

Since that time new texts have been found, confirming the previous readings and enlarging our information of these times. To Father Scheil—perhaps the most successful discoverer of such monuments of late years—we are indebted for the knowledge of three tablets now in the Museum, Constantinople, with most important texts, which well elucidate the history of such far away times. These chiefly induced Mr. Pinches to enter again on the investigation of the story and form the basis of his expected paper. How far back the times were we can form some idea from the following considerations, apart from our Bible. Assurbanipal, the warlike son and heir of the Bible Esarhaddon, whose library is now secured in the British Museum, records in his annals that in his eighth campaign, 659 B.C., he recovered the image of the goddess Nana, which the King of Elam, or Kudur Nanchundi, had carried off from "the land of Accad," or Babylonia, 1635 years previously, and restored it to Erech, her native city. This leads us back to 2294 B.C., at which time we are told by Berossos the Medes had conquered Babylon and established a dynasty of Elamite princes, instead of a native Government. One of these was named Kudur Mabug, whose inscriptions found at Ur tell us that he reigned as far as Syria.

His son Eriaku names himself "King of Larsa (Ellasar of Gen. xiv.), Sumer and Akkad"—i.e. of the entire country—so that Kudur Mabug was his father and his suzerain prince at the same time. This Eriaku is for such reasons taken to be the Arioch of Ellasar of Genesis, and the name of Chedorlaomer appearing in the texts of this time as an Elamite prince, there was less difficulty in admitting their identification. Tidal and Amraphel have also been found in them, and all that remains is to work out the details of the inscriptions, so that we may for ourselves find out "the form and fashion of the times" when they lived. This is what Mr. Pinches and others are doing, leaving their translations to speak for themselves. Accordingly, such texts written by Babylonians describe Chedorlaomer as "the enemy," the "evil man," who burst into Babylonia "like the god of war" harrying the temples all over the country, and who did not refrain from the most sacred shrines of the capital—E. Sagila and E. Zida—the temple of "the seven lights of the universe" itself. These are said to have been destroyed, but allowance must be made for the highly-figurative language of Orientals, especially when we know that Herodotus found the temple existing in his days, and that the mountain ruins of Birs Nimrod represent it in our own times. For 4,500 years have these basement-bricks remained *in situ*, and on this ground, at all events, may represent the identical bricks made by the early inhabitants of the plain of Shinar for their tower to reach to heaven—the tower of Babel. So thorough was the work of destruction carried out that mention is made of waters overflowing the city and temple of Sagila, and other passages speak of the city and the entire land of Kar Dunias as being given over to destruction.

Ine Tutu, the Patesi or governor of the city, fled in terror to the marshes of Chaldea, where he remained till the storm was over. We are then told that the conqueror withdrew and passed to the north—to Shishkish or Sheshach, as Professor Sayce reads the word.

Babylon and the entire holy land of Kar Dunias was thus prostrated before Chedorlaomer and his warlike hordes from Elam—the Umman Manda as they are called in the text. But,



like many conquerors since, he found it was one thing to subdue a people and another to secure their confidence. A new text in the form of a letter sent by Hammurabi—the most powerful of the native princes—to one Sinidinnam, the Babylonian King of Larsa, has been found, in which he promised as a gift the present of a celebrated image as a reward for his bravery in resisting Chedorlaomer. This letter is very significant, as it tells us how important Hammurabi then was among the native rulers of the day, as well as how sorely pressed they were by the Elamites. That this inference is justified we learn from further texts, which show how Hammurabi became the leader of a native confederacy who drove the Elamites from the country, and became the first monarch of a new dynasty of native princes. Many points are raised by these new texts which cannot be considered here. That this Elamite invasion made a profound impression on the whole future history of Babylonia seems clear. It is suggested in the national epic of Gilgames or Izdubar, where he and Hëabani went to free the beleaguered city of Erech from the Elamite tyrant Humbaba, an epic in which are embedded many primeval traditions. To mention only one here, we read that the two heroes, in their pursuit of the tyrant, enter a holy grove, where was the cedar-hill, the dwelling-place of the gods. Here is a magnificent garden (a paradise), in which a cedar (the tree of life) is distinguished from other trees as peculiarly beautiful. This was in the neighbourhood of Kardunias, the holy land of Babylonia, in which F. Delitsch found reminiscences of the Bible Eden, and from which in all likelihood arose the mystical name of the capital Tin-tir-ki, itself the “seat of life”—*subat balati*.

But the terror it produced could never be effaced. How ferocious the tyrants were is shown by these texts. We read that Chedorlaomer “his son with the iron dagger of his girdle pierced his heart,” i.e. of his father, whose name unfortunately is wanting. Dur-sir-ilani, son of Arioch, is suggested as slaughtering some person “like a lamb” in words that speak of a son doing so, and immediately after Tidal “fell on his father with the weapon of his hands, and then proclaimed his sovereignty before the temple of Anunit.” Can we help agreeing with Pinches that these three contemporaries were parricides, and that they were impelled to the invasion of Babylonia and Palestine by personal ambition? If so, the resistance and check to their ruthless career inflicted by Abraham under God was a blessing to the race.

#### EDINBURGH ARCHITECTURAL ASSOCIATION.

AN ordinary meeting of the Edinburgh Architectural Association was held on the 21st inst. in the Royal Institution, Dr. R. Rowand Anderson, president, in the chair. A large number of drawings of old Scottish work, by students of the Applied Art School, were exhibited, and explanatory historical and architectural notes on them were read by Mr. J. Forbes Smith and Mr. Ramsay Traquair, students. Among the subjects of the drawings were Holyrood Abbey, Craigmillar Castle, Argyll's Lodging at Stirling and Cowane's Hospital.

The Chairman, in proposing a vote of thanks to Messrs. Ramsay Traquair and Smith for their communications on the interesting buildings they had been studying, said that the Association, in devoting one of its evenings to an exhibition of the work of the students of the Applied Art School, was desirous to make it known, especially to the young men who were to follow applied art, that the Association was doing its best for them, because it made annually a handsome subscription from its limited means to forward the cause of education, and it desired to make it known that it did not limit its subscription to benefiting those only who were to follow architecture, but that it gave its support to a school which, in carrying out its system of education, made no distinction between the architect and all other art-workers—that was to say, that the scholarships and other rewards at the disposal of the school could be obtained and held by the decorator, the sculptor, and any other art worker equally with the architect. The Association also desired to emphasise the great importance of the study of ancient work, in all its departments, as a true foundation for the future work of the artist. Work of the character they saw that night might be described as analogous to anatomy in the study of medicine. They brought the student into actual contact with work of all kinds. He was taught to dissect, to analyse, and to work out for himself all the reasons that gave rise to the various features he saw in buildings. All artists of eminence had recognised that the study and analysis of ancient work were among the most important factors in the education of all art workers, and the Association desired to make it known as widely as possible that the Applied Art School held out every inducement to students within its, he was sorry to say, somewhat limited means, to come and perfect their education.

The Association visited on the 24th Bavelaw Castle, near Balerno, by permission of Mr. Charles Gulland, commissioner for Mr. George Johnston, of Bavelaw, and Mr. Robertson, the

tenant. Mr. Frank W. Simon, architect, who led the party, described the castle, and Mr. Glover, factor for the property, supplemented Mr. Simon's description. On the motion of Dr. Rowand Anderson a vote of thanks was given to Mr. Gulland and Mr. Robertson, and to Mr. Simon for his descriptive notes.

#### THE PARTHENON.

THE following letter by Mr. J. R. S. Sterrett has been sent from Athens to the *Evening Post* of New York:—

Perhaps many who have seen the stately pile only from below will be inclined to doubt statements brusquely made. Indeed, when one sees the ruin from a distance, or looks upon it from among the pillars of the western façade, it seems so strongly built, so secure, that the visitor has no thought of decay or ruin, but leaves the place under the impression that the Parthenon will continue to defy time for thousands of years to come. But the fact is that, ever since the last earthquakes, its immediate ruin has been a foregone conclusion in case another earthquake should occur before certain contemplated repairs shall have been completed. At this moment the whole western façade is disfigured by an immense scaffolding, built in the strongest possible manner from enormous beams that were brought all the way from America to succour Athene. This mighty scaffolding subserves a twofold purpose: primarily it enables the architects to replace certain rotten and broken architrave blocks with fresh blocks, but its important secondary purpose is to serve as a prop to the entire entablature, and prevent the collapse of the building in case an earthquake shock should visit Athens, an event that may occur here at any time.

Visitors are excluded from the scaffolding, but I gained admittance on two occasions recently, and was thus enabled to examine at close quarters the frieze of the western end. From the base of the columns below any study of it is out of the question, firstly because, owing to the projecting epistyle, the bottom of the frieze cannot be seen; then again because the whole frieze is distorted by the sharp perspective and the lower-lying parts of the reliefs are obscured by the higher. The scaffolding thus affords a unique opportunity for the study of certain chapters of Phidian art.

But, not to dwell longer upon the frieze in this connection, I was dismayed at what I saw. The inside and interior stones of the entablature, colossal though they be, are rotten through and through; in some cases these rotten stones were broken by the recent earthquakes into many pieces, though, by the veriest miracle, the pieces still cling together. As is well known, the epistyle consists of three huge blocks that stand on their edges side by side and span the intercolumniations. Of these three blocks the outside ones alone are comparatively sound, while the interior and inside blocks are in a most ruinous condition. All of these inside blocks are to be replaced by new ones that are now lying on the ground below, ready to be put into position as soon as the mighty derrick that is to lift them on high shall have arrived. The new blocks will be coloured with oil and wax in order to rob them of their glaring whiteness and newness. Even more sorrowful is the fact that, though this ruin may be stayed for one or two centuries yet to come, still in the end the Parthenon must collapse unless virtually the whole entablature be replaced by new and sound stones.

For this ruinous condition of the Parthenon several causes have been in effective operation for many years, though unsuspected. In point of fact the builders of the Parthenon employed first-class marble only on the outside of the building, only where the eye could see it. In the Pentelic marble there are veins of schist that disfigure and ruin many a fair block. Visitors will remember the many unfired drums of columns that lie here and there around the temple. These are drums that were rejected by the builders—rejected because they were faulty in some way, often precisely because of this disastrous vein of schist. Indeed, one of the new epistyle blocks has just been rejected by the committee of architects because of its faulty character, which was discovered only after the block had been completely hewn and was ready to be hoisted into position. Of course perfectly sound marble was employed in the columns, both because they were completely visible and also because they had a great weight to carry. Sound marble was employed also for the outside blocks of the entablature and in the outside stones of the cella wall, but the inside stones and the completely hidden interior stones of the epistyle and cella walls were faulty from the start—faulty because of this vein of schist.

As long as the building was covered by a roof the faulty character of these stones was of no importance whatever, and as is well known, the Parthenon was always covered by a roof until its final disruption by the gunpowder explosion two centuries ago. The ruin that now threatens the portion of the Parthenon left standing on that fatal occasion began from the moment of the explosion, and it has become more



threatening with each succeeding year. The roofless condition of the building has made it possible for the rain to penetrate into the schist veins of the faulty stones, and the frost of winter and the scorching sun of summer made the evil greater from year to year, until at last we discover that these stones are rotten throughout, and that utter ruin is impending.

And here comes in a fear for the frieze, the glorious frieze, that fairly palpitates with the genius of Phidias. When the final collapse of the Parthenon comes, the frieze will be gone for ever. This remote danger, however, is not the only one that threatens the frieze, for there it stands, exposed, like all the building, to slow but certain decay and ruin. In the recent earthquakes the head of one of the horsemen was broken off and dashed to pieces on the marble floor below. A similar fate is in store for the entire frieze, for the rotting is already visible in the reliefs. These reliefs ought to be removed now, so that they may be preserved in the museum for ages after the original entablature has ceased to exist. Dörfeld did, indeed, propose to the committee that the frieze be removed to a safer and drier place, and be replaced by a marble copy. But conservatism carried the day. The thought, too, that the removal of the frieze to the museum would seem to justify the spoliation of the shrine by the deeply detested Lord Elgin had much to do with the stand taken by the majority of the committee. The frieze, therefore, will remain *in situ*, and will perish. There can be no doubt that the Parthenon would hold out for many centuries longer if it were covered by a roof. The care which the Greek Archæological Society bestows upon all the ruins is worthy of unstinted praise. The ruins are now placed behind strong iron bars. A great iron fence protects the whole country between the Odeion of Herodes Atticus and the Theatre of Dionysos. Another fence protects the Dipylon Kerameikos region, another the Areiopagos and the sanctuary of the Eumenides, once the rendezvous of gipsies and unsavoury tramps. Nor is this change for the better seen and felt in outdoor matters only; the museums themselves are now arranged and managed in a most satisfactory manner. Something like order reigns, and scholars may study without vexation and loss of time.

### TELEGRAPH POSTS IN THE COUNTRY.

IN a letter to the *Times*, Mr. W. C. Renshaw, of Hayward's Heath, writes:—It seems to me that the time has come for calling attention to the methods of the post office in connection with the erection of telegraph or telephone lines. Here in Mid-Sussex one of our main roads—namely, that leading from North Chapel *via* Lindfield to Brighton—has lately been made available, not for any purposes relating to local service, but in order to facilitate direct telephonic communication between London and Brighton exclusively. This work is being executed on a large scale. The posts, some 30 feet high, are fully a foot in diameter and are maintained in some cases by converging wooden props inserted in the ground about 2 feet or 3 feet from the main post, and in others by metal stays set at varying distances, but in either case making a sort of trap.

The general results are a hideous disfigurement of a hitherto pretty country, and an addition of danger in case of a runaway horse or a bicycle running downhill out of control, which, having regard to what I call the traps, makes one shudder to contemplate. The particular results are a great diminution in the frontage value of land and permanent obstruction to the opening of new gateways or roadways into the high road without any compensation to the person aggrieved.

But all this when the road authorities, with more or less indifference, give their assent, appears to be legalised by the Telegraph Act, 1863, into which for "company" must under the Act of 1868 be read "Postmaster-General." Now what I complain of is that, in carrying into execution the wide powers conferred upon the Postmaster-General by them and the other Acts, no regard is paid by his officials to the provisions contained in them for the protection of landowners and others.

Section 21 of the Act of 1863 imposes a prohibition against placing any "work" in any land without the previous consent of the owner, &c. By section 3 "work" includes "telegraphs and posts," and post is defined as meaning pole, standard, stay and strut. This is sufficiently plain, but the officials do not hesitate to injure the hedges, to dig into the banks of the owners adjoining the road, and therein to affix metal stays or wooden struts fastened into buried pieces of wood about 4 feet long without even asking for consent. I myself wrote to the Secretary of the Post Office on January 31 complaining of trespasses of this description, and on February 2 received an acknowledgment stating that my letter should receive attention. It has received such prolonged attention that I have never had an answer yet. This very morning workmen were engaged digging a large hole in one of my hedge-banks, which the foreman frankly admitted was my property, but said he was

under orders to do it. If an individual did this sort of thing on his neighbour's land I think his conduct would be stigmatised by some strong epithets.

Section 12 of the Act of 1863 enacts that when a public road passes by the side of any park or pleasure-grounds, or crosses or abuts on a private drive to any mansion, the company (*i.e.* the Postmaster-General) shall not without, or otherwise than in accordance with, the consent of the owner, &c., place any "work" above ground on such public road. In 1892 a telegraph line on posts was laid along the public road called the Rookery Lane, abutting for some third of a mile or more on my pleasure-grounds, and a post was set up immediately opposite my entrance gates and ornamental trees were mutilated to make space for the wire. No consent to place this work above ground was asked for. In this case also trespasses by posts and stays being inserted in my land were committed.

The Acts contain, so far as I can find, nothing which authorises the cutting or mutilating of trees, whether ornamental in the legal sense or not. As to this I am bound to add that my permission was lately asked by an official to cut some old Scotch firs, whose object is to hide out a row of ugly cottages, but it was only asked for after the posts had already been erected in such a position that the wires could not be put up without mutilating the trees, and this notwithstanding that there was already a line of posts carrying only two wires on the opposite side of the roadway.

### TESSERÆ.

#### [The Arts and Literature.]

THERE is a pathological connection between the arts, the drama and the complexion of natural literature more or less marked in the evolutions of history. As the geologist from the plant vestiges in the earth's crust can construct the animals at any period on its surface, so from the sculpture and frescoes of the Roman empire we can set up the habits of life, the degree of refinement, the nature of the literature—nay, the very reign under which they sprang into being. The whiskered busts of Hadrian point as indisputably to the rhapsodies of Valerius Flaccus and Statius as the chaste marbles of Augustus to the productions of Horace and Virgil. The culture of the beautiful reached its highest development in the age of Pericles, and with it was associated the most brilliant literature and the profoundest dramatic art the world has yet seen. As art declined with the waning power of the Roman empire, literature and all relish for pastimes of a purely intellectual nature fell along with it. If the reign of Constantine signalled the triumph of the Christian Church, it was upon the ruins of the literature and artistic creations of the Roman world. For a thousand years statuary and painting lay buried beneath the soil of Rome and Greece, and in the same grave lay two literatures whose greatest achievements were contemporaneous with that of the two arts which they had followed to the tomb. The peculiar dogmas of the Arabs were hostile to sculpture and painting, and when their empire culminated under the Abassides, their warlike spirit gave way to scientific researches. But there was no art, and consequently no literature having the slightest claim to originality. It will not, therefore, startle us to find that when those arts sprang into new life under the Medici, a powerful literature was seen side by side impressing its influence upon Europe. With ourselves, the perception of the beautiful, in so far as its realisation was felt in our daily life, was most manifest during the era of Elizabeth, and contemporaneous with that spirit our national drama then achieved its proudest distinction. But for these revivals, the exhuming of Greek statuary from the Italian soil prepared the way quite as much as the dispersion of Greek manuscripts from the shrines of Constantinople. The recovery of a Greek Antinous or Erato had the same effect in rescuing men's minds from the gloom of barbarism as the detection of the works of Euripides in some old palimpsest out of the convents of the Hellespont. The literature was quickly rivalled, and in some respects surpassed. The sculpture still remains to reproach us with our littleness, and urge us to loftier flights in the sphere of ideal creation.

#### Canute's Canal.

Canute, king of Denmark, when he besieged London, was impeded in his operations by a bridge, which, even at that time, must have been strongly fortified, as it obliged him to have recourse to the following expedient. He caused a prodigious ditch to be cut on the south side of the Thames, commencing at Rotherhithe, and which he continued at a distance from the south end of the bridge in the form of a semicircle, opening again into the western part of the river. Through this he drew his ships, and effectually completed the blockade of the city. Evidences of this great work were found at Dock Head, at the end of Tooley Street, where it was first commenced.



Fascines of hazels and other brushwood, fastened down with stakes, were discovered in digging the dock in 1694; large oaken planks and numbers of piles have also been discovered in other parts of its course. It is, however, doubtful whether what was found was evidence of a canal rather than of submerged vegetation. In 1826-27 an excavation was made the whole length of Bermondsey Street into Tooley Street for the purpose of building a new sewer. The first few feet were made ground, merely rubbish; then came a thick, close sedimentary deposit of alluvial clay and Thames river mud, averaging about 7 to 10 feet thick, which evidently had its origin in the tidal and sedimentary matter from the adjacent river; below this mud and clayey deposit was a close stratum of peat, tightly compressed, varying materially in thickness in different places along the street, but averaging from 2 feet to 4 feet and 5 feet in thickness. This peat was chiefly composed of vestiges of hazel-trees, hazel-nuts (in beautiful preservation), fragments of oak, beech and other trees, and leaves and stems of various plants confusedly intermixed, the wood and hazel-nuts and the oak differing in no respect in their character from what might be grown at the present time in the same county. This peat and wood had undergone no apparent chemical change; it was highly saturated with moisture, had rather an agreeable odour, of a light brown colour, and fragments of the hazel and oak wood on being kept in a dry situation for two or three months shrunk into about one-tenth of their original size by the evaporation of the combined water, but left the outside bark in its original shape, while the remaining inside ligneous fibre of the hazel or oak became (on cutting it with a knife) nearly as black and as hard as ebony. Below this stratum of peat came the usual angular fragments, called by geologists diluvial gravel, consisting of fragments of flint reposing on the great argillaceous deposit of the blue London clay. A continuous formation of the peat stratum and the alluvial mud and clay reposing on it can be traced along the banks of the Thames at Limehouse and at the entrance of the London Docks, as well as at the East India Docks, Blackwall, and in that neighbourhood. From the above statement of facts one or two interesting inferences or deductions may be drawn. First, that at the time when the above hazel trees and wood were growing (at the depth now of 10 or 12 feet), the relative level of the height of the water in the Thames must have been at least 12 feet lower than it is at present. Secondly, it is highly probable that, even long anterior to the time of the Romans, this forest or wood must have become submerged by the vast accumulation of the Thames sedimentary mud and clay, thereby accounting for the progressive rise in the relative level of the river to that which we at present witness at high water.

#### Sir W. Chambers.

Sir William Chambers threw no new lights on the art over which he was destined to preside. In its practice and more scientific department of construction he was, comparatively with such men as Wren and Hawksmoor, totally ignorant. His taste was Roman, and, being unacquainted with the sublimer beauties of Grecian art, was consequently less refined; yet his works have a chastened correctness of detail of the best style of Italian art. He is less exuberant than Scamozzi, Serlio and Borromini, and even than Palladio himself, except in his very best examples. He may be called the *Palladio riformato* of the Georgian era. In the course of his travels he had visited parts of China, and published a treatise on the gardening and architecture of that strange people. The royal gardens of Kew and its lofty pagoda are among the results of the Chinese phantasy that he had inflicted on his royal master, and led to the introduction of that fanciful and inelegant style. Yet the Somerset House of this architect has many redeeming beauties, and his work on "Civil Architecture," in spite of bad taste in reviling the architecture of ancient Greece, of which he knew nothing, abounds with sound doctrines. Fond of ease, he indulged in his professional reveries in his office at the Board of Works. Not being a regularly bred architect, or even builder, he educated no pupils—that is to say, as the word is now understood; he therefore formed no school, and left little more than his Somerset House, a few edifices of lesser notoriety, his Chinese buildings at Kew, and his "Treatise on Civil Architecture" to perpetuate his fame; but his name will always hold a distinguished place in the list of British architects. His only followers or pupils were bred in the office of the Board of Works, in which he held the situation of surveyor-general.

#### Ancient Seals.

Whenever we find an old charter or deed with a seal in tolerable preservation we have another link added to the chain of historic evidence—it establishes original relations between public or private parties—it elucidates the records of heraldry, it shows the state of art as it then was, and in other ways it serves to fill many a gap in local or even general chronicles because of the precision in the ancient method of seals, whereas

now, how is it? Who would think it worth while noticing the mass of devices, or care to add them to a collection? They tell no tale and imply no meaning. Except in the most solemn instances we have nothing but disorder in their use; the seals of one office confounded with another; privy seals and public seals impressed at random; one person borrowing his neighbour's, and his neighbour's answering for all the world, if the world please; individual officers adopting devices mistaken afterwards for the stamp of the office itself, or perhaps for the coat-of-arms of a county or city or corporation, instead of the person's representing it; and even, when regularity is aimed at, designs formed upon no clear principle, heraldry mixed with allegory, fancy preferred to reason, or ancient symbols set aside for individual whim. In short, seals have long altogether lost their import. The Normans required the seal in addition to the signature, a point not essential with the Saxons, though occasionally used by them. But then the Mediæval noble stuck his own tooth into the wax, "In witness of this sooth," "I seal with my fang tooth;" or he put a bit of his own hair into it in token of his personal bequest, or left the impress of his own fingers deep on the back of the wax when he placed them on it, saying, "My act and deed," or plucked some of the grass itself as a first-fruit of the land which he conveyed, and so identified it with the substance of the seal, or endorsed it with his own signet, or badge or other mark which could be mistaken for no one else's but his own, or even fastened a ring, or knife or pledge of some kind to the deed. So particular, indeed, were they (even from the classical era) that the seal was examined critically, and in after times, when every landowner used his seal, a facsimile of most of the important ones was laid up with the registrars, often impressed on lead, in order to detect forgeries.

#### Æsthetics and Art.

This being a critical, conscious age its artists must be critical to fulfil its demands, and æsthetics we take to be one of the means of elevating it out of the "slough of despond;" although it must likewise be emancipated from "commerce," and be placed on its own high pedestal, with real priests at its altars and real faith in its worshippers; so long as the "commerce of sweet sounds" is the jingling of guineas, little can be hoped for. But that æsthetics, however studied, is able to create artists we do not for an instant imagine; it can but direct the artistic genius. Æsthetics is the philosophy of art, and "philosophy," says Solger, "can create nothing; it can only understand. It can neither create the religious inspiration nor the artistic genius, but it can detect and bring to light all that is contained therein." To create a new and commensurate art is not in the power of æsthetics; that must come from the new birth of an era; there must be the inspiring ideas, but as in all the secondary stages men are employed in developing the many phases of the idea, æsthetics, when perfected, will necessarily direct their energies into the right channels. And this leads us to the indisputable position of æsthetics. If it be of no assistance to the artist (which we deny), it will render intelligible art as art, as well as all existing works; it will enable us fitly to judge of the relics of the past and the productions of the present, and it opens an inquiry in the psychological department of the very highest interest. For these, then, do we demand a consideration of the subject. In France, although rapid strides have been taken and some notable results elicited, it still remains in a fragmentary state. The works of Quatremère de Quincey, however, are equally admirable for their clearness and profundity. Sainte-Beuve, George Sand and others show profound insight, but only in parts; a whole is still wanting. In Germany it is received as one of the branches of philosophy, has its professors, its treatises and systems, and every man, woman and child is more or less imbued with it. Lessing, Winckelmann, Herder, Goethe, Schiller, Kant, Schelling, Novalis, the Schlegels, Tieck, Jean Paul, Solger, Hegel are among the great stars which illumine this atmosphere, but their separate endeavours are too comprehensive to be even mentioned here. Solger and Hegel may both be consulted for the historic portion. Lessing's works, though mostly polemical and directed against the French poetry, yet contain much that is true and admirable for all times, especially the "Laocoon." Winckelmann's works are much spoken of, unfortunately little read. Jean Paul's "Vorschule" does not pretend to be systematic, but it contains some charming writing, illustrations and close argument. His remarks on wit and humour are well worthy of study. Solger can be recommended to those who are content to view the matter in its abstract logical shape, unrelieved by applications and illustrations. The essays of Schiller, though rather repulsive at first from their Kantian rigidity of form, yet contain important ideas, and occasionally go to the very depths of the subject. But while all these works are more or less known and talked of in England, the masterly and comprehensive "Lectures" of Hegel remain without even the most vague and general notice.



**Simon Lantara.**

The French landscapist Lantara was the son of peasant parents, born at Oncy in 1729—was brought up as a herd-boy—brought forward by Gillet de la Renommière, the great man of the neighbourhood—and by a member of the family placed under a master at Versailles, having displayed on the walls of his stable signs after their kind as unmistakable as the Greek quotation which led Coleridge's commanding officer to suspect the so-called Comberback a trooper fit for better things than littering cattle. From Versailles the boy passed to Paris, and there, it seems, established a reputation, not merely for cleverness of hand, but for conviviality and sharpness of tongue. The old story, which has done service in the lives of so many different artists, of the fly as living as life which the pupil painted on a picture in the absence of his master, is among M. de la Chavignerie's collections to Lantara's credit. Another anecdote, quoted from Lenoir's "Dictionary of Conversation," is also not unfamiliar:—"A nobleman gave Lantara a commission for a landscape, in which there should be a church. The painter, like Claude Lorraine, did not know how to paint figures. The amateur, on receiving the picture completely finished, enchanted with the truth of the landscape, the freshness of the colour and the simplicity of the touch, said, 'M. Lantara, you have forgotten the figures in your picture.' 'Sir,' was the painter's ready reply, 'they are gone in to mass.' 'Very well,' was the patron's rejoinder, 'I will take your picture when they come out again.' Lantara is fathered with the well-known drinking-song, "A boire je passe ma vie." For the reputation which he bore of being one of those good fellows at a tavern, "who are no one's enemies save their own," he was served up by MM. Picard, Barré, Radet and Desfontaines as hero of a sentimental vaudeville, which was played and sung with great success in 1809. He died with a joke on his lips in the hospital of La Charité, in 1778. During his last illness he used to make little drawings on cards, says M. Lenoir, "and exchange them for lumps of sugar, sweetmeats and other dainties."

**Maclise's Portrait of Sir John Soane.**

Sir John Soane having been a large subscriber to the Literary Fund, some desire was manifested to have his portrait placed in the committee-room, and Maclise generously offered to paint it for the society gratuitously. Sir John accordingly sat for his likeness, and for a time it was pronounced to be perfect, both as a work of art and a complete resemblance. Some good-natured friends, however, got round the old architect and, with marvellously kind intentions, persuaded him that, while the Adonis-like charms were concealed, the defects and wrinkles of eighty years were too prominently put forward by the painter; assured him, while they shook his hand and swallowed his wine, that he was caricatured, not portrayed; libelled, not limned; and worked up the poor old man to a state of desperate rage with himself, Maclise, the Literary Fund and the whole world. Frantic with passion he demanded that the committee, on pain of his ceasing ever again to subscribe to the funds of the society, should immediately take down the offending likeness, whose libel was its truth, from the walls of their room and hand it over to him, while at the same time he offered to replace it by a copy of his portrait by Sir Thomas Lawrence. To the latter part of the offer no objection could well be made, but Maclise demanded back his portrait, while Sir John strenuously insisted that to himself alone it should be given. The committee were thus placed in a dilemma. They did not wish to offend Sir John, but they felt that it would be grossly unjust to Maclise if they refused to give him back his portrait. While they were deliberating a poor, half-witted fellow who had by some means heard of the controversy put an end to the dispute in the simplest manner possible. Having surreptitiously obtained admission into the committee-room late in the evening he cut the portrait into pieces and then went away, leaving a note on the table to the effect that he had destroyed the bone of contention. It was at first proposed to indict the offender for felony, but Maclise generously had pity on the wretched man. So extraordinary an occurrence furnished food for table-talk in London for a considerable period and gave rise to a hundred epigrams.

**Record Reign Inventions Competition.**

SIR,—We are exceedingly obliged for the very kind notice you have put in your valuable paper respecting *Western Mail* inventions competition. Unfortunately, however, a little error has crept in to which our attention has been called. The *Western Mail* is a *Cardiff* paper and not a *Plymouth*. If you will kindly refer to our letter we think this is clear. Perhaps

you may be able to oblige us with a very short reference to this matter in a coming issue in which you will correct this error. Thanking you for your kindness in this matter.—Yours faithfully,  
(GEO. H. RAYNER) RAYNER & CO.

37 Chancery Lane, W.C. : April 24.

**Royal Institute of British Architects Elections.**

SIR,—The fact that sixty existing members (out of sixty-four) have nominated themselves for the standing committees should be widely known. The best thing to be done under the circumstances will be to "plump" for new candidates, as in any case a large proportion of existing members must necessarily be returned. As seventeen of the existing Council are renominated for eighteen seats, it is desirable that all members vote, and for new men only. The existing seventeen members will no doubt be well looked after by their own friends; as they have renominated themselves, they will probably also vote for each other, but a few of them should give place for new blood.—Yours faithfully,  
A LONDON ASSOCIATE.

April 27, 1897.

SIR,—A doubt has been expressed as to the accuracy of the statement that a large proportion of the members do not vote at the annual elections for the Council. The following are the actual figures from the Institute Journal in reference to the last election:—

There were only 468 envelopes sent in containing the voting papers, and 29 of these were spoiled by informalities; no candidate obtained more than 391 votes, although the total number of members with voting powers was then 1,581, therefore no less than 1,113 neglected or refused to send in voting papers.

It is to be hoped that there will be more voters this year and that they will consider six new members of the Council, with twelve old members, a fair proportion.

The best way to secure this result would obviously be to "plump" for new candidates only, for it is absolutely certain that twelve, at least, of the existing Council will be returned.—Yours faithfully,  
A METROPOLITAN FELLOW.

London : April 28.

**GENERAL.**

**Messrs. Partridge & Cooper** announce that they will shortly publish an illustrated souvenir of the Queen's Diamond Jubilee, entitled "Temple Bar and State Pageants, an historical record of State processions to the City of London, and of the quaint ceremonies connected therewith, written by Mr. Henry Johnson, illustrated with pen-and-ink sketches by Elsie M. Cluff." The illustrations will likewise include reproductions of several interesting engravings in the British Museum.

**A Reredos** is to be erected in the parish church, Littlehampton, as a memorial of the late vicar.

**The New Town Hall** which the Vestry of Rotherhithe have erected was opened on Wednesday. The building will cost about 20,000*l*. It is in the Renaissance style, and has been designed by Messrs. John Murray & Frank Foster, of John Street, Adelphi. The builder is Mr. Howell J. Williams, formerly a county councillor for Rotherhithe.

**A Memorandum** was presented to the Salisbury Diocesan Synod on Wednesday, stating that during the last twelve months more than half the parishes in the diocese had generously contributed to the fund for the repair of the tower and spire of Salisbury Cathedral. In the Archdeaconry of Sarum the amount collected was 402*l*.; Archdeaconry of Wilts, 229*l*.; Archdeaconry of Dorset, 371*l*.—total, 1,002*l*. Altogether the fund now amounts to 11,500*l*., and 3,500*l*. is still needed to complete the work, which Sir Arthur Blomfield reports to have been up to the present time "accomplished in the most workmanlike and satisfactory manner."

**The Decorations** of the choir of St. Paul's Cathedral, on which Mr. Richmond has been assiduously engaged during the past six years, are now practically completed, and the work on the quarter domes will be at once taken in hand.

**The Interior** of Her Majesty's Theatre owes much of its effect to the co-operation of S. J. Waring & Sons, Limited, of Oxford Street, W., Liverpool and Manchester. The firm produced the splendid proscenium curtain, the carpets and the upholstering in the stalls, boxes and dress-circle, which impart colour and other advantages to the house.

**A General Meeting** of the Royal Society of Painters in Water-Colours was held on Monday, when Mr. Napier Hemy, Mr. Samuel T. G. Evans, Mr. J. Henry Henshall and Mr. J. R. Weguelin were elected members.

**The Architectural Association**, which was constituted fifty years ago, will hold its jubilee banquet at the Trocadéro Restaurant on Wednesday, May 5, at 7 P.M. Mr. A. Beresford Pite will preside. The guests include the Lord Chief Justice, the Bishop of London and Viscount Halifax.



# The Architect.

## THE WEEK.

THE terrible catastrophe which occurred in the Rue Jean Goujon on Tuesday is enough to extinguish the gaiety of Paris during many a day. It becomes, if possible, more awful when all the preliminaries are considered. The most admirable arrangements which were inspired solely by the desire to increase the revenue of the charitable society have brought about the calamity. It was the first time the Bazar de la Charité was held in the Rue Jean Goujon, one of the streets in the neighbourhood of the Palais de l'Industrie, where the last Salon exhibition is now open. Hitherto it was found in the Rue de la Boétie on ground belonging to a relative of the French President. By substituting the Rue Jean Goujon a sum of 200*l.*, which would have to be paid as rent, was saved, and that determined the migration. The honorary president of La Charité, Mr. HENRY BLOUNT, who is one of the worthiest representatives of England in Paris, was anxious to discover attractions on economical terms. He remembered the reproduction of Old Paris, which had served its purpose in the recent Theatrical Exhibition in the Palais de l'Industrie, but was not destroyed. Mr. BLOUNT secured it for 180 francs, or about 7*l.*, and M. CHAPERON, the scene-painter, who erected it, offered to touch it up without any cost. The space occupied by it measured 80 metres by 10 metres. As there was much more space available it was decided to instal a cinematograph close to Old Paris with its twenty-two booths, and to that installation the catastrophe must be ascribed. The only result anticipated by the founders was the receipt of at least 40,000*l.* The loss to the poor of Paris is therefore serious, but that will not receive much consideration at present.

ACCORDING to the report of the Art Union of London, there was an increase of over 100 subscribers in the past year. The amount of subscriptions enabled the Council, after setting aside 1,742*l.* for the production of the annual work, to appropriate 616*l.* for the purchase of prizes to be drawn by lottery, making, with those awarded as "consolation" prizes to unsuccessful members of ten consecutive years' standing, a total of 204 prizes. Mr. KIMBER, M.P., the chairman, said the Council had had exceptional difficulties to contend with during the past year, but, notwithstanding these difficulties, and the severe competition which had been encountered, the Society had been able to more than hold its own. The number of new members had more than counterbalanced those who had dropped out, and they had added to the subscription list by over 200*l.* The reversal in the House of Lords of the decision of the Court of Appeal in favour of their claim to exemption from parochial rates had, however, caused a serious inroad upon the funds during the year. The Council continued to offer only the very best works to the members of the Society, and for production as the annual work next year they had secured the copyright of Mr. EDWIN ABBEY'S dramatic picture, *Richard, Duke of Gloucester*, and the *Lady Anne*.

It appears almost incredible that a temple near Athens which was known to STUART and REVETT no longer remains be above ground, and that much trouble should have to be taken in order to discover the site. This temple, which was dedicated to DEMETER, stood on the left bank of the Ilissos. The style was Ionic, and it resembled the Nike Aptēris. When the French ambassador, the Marquis DE NOANTEL, visited Athens it was used as a Greek church, but he was able to have a mass according to the Roman ritual celebrated at the altar. On that account it lost its sacredness in the eyes of the Greeks, and it ceased to be one of their churches. It was therefore neglected, and by 1821 all the stones were used for other purposes. A windmill was erected on the site. Some Greek archæologists have succeeded in determining its position, and probably a plan of the foundation can be prepared. Judging by the number of fragments of votive tablets which have subsisted, the temple of DEMETER was at one time much honoured.

THE Special Committee appointed by the Government to consider "Where, in what manner and at what probable cost, provision may be best made for housing and exhibiting the art collection recently bequeathed to the nation by Lady WALLACE, and to make any recommendations which may seem fit to them as to the constitution of a trust in which this collection may be vested," will consist of the following members:—Lord LANSDOWNE (chairman), Sir WILLIAM HARCOURT, Sir EDWARD POYNTER, Mr. FREEMAN MITFORD, Sir F. MOWATT, Mr. WALTER ARMSTRONG, Director of the National Gallery of Ireland, Mr. ALFRED DE ROTHSCHILD and Mr. ALFRED WATERHOUSE. It is not often an architect is selected to take part in Government commissions, but in this case it could hardly be avoided. There is, it will be observed, no representative of the Science and Art Department on the committee.

At Meron, near Angers, the remains of a Roman temple have been discovered. The French peasants are not enthusiastic archæologists, and as soon as the foundations were seen the people of the district lost no time in seeking for treasures. Some coins were discovered, and as they were rare the prices obtained for them increased the eagerness for further explorations. Not the least regard was given to the old masonry, from which it would have been feasible to prepare a plan of the temple. Now much will have to be derived from imagination. The Conseil Général, apprehending additional mischief, has appealed to the administration for interference. After some delay money has been granted to the departmental commission for the purpose of ensuring the safety of any masonry that has survived.

AMONG the aids for decoration which can be generally employed during next month's festivities, we have not seen one which is so suitable as the Commemoration Shield prepared by the Anaglypta Company, Limited. As our readers know, the material from its toughness, endurance and consistency is capable of being utilised for reliefs which shall have as much sharpness as any in stone, and it is evident that for the design of the shield a sculptor was commissioned. In the centre is a bust of Her Majesty on a medallion surrounded by a ribbon with the motto of the Order of the Garter, with the lion and unicorn as supporters. Above are the dates 1837-1897 on each side of the royal crown, while below is the shield with the quarterings relating to Great Britain and Ireland with national emblems on either side. All the details could not be more creditably executed by the medallists of the Royal Mint with the aid of the College of Arms. The shield is 42 inches square, and is produced in gold and colours at a most moderate price. By itself or as the principal element in a trophy formed of flags the shield is a very attractive piece of decoration, and it merits to be used throughout the country during the festivities, and to be preserved as a memorial of so memorable an occasion.

THERE is a contest between the administration of Fine Arts in France and M. DANIEL DUPUIS the medallist. He was commissioned to prepare a model for the new bronze coinage which is about to be issued. It is no easy task to satisfy the authorities when they have to deal with a subject of the kind, and M. DUPUIS must possess exemplary patience or he would never have submitted his work to such a long series of trials. At last he was compelled to rebel. On one side of the coin M. DUPUIS has modelled a head in profile of the Republic, with a phrygian cap on the head. Very few alterations were asked for on the obverse. But on the reverse the artist has represented a figure symbolic of France, holding an olive-branch in the left hand, while the right grasps a flag which shelters a child carrying a hammer and a sheaf of wheat, being, in fact, the representative of labour. Twenty times the reverse has had to be altered, and yet the authorities are not satisfied. They wish to have the baby labourer removed. M. DUPUIS has refused, and it remains to be seen whether the Department of Fine Art will respect an artist's rights.



## PAINTING AT THE ROYAL ACADEMY.

THERE has to be such incessant production in our time, little leisure is allowed for thinking or invention, and accordingly in the arts, as in the commonest machine-work, monotony prevails. This applies especially to painting. In consequence, every one who is accustomed to visit modern exhibitions is able to form a tolerably correct notion of the contents of a new exhibition before he sees them, if the names of the artists are given to him. Indeed, anticipation is more easy with painting in this country than with any other form of art. Public opinion, which is supposed to be an infallible authority, generally determines to its own satisfaction what variety of subjects a painter is competent to treat, and purchasers, who as a rule are incompetent to judge, prefer works which will correspond with the public verdict. In a large collection such as we see every year in the Royal Academy we have therefore to encounter many pictures with which we somehow seem to have been a long time acquainted, and it is unnecessary to refer to the catalogue to ascertain by whose hands they were produced. If the exhibitions consisted solely of those works a visit would rarely be a pleasure to any one who was not a novice in picture-seeing. But happily there are artists whose grooves are not yet assigned to them—some who are ready to revolt against what professes to be authority, others who love experiments, and, lastly, those who are only feeling their way. Thanks to them, there is occasionally a chance of seeing something that compensates for the inevitable monotony which is one of the consequences of our social organisation, and this year the number of novelties is larger than usual, and some might be considered as surprises.

Before mentioning any of the works in question, it may be well to remark that a sort of novelty is imparted to this year's exhibition by the number of pictures of military subjects. A few years ago it was with difficulty an occasional work of that class could be discerned. Now they form an important proportion, and, what is more remarkable, they appear to be well appreciated by visitors. Among them may be mentioned *Quatre-Bras*, by Mr. V. HAMILTON; *the Attack on the Gatehouse of the Château of Hougomont*, by Mr. CROFTS; *the Captive Eagle*, by Mr. J. P. BEADLE; *Norman Ramsay at Fuentes Onoro*, of which there are rival versions by Mr. R. C. WOODVILLE and Mr. W. B. WOLLEN; *Nelson at the Battle of Copenhagen*, by Mr. T. DAVIDSON; "*Steady the Drums and Fifes!*" (the 57th—Die-hards—drawn up under fire on the ridge of Albuera), by Lady BUTLER (which is the most fitting of the painter's works to be a pendant to the *Roll Call*). That war is not always without a humorous side is suggested by Mr. W. C. HORSLEY'S *Incident of Napoleon's Egyptian Campaign*, in which we behold a party of the French *savants* and their *demi-savants* (or donkeys) about to be enclosed within one of the infantry squares as an attack of Mamelukes was impending. NAPOLEON is also the subject of other pictures. Mr. GOW gives us a glimpse of the Emperor on his way to surrender himself to the English captain; while Mr. H. H. PIFFARD shows his *Last Review*, the troops being a little boy and girl, children of the faithful BERTRAND. In these works the usual sympathy with the fallen chief is exhibited.

In the first room the work of the Spanish painter JOAQUIN BASTIDA asserts itself among its companions, not only by the subdued gold frame but by the vigour of the handling. A *Segovian Family* shows the interior of a room with a few poor people at work, and the brilliant light which falls on them seems to elevate them in character. Very few colours are used, and yet the picture is impressive from colour alone. Mr. R. NOBLE'S *Golden Harvest Time* appears to be taken from a Scottish scene, for in England we are not familiar with a meadow which lies between a great lake and a wood, and which an old castle guards. The hot haze of autumn dominating such a scene is ably rendered. Mr. HACKER'S biblical scenes are rarely conventional. *And there was a Great Cry in Egypt*, although only a single figure is shown, is most impressive, for the angel to whom is entrusted the charge of smiting the first-born seems appalled with his task. EBENEZER ELLIOTT'S *Angel of Eternity*,

With his wings of sorrow and affright,  
Veils his impassioned brow and heavenly tears,

but the Angel of the Exodus hides his sorrow under a brown veil. The figure is placed diagonally across the canvas, and seems as rigid as the long sword which is borne, and to be equally, if involuntarily, an instrument of destruction. Did the hangers wish to suggest the difference between Greek and Semitic theories of life when they placed Mr. G. W. WETHERBEE'S *Aphrodite's Realm* above the Scripture piece? The little amorini who are joyously disporting themselves in waves which appear as if never likely to be subjected to a storm, are a sort of symbol of a Greek's notion of life and religion. Mr. JOHN FINNIE'S *A Tragic Sunset* is forcible in every way, but it is one of the very few pictures which might be cited this year as not creditable to the hanging, for we must say that delicate operation has been conducted with rare equity towards outsiders. If the County Council of London were wise, they would secure, if possible, Mr. DAVID MURRAY'S three large views of *Hampstead's Happy Heath*, and hang them where the poorest as well as the rich could see them. The paintings would be more serviceable than paid officials in revealing what art can do, and what lovely natural scenes are to be discovered in Cockneydom by all who have eyes to see. Mr. OLSSON'S *Golden Shore*, a range of red cliffs, are also worth attention. Mr. LA THANGUE gained notice by his treatment of light and shade, and his *Travelling Harvesters* displays that power to a remarkable extent; but the *Summer Morning*, although wanting in strong effects of that kind, is likely to afford more constant pleasure. The boy, whose bait has succeeded, is probably more surprised than the gudgeon that is hooked. We hope the artist will not allow himself to be coerced into a sort of daylight WRIGHT of Derby, and will paint many summer morning scenes in which no one quality is made predominant. Sir GEORGE REID'S *Professor Mitchell* is one of the most telling portraits in the exhibition, but the subject has much of the appearance of one of those stealthy officials who are always dropping on youngsters in French schools. Mr. GUNNIS'S *A Spring Cleaning* would be welcome for its humour alone. It represents the agony of a professor who discovers his violins in the wash-tub, but the greys and white are excellently combined.

In Gallery II. Mr. F. A. BRIDGMAN, the American painter, shows a departure from his customary Eastern scenes (*Arabs Bathing Horses* in Gallery IX. is a good example) in his *Bacchante*, in which the revellers assume a decorative arrangement without any loss of spirit. It was a difficult subject to paint, and the artist has succeeded. Mr. ALFRED PARSONS is fond of evening scenes, but he generally prefers lowland spots. In *The Star that bids the Shepherd fold* he shows the side of a hill with many boulders, with a shepherd gathering his flock. The calmness is not less marked than in the earlier views. Mr. J. W. NORTH'S *The Old Abbey Fishpond—Morning in March*, is also a departure from his usual preferences, but habit is powerful and it would take very little work to make the picture represent a morning in autumn. The *Love's Baubles*, of Mr. B. SHAW, girls following Cupid, is very brilliant in colour and almost elaborate enough in detail to satisfy a pre-Raphaelite. It is not right to suggest a goddess could be tired, but that is, we suppose, what Mr. ARTHUR WARDLE in his *Diana* wishes to suggest. If considered as an ancient huntress attended by sympathetic dogs the picture is delightful. M. BENJAMIN CONSTANT'S *Earl of Ava*, the portrait presented to Lord DUFFERIN by the English Colony in Paris, is a remarkable feat as a representation of an Englishman by a foreigner, in which no foreign characteristics are introduced.

Mr. C. NAPIER HEMY has, by means of his *Pilchards*, drawn one of the prizes which are so eagerly desired. It is not merely that the picture will be included in the Chantrey Collection, for selection is not always a proof of merit; what is more advantageous, the public are impressed by the treatment. We cannot remember seeing a picture as large by the artist, but many of his smaller works were no less able. In *Pilchards*, as in his other works, there appears to be a fisherman's delight in a haul, and it suggests that Mr. Hook may be considered as the founder of a school in which Mr. NAPIER HEMY, Mr. COLIN HUNTER and others have been worthy pupils. Mr. LOGSDAIL'S *Bronze Horses of St. Mark's, Venice*, suggests how different a subject may appear when seen closely from what it appears from a remote point of view. The picture corresponds exactly with THEO



GAUTIER's description of the horses as "airain de Corinthe, dont on voit la patine verdâtre à travers un vernis de dorure écaillé par le temps." Mr. BOUGHTON, who has so long succumbed to the call for namby-pamby figures that, judging from his diploma picture, *Memories*, he must believe his vocation is to produce them, emancipated himself while painting *After Midnight Mass, Fifteenth Century*. It represents a part of a varied congregation leaving a church when snow has fallen, and the grand folks have to be lighted on their way by torches. Technically, it cannot be supposed there could be so much clearness of illumination with torchlight, but there is the advantage of seeing the most interesting collection of figures which the artist has produced of late years.

Gallery IV. contains what is likely to be the most popular picture of the year, viz. Mr. E. J. GREGORY's *Boulter's Lock: Sunday Afternoon*. We hope it will have a place within the English section of the International Exhibition of 1900, if it were only to convince foreigners that perpetual fog does not overhang the environs of London, that English folk do not always occupy their Sundays with tribulation, and do not take their pleasures sadly. There is so much faith in Mr. GREGORY's powers, the picture, beautiful as it is, may not after all correspond with the expectations of his friends. It has the disadvantage of appearing as a combination of portrait groups, and the excess of pink is rather fatiguing. But it was no easy task to paint so many people in a sort of prison, for what else is a narrow lock-chamber, without a suggestion that they were momentarily deprived of liberty? Activity and repose had to be also combined, the Sunday costumes of women with the *déshabille* of men. The light that beats along the lock is also to be supposed as adding brilliancy to the colours. We should also remember that after all the scene depicted is commonplace, and only the finest tact could make it attractive. We ought to be thankful for such a revelation of beauty, but Mr. GREGORY has the knack of exciting anticipations which probably can never be realised on canvas with ordinary paints. Near a picture in which red prevails the advantage of green is manifest, and it was a happy thought to hang Mr. YEEND KING's *The Garden by the River* on the same wall with the lock scene. The *Colt Hunting in the New Forest* by Miss KEMP-WELCH is one of the surprises of the year. The subject was treated before, but never, so far as we know, on so large a scale. Like the *Boulter's Lock*, it will reveal to strangers that this country is not given up entirely to factory-life. Powerful animals like those which appeared in Middle. ROSA BONHEUR's two great pictures are not introduced, but, on the other hand, there is more variety of animation, and as the figures are not seen in profile, as in the French artist's work, more skill was needed to make the group effective. Skill which merits recognition is also seen in Mr. A. P. BURTON's *Night Fleeing from Dawn*, in which a nude figure appears that suggests flight. Mr. F. DICKSEE has treated the same subject in his *Dawn*, but with a less display of technical power.

Mr. E. BUNDY's *Puritans* in Gallery V. shows one of those assemblies for prayer and preaching which increased the resolution of reformers. The men are gathered round a table in a room, and so remarkable a collection of heads will not be found in any other picture this year. The creation of such a number of varieties was no easy task, and they all seem to be true to nature. Mr. STANHOPE FORBES has painted forges and other scenes of country life. In *Christmas Eve* he has ventured to grapple with so mean a subject as a back street in a town, with the "waits" playing outside a public-house. The contrast which the artist's favourite bluish-grey would offer when opposed to an ophicleide and other brass instruments was, we suppose, the original temptation. It is a novelty for Mr. FORBES, but the subject was not worthy of so much labour. Signor BACARISAS' *The Corso, Rome*, however, gains in interest when we see it near so chilling a street view. *Evening after a Hot Day*, by Mr. H. SWANWICK, represents farm stables, with two tired grey horses and a brown about to drink. The slowness of their pace and the weariness of the boy guiding them, with the dull light on the ground and walls, are enough to suggest the character of the scene if the title were not given. In Mr. SWANWICK agriculture has found an illustrator who appears to have a familiarity with

country life which is hardly possible with a townsman. Among the "new departures" of the year there is not one so remarkable as Mr. J. C. DOLLMAN's, for he has attempted the *Temptation of St. Antony*. Flemings and Dutchmen used to make it a favourite subject, and the finest of all interpretations of the legend was by a Fleming, GALLAIT, of Brussels, who died a few years ago. In that work human weakness was not ignored, for the hermit appeared afraid of the spectre. In the English picture the saint is seen kneeling before a cross which is in a recess of his cell, a light being near it which is reflected in the eyes of the monkeys and other beasts which form a circle round the principal figure, which is that of a woman as fully displayed as the *Phryne* of M. GÉRÔME. He gazes steadfastly on the cross, and is apparently unconscious of the trial awaiting him. The old painters have not as a rule allowed St. ANTONY to remain free from positive coercion by the enemy, and Mr. DOLLMAN's drama scene may, therefore, appear incomplete. But we can imagine the coercion was of a mental and invisible sort, and the picture gains by the departure from tradition.

Mr. ABBEY's feat last year has incited him to produce another Shakespearean illustration of an original sort. It is less easy to understand his *Hamlet* than the *Richard Duke of Gloucester and the Lady Anne*. In the picture we see the spectators at the play scene, but not the players. It is therefore absurd to compare Mr. ABBEY's work with MACLISE's. The new work is moreover less complete in an æsthetic sense, for there is nothing to suggest why CLAUDIUS, GERTRUDE, OPHELIA and others should be gazing into vacancy—that is, towards the spectator. Then, again, why should the king and queen be painted with their heads touching the frame of the picture, and in fact all the figures cabin'd, cribb'd, confined, as if they were puppets in a box? We assume that Mr. ABBEY was desirous to suggest that as the story of the poisoning of HAMLET's father was related by SAXO GRAMMATICUS, therefore a thirteenth-century appearance should be given to his picture. But the artist might have known that thirteenth-century illuminations are not remarkable for the restrictions of space when there are incidents to be depicted. The old miniaturists made no fuss about adapting figures to fill very narrow or very awkward spaces. But in important scenes they suggested spaciousness. One aid towards producing the effect was the introduction of pieces of furniture, or most careful showing of the architecture. It is well known that illuminated manuscripts are, in consequence, of much use in determining problems about the appearance or details of buildings which no longer exist. Now, it is remarkable that although Mr. ABBEY apparently is inspired by archæology, his picture is without any object which would suggest that it was the work of a past age. The seat on which CLAUDIUS and GERTRUDE are placed is concealed, while a Mediæval artist would have a beautiful throne. We do not insist on the necessity of thirteenth-century surroundings—the attempt to introduce them has been injurious on the stage—but if they are employed they should be correctly employed. We suppose it is to keep up the archaicism that most of the faces appear inane, and OPHELIA becomes an idiotic spinster. SHAKESPEARE would be dumfounded if he could see the picture, and then he would be likely to enjoy it for its novelty of interpretation. He expressed in "Hamlet" the latest thought of the age; the prince was a student of Wittemberg, and he represents the transition from Mediæval knowledge to modern science. The Danish HAMLET was a man of a different class. Remarkable as is the picture, we cannot consider it as in any way helping us towards a clearer understanding of the tragedy than is possible with the aid of earlier pictures. Mr. PHIL MORRIS in *The Builder's Daughter* depicts one of the legends of the origin of the Prentice's Pillar at Roslyn, and instead of a competition between apprentice and master suggests the carving was a lover's testimony. It is not often we see DON QUIXOTE and his squire of late years, and Mr. ARTHUR LEMON's picture of the delay on the roadside when the sceptical SANCHE PANZA declares, "The devil of any knight, giant or man can I see of all those you talk of now," is therefore a pleasing addition to the collection.

(To be continued.)



## ARCHITECTURE AT THE ROYAL ACADEMY—II.

**H**ITHERTO Messrs. AUSTIN & PALEY, of Lancaster, have held aloof from Academy exhibitions, but this year they have given way to the common weakness. They contribute a view of the proposed church of St. Thomas, St. Anne's-on-the-Sea, a long regular church with two windows between each buttress and a very slight belfry, and three views of a more important building—St. George's Church, Stockport—which in every part reveals the hand of a designer who has had abundant practice. St. George's is Perpendicular, with a tower having panelled faces and a tall spire, the lines of which combine with the tower by means of small arched buttresses, and therefore the abruptness which is common is avoided. The roof of the nave is open timbered. The altar is placed in a recess, and the choir has a groined roof. It is a costly building, and a dignified appearance has been imparted to it by the architects. In Hillmorton House, Rugby, light brick and red brick are combined by Mr. SUGDEN, and, judging by the breadth of the windows, the rooms must be low. The Design for Wrought-iron Gates for Dacre Court, Buckingham Gate, by Mr. C. J. C. PAWLEY, from the alternation of plain bars with ornamental masses of similar dimensions, is much more effective than if ornament alone were presented. There is a suggestion that constructive needs have been met which is not apparent in many elaborate gates.

Mr. WATERHOUSE's only contribution to the Architectural Room is the Surveyors' Institution, which occupies a corner site at Westminster. In it terra-cotta is largely used, and as usual verticality is markedly expressed by the mouldings. There is, too, a very elaborate cornice. The capacious size of the windows suggests that the theatre or hall is to be used by day as well as night. The design has all the strength that is customary in the architect's buildings. Justice does not appear to be rendered by the draughtsman to Messrs. MURRAY's Church of St. Saviour, St. Leonards-on-Sea, which we suppose to be more picturesque in reality than on paper. From the large size of the west window of Mr. MOUNTFORD's Church of St. Michael, Southfields, Wandsworth, and the smallness of the other windows, the building, we suppose, is mainly lighted from the ends. The small detached vestry at right angles is rather quaint. Holy Trinity, Southport, by Mr. HUON MATEAR, will be an important addition to the numerous churches in that town. It is boldly symbolic, for the tracery of the great window is arranged in cruciform lines, and in the gable is a sculptured representation of the Crucifixion. The Manx and other crosses introduced at the foot of the building help out the meaning, which is expressed, moreover, by a very vigorous drawing. Mr. C. F. A. VOYSEY is a believer in the moral effect of a severe simplicity in residences. The House at Guildford might be covered with whitewash, and the windows could hardly be plainer. The only concession to those who dislike to live in boxes is seen in the carrying down of the green slate roof almost to the ground—an arrangement which is not economical. There is not much use in an Academy exhibition if all the drawings cannot be studied. The Academicians in their desire to oblige do not consider that purpose, and as miniature drawings do not appear dignified in the lower strata they are placed as high as possible in positions where they cannot be examined without the aid of ladders. Mr. HUNTLY GORDON's Shops at Teddington Bridge, a group partly in half timber, is one of the sufferers. The Design for Meffan Institute, Forfar, by Mr. T. M. CAPPIN, is, like his hotel, remarkable for the absence of local characteristics. Mr. BELCHER at one time used to secure more wall-space than the majority of exhibitors. This year he has only three small drawings: one represents the stalls, organ-case and screen for Kineton Church, Warwickshire—a study in colour rather than form; the second is a dining-room that recalls NASH's lithographs; and the third is a Design for a Mausoleum, which has a dome and is rather heavy. Mr. D. JOSEPH's South Hackney Synagogue is like a commonplace City church with galleries, but there is more of the Moorish style about the exterior of his Cardiff Synagogue. Mr. E. GOLDIE has a fine Gothic interior, St. Alban's, Blackburn. The piers are made slight in order to afford no interruption to the view, and there is a general

air of lightness. There is also a revival of the reredos, a feature which of late was generally superseded in Roman Catholic churches. Hawkesyard Priory is a large and important group so arranged that the chapel appears to have most importance. Mr. H. BRAKSPEAR's Remodelling of Chancel, Lacock Church, is suggestive of massive if not heavy details, which, we suppose, are in keeping with the rest of the building. Mr. H. REDFERN has a gate-house and master's lodgings, Abingdon School, which have a sort of old-fashioned simplicity that dons hardly appreciate nowadays. Mr. JOHN BROOKES' Parish Church, Handforth, is a type of a good village church. The Rood Screen, Blisland Church, Cornwall, by Mr. F. C. EDEN, is a sort of a structure which appears to be now preferred. The screen is close to the altar, and from its character must obscure the chancel, while above it is a substantial gallery or rood loft with a Crucifixion, winged figures being substituted for the customary figures. The Memorial to the Countess DUCIE, designed by Mr. CARÖE, consists of a screen with seats, to which a ruin serves as a background. Mr. SHINER's Memorial of the late J. THEOBALD, M.P., shows the apse to Grays Church, the windows being varied in treatment. In Messrs. PARKER & UNWIN's Living-room, Woodcote, timber is employed so liberally that those who are seated in the ingle-nook can easily imagine they are in a sort of prehistoric dwelling. Mr. S. PERKS is another contributor of a small half-timbered house. Mr. CARÖE's design for the Museum Extension, Liverpool, is Classic of the Liverpool type, the Corinthian Order being employed. It is in keeping with the original building. Mr. H. ROSE has a screen with figure and altars for St. Mary's, Chaddesden. Mr. G. H. SHACKLE's design for a church in Exeter shows a tower near chancel. Generally the treatment shows more severity than is to be found in the older exemplars in Exeter. Mr. W. RAVENSCROFT's House and Stabling at Maidenhead is more suggestive of some large institution requiring a wide landscape to develop itself in than a family dwelling-house. Whetton Court, Salop, by Mr. H. E. FARMER, is another example of needs which are not to be satisfied in a restricted space, for it appears to form a terrace of three houses. A third large house is The Shotts, Dartmoor, by Mr. T. H. LYON.

Mr. A. H. SKIPWORTH shows designs for two churches—St. Aidan's, Walton-le-Dale, and Cockington, Devon. The latter is the more costly, and much thought has been evidently given to details. The polygonal belfry, surrounded with shields for armorial bearings, is a picturesque addition. Mr. J. J. STEVENSON, in his Houses in South Street, Mayfair, appears to have renounced Queen Anne, and favours a sort of French type, with high mansard roofs and stone dressings. The three designs in one frame, by Mr. BERESFORD PITE, are interesting as examples of a free treatment of Italian, in which sculptured figures are essential; in the others we see mezzanines flanked by figures. The designs suggest that ordinary houses can gain a large increase of interest by such additions as are represented. Mr. H. T. HARE, in his Presbyterian College, Cambridge, has introduced much variety in the parts of the long range of building. Another design for the same work is by Mr. W. H. SETH-SMITH, but from the point of view taken it is more suggestive of a church than of a college. Mr. W. C. HARDISTY has a view of the chancel of Christ Church, Moss Side, Manchester. Mr. A. W. COOKSEY is represented by a design for cottage alms-houses, and Mr. J. H. SELLERS by a small country house. Mr. ASTON WEBB's Additions to Paddock House comprise a long range of conservatories and rooms with windows that are almost like walls of glass. The Kennington Road Public Baths and Wash-houses by Mr. A. H. TILTMAN have a good effect owing to the solidity expressed by the plain wall surface below. The upper windows are skilfully arranged. It is not often so luxurious a private chapel is met with as that in Douglas Castle, Lanark, which Mr. WHALL represents. All that marbles and painting can do to produce effect is visible. Messrs. ERNEST GEORGE & YATES, in No. 49 Prince's Gate, show a finely panelled dining-room with deep pilasters flanking doorway, windows and fireplace, and carrying an enriched cornice which is broken by consoles. The usual flatness of walls is therefore obviated. The window of the music room is no less interesting, but graceful Corinthian colonnettes are used to



form the bays. Another drawing by the same architects shows various views of the interior of Claridge's Hotel, which are treated so as to correspond with the purposes for which the rooms are designed. The New Buildings, Liverpool, by Mr. R. N. SHAW and Mr. J. F. DOYLE, are more severe and Italianised than would be imagined. The use of rustication and the small size of the window-panes suggest strength and endurance, but the projecting turret is, we suppose, intended as a compensation for the rigour of the lines generally. Holmwood, near Wimborne, by Messrs. CRICKMAY & SONS, is attractive mainly on account of the porch. Mr. H. WILSON's drawings are always noteworthy. The Staircase, Welbeck Abbey, is placed where it can be seen from the adjoining room. The marbles are well relieved by the red wall space. From the number of sloping lines Messrs. SILCOCK & REAY's Village Hall, Claverton Bath, at the first glance might be taken for an Egyptian work. Mr. R. S. BALFOUR's Institute of Architects won the Soane Medallion in 1895. It is a massive Classic building, but coldly Academic.

(To be continued.)

### THE GENERATION OF ELECTRICAL ENERGY FOR TRAMWAYS.

A PAPER with this title was recently read before the Institution of Electrical Engineers by Mr. J. S. RAWORTH, and, as the introduction of electric traction is now being contemplated by many municipal bodies, it may prove of advantage to review it. Mr. RAWORTH referred to the development of the dynamo, and stated that the object of the paper was to show that a paying price for the supply of electrical energy for tramways, under reasonably favourable conditions, was *one penny* per unit, and also that such a supply reduces the cost of current for lighting by a small amount. Referring to the steam consumption of an engine, he pointed out that Mr. WILLANS had told us that the consumption at no load is about one-third of that at full load with a constant expansion, non-condensing engine, and because of this the cylinders of engines were made smaller, and no margin was left for overload, as a waste of steam would be the result. In mentioning the fact that indicated horse-power is only a stepping-stone to the electrical engineer's goal, which is electrical horse-power, Mr. RAWORTH referred to the losses, per electrical horse-power, which, he said, could be improved considerably, (1) by increasing the efficiency of the engine and dynamo, (2) by using a condenser with the engine. Although the effect of the latter is considerably better than the former, in both examples there is considerable loss in working much below full load; and owing to this great care has been given to the design of electric-lighting stations and the working of the same by the subdivision of the plant, so that the loss due to engines working underloaded may be low. But he pointed out that this subdivision of plant has increased the complication of the steam-pipes and valves, which causes waste due to the condensation of the steam, and also means that skilled supervision is necessary in order that the plant may be worked economically by constantly changing the different sizes of engines.

The bearing of all this on the traction question, he said, is that some engineers have come to the conclusion that a unit of electrical energy for tramway purposes will cost as much if not more than for lighting, as they cannot change their engines as quickly as the tramway load changes.

He (Mr. RAWORTH), when comparing an automatic expansion with a fixed expansion engine (each taking the same amount of steam per indicated horse-power hour at full load), said that the automatic expansion engine has a better economy per electrical horse-power down to one-third full load than at full load, and even below one-third full load. The loss of economy is much less than with a fixed expansion engine. From curves that were shown it followed that an automatic expansion engine is more economical than a fixed expansion one at all loads, and that its greatest economy is at about  $\frac{1}{6}$  of full load. The practical application of this statement to traction work is as follows:—

As the average load remains fairly constant, and the momentary variations are as erratic as they are great, there is no advantage to be gained by the subdivision of plant. The problem, therefore, approaches the case of a mill, viz.

one engine large enough to do the work, and the solution will probably be similar, with, of course, a spare engine and dynamo, but this latter need not be kept under steam.

In assuming this solution adopted, he proposed to prove that electrical energy can be supplied, as previously stated, for 1*d.* per unit, and gave the case (as an example) of a tramway requiring 1,000,000 units per annum, taking the number of hours run per year to be 5,720, that is, allowing sixteen hours a day and fourteen on Sundays, and taking the plant to be provided to have a capacity of 470 electrical horse-power. He went into details with regard to the capital cost, cost of generation and management, and pointed out that not only can the energy be supplied at 1*d.* per unit, but a profit of 8 per cent. can be made. With regard to reducing the cost of the energy for lighting purposes by combining the two (lighting and traction), he pointed out that an annual saving could be effected, or sufficient to increase the profit on the traction plant to 10 per cent., or decrease the cost per unit for the traction to  $\frac{1}{8}$  *d.* In his figures only ordinary efficiencies had been allowed for, and coal had been taken at 10*s.* per ton.

He then referred to the problem of engine construction and pointed out that with electric traction, although involving sudden variations in load, there is no difficulty in arranging so that the maximum load shall not exceed the power of the engine, unless caused by short circuits, which are now minimised by automatic circuit-breakers protecting the dynamo, and therefore neither the strains nor the wear due to such causes will ever exceed those which are dealt with in electric-light stations.

Mr. RAWORTH's opinions may be summed up that high-speed automatic expansion engines of large size are the most suitable and economical for tramway working, but that the saving on the score of the lighting load is not very high. In the case he took the saving was sufficient to raise the profit on the traction plant from 8 to 10 per cent.

Looking at the part of the paper in connection with lighting, the headings under which he finds a saving can be effected are manager, boiler and stoker, but he does not mention any saving in connection with capital expenditure on buildings and electric-lighting plant, also any saving under running expenses of engine-room staff and outdoor staff.

The paper is excellent from a traction point of view, but no statement is made as to whether the same plant can be used partially for lighting; it ought, however, to be of considerable interest to borough engineers and surveyors in whose districts the conversion of the horse tramways into electric is being considered.

### THE ASSOCIATION JUBILEE BANQUET.

THE Architectural Association held its Jubilee banquet in the Trocadéro Restaurant on May 5, the president, Mr. Beresford Pite, in the chair. Among those present were the Lord Bishop of London, Viscount Halifax, Professor Aitchison, A.R.A., Mr. H. C. Richard, M.P., Mr. J. P. Seddon, Mr. R. Kerr, Captain Lambton Young, Mr. A. S. Murray, LL.D., Mr. T. M. Rickman, Mr. W. H. St. John Hope, Mr. Alex. Graham, Mr. Aston Webb, Mr. T. W. Goodman, Mr. J. Edmeston, Mr. J. Norton, Mr. T. E. Colcutt, Mr. H. C. Boyes, Mr. T. Roger Smith, Mr. J. Sulman, Mr. W. M. Fawcett, Mr. T. H. Watson, Mr. E. W. Mountford, Mr. J. Ely, Mr. Walter Crane, Mr. Leonard Stokes, Mr. T. Blashill, Mr. John Slater, Mr. E. P. Warren, Mr. C. Hadfield, Mr. W. Henman, Mr. S. Perkins Pick, Mr. F. W. Pomeroy, Mr. H. Devey Browne, Mr. J. H. Christian, Mr. W. D. Caröe, Mr. J. M. Brydon, Mr. A. W. Weedon, Mr. W. G. B. Lewis, Mr. H. Tanner, sen., Mr. J. Jacob, Mr. W. J. Cloake, Mr. E. Inigo Thomas, Mr. G. B. Carvill, Mr. Ellis Marsland, Mr. A. Wallace Rimington, Mr. J. K. Colling, Mr. J. Edmeston, and the hon. secretaries.

The President, in toasting the Queen and the Royal Family, said her Majesty had bestowed an infinite blessing on the production of the finest works of architecture, by the glorious peace which had been maintained with our relations and by the wonderful wealth with which her subjects had been blessed. If it had not been for these two benefits they would have been a scattered band of hungry architects.

The President, in proposing the toast of the Church, said the magnificent character of our national ecclesiastical architecture was the prime cause of the enthusiasm aroused in the breasts of Englishmen concerning the constructive art. When they came to the question as to what was due to the pre-eminent character of this art they were face to face with a difficulty in definition. With the Lord Bishop of London on his right hand



he ventured to suggest that the problem which united Church history and architecture in a knot, and which drew our admiration to cathedrals and village churches, was a subject which made them feel honoured in having his lordship as their guest.

The Lord Bishop of London, responding, said they were met either as architects or as people intimately connected with architecture; in fact, all men were under an obligation to architects, as all needed some shelter in houses constructed after their plans. To whatever profession they belonged, or whatever vocation they pursued, they all felt a debt was owing to architects. He thought there was a difference between the Church and other professions. Whereas everybody wanted architecture which was adapted simply and solely to convenience, the Church needed architecture adapted to the expression of ideas. Because the Church stood in that peculiar position, it had inspired those engaged in the architectural profession to erect the mighty works which one saw. A house was a building split up for convenience into small rooms; and even great buildings for municipal purposes, whilst affording artistic scope in their treatment, had to be split up into suites of rooms. The church was the only building which directly challenged the architect's skill. Outside and inside alike it was one mighty span, and offered space and largeness, which were absolutely necessary for the development of every great art. It was therefore that the church required, first, the exposition of ideas, and, secondly, that the mere form of its building should be large, spacious and splendid, thus calling upon architects, not only in their spiritual and moral nature, but also in their capacity in simple structural development, giving those opportunities which had been so worthily made use of in the past and also in the present. Since coming to London he had been struck by the resourcefulness of architecture in modern times. There was a time when he admired only the ancient in art, but he was fast becoming an admirer of modern construction. The great growth of London had given scope for the architect. Modern buildings, however, demanded a disposition of site unknown in the old days. The sites at the first glance appeared unfavourable, but he was struck with the capacity shown for using the small opportunities afforded, and adopting the land to the purpose for which it was needed. In the admiration of a past age it was often said that we to-day were not so artistic. He was not quite sure that if the history of our modern cathedrals were studied that conclusion would be arrived at. In the old days people were not in a hurry, and they did not require their buildings to be adopted to vastly growing populations, but were prepared to erect a building without regard to the surrounding community. Then the cathedrals were competing for pilgrims, and built purely as an advertisement in order that they might draw pilgrims from the other "shop" which was not so well adapted. A great deal of the history of our cathedrals was explained by this formula. First the choir and the nave would be erected, and as the work of some other part was proceeding news would be brought that a neighbouring establishment had gone one bay better, and in order not to be out of the race, the cathedral in course of erection would have to go one better, or the pilgrims would go over to the other place. The more the history of the Middle Ages was studied, the more one found the same prosaic and commonplace questions lay at the bottom of a good many minds. The clergy were not held in very great estimation by some of his hearers from a professional point of view, as they frequently stood to the architect in the relation of the employer of labour, and he thought an employer often embodied reminiscences of a vast amount of unintelligible criticism. Architects had a great misfortune in being subject to this kind of criticism. In the treatment of ecclesiastical buildings entrusted to them, architects were doing their best, and not only the work which was the result of the piety and genius in the past, but the construction of other buildings in the present would not be unworthy of their predecessors. In conclusion, he wished them all prosperity in the arduous undertaking they were engaged in. Clergymen felt their dependency on the skill of the architect, and he thanked them for the good they were doing on behalf of the Church.

Viscount Halifax, who proposed the toast of the Architectural Association, disagreed totally and entirely with the Bishop of London in that ideas were not necessary in the construction of houses. The one thing more necessary than another was that houses should express ideas, and he knew how much influence a house had on its occupants, and how much depended upon details, not merely for comfort, but also for a sense of well-being. He said there was no institution in England for which he wished a greater development than the Association. Dwelling at length on the object for which the Association had been founded, namely, voluntary and mutual instruction in architecture, he proposed the toast.

The President replied, and in the course of his speech narrated the history of the Association. He referred to the presence among them of Professor Kerr, who was president for 1847-48. Without the aid of the Association the Institute must have suffered. They possessed a large number of active

members, and their classes were well attended. But they still needed a home, a building which would be suggestive of the history of the Association. The temporary premises were overcrowded. The President proposed the Royal Academy, the Institute and Kindred Societies.

Professor Aitchison, in reply, said the Institute did what it could for architecture, but the Association had taken a more practical view of the art. He hoped architecture would become a progressive art, which could only be attained by pursuing it in a systematic manner. But as an aid towards that end it would be well if the services of architecture were more generally recognised.

Mr. J. Ely also responded.

"Literature," "The Visitors" and "The President Elect" were in succession toasted.

## THE HOSPEDALE MAGGIORE, MILAN.

TRAVELLERS from North Europe flow in great numbers at this season of the year through the St. Gothard Tunnel, writes a special correspondent of the *Glasgow Herald*, and descend with even greater speed than the melting Alpine snows to the warm and fertile valleys around Bellinzona, and to the borders of the blue Italian lakes. In Italy were founded the first medical schools, the first hospitals, the first human body was dissected, and the first surgical operation performed. The first modern hospital was built upon that spot in the seventh century; its special interest is that it was founded on behalf of Anglo-Saxon pilgrims. It was called the Hospital Spiritus in Sassia, in connection with which Pope Innocent III. organised from it as centre the hospitals of the Holy Spirit over the whole of the West. Of the old Tiber Hospital only two or three stones remain concealed among trailing brambles, and visible only when the Tiber is low. One stone has still upon it a graven serpent, symbolic of the healing art, and on another stone the ram's head is still visible, symbolic of wisdom, and representing the commonest offering employed in ancient times to avert illness and the consequences of sin—a symbol which has been associated with healing since long before the time of Abraham. These stones are the sole remnants of this first hospital. The so-called Hospices of the Middle Ages (especially of the early Middle Ages) were mainly intended to afford a short resting-place for pilgrims and travellers. The priests had barely time, however, to perform their prescribed religious routine, much less to assist the sufferers with remedies, or to inquire into the nature of their diseases. They thus, although they subsequently became hospitals, afforded little help to the sick or to medical science.

In this year of celebration, hospitals of this country are attracting a considerable share of public attention and public assistance, and one would naturally turn to this land of the first hospitals, towards the country which opened the gates of medical science to surrounding nations, to observe modern progress, to learn ancient secrets and obtain the fruit of ancient culture. The visitor to Italian hospitals, however, will be sadly disillusioned. It often happens, that ancient institutions rest upon their former splendour and achievements; improvements are slowly adopted, ancient rites, ceremonies, methods, apparatus and *personelle* retain in them their pristine forms. When to these factors is added the effect of the cloister and the convent, there is less cause for astonishment that the labour of the first years should have become less efficacious, and that the progress of science should latterly in those countries have come to be in some degree paralysed. The Hospedale Maggiore at Milan, the largest hospital in Italy, affords a terrible example of a Mediæval hospital existing in the midst of nineteenth-century requirements. Italian glamour without gives an imposing appearance and a gaudy air to this huge building, which has existed from the middle of the fifteenth century, its foundation being contemporary with the invention of the art of printing. Its outward form engaged the skill of Antonio Filarete of Florence, of Richini and of Bramante, who devoted their art mostly to form, to terra-cotta decoration and external ornamentation, without troubling much about the rules of hygienic hospital construction or the selection of a suitable hospital site. They erected a massive building on the banks of a half-empty, sluggish, smelling canal in a low, crowded, dull and dirty part of the town. The building resembles a huge prison, and strikes the visitor with a sense of pity for the inmates. It has twenty-eight large and gloomy wards, stone floors covered with dust, whitewashed walls bespattered with finger-marks and cobwebs, and many of the wards have the beds arranged in four rows. The sense is suffocated and the mind distressed with the odours of disease and the spurious sanctity which pervade all the wards. The surgical wards would excite much concern in the mind of Lord Lister, the operating theatre would accomplish the resignation of Professor M'Ewen, the arrangement



and style of instruments would excite contempt among dissecting-room caucuses, and the sight of the performance of minor surgical operations in the open wards would create a panic in the hearts of lady visitors accustomed, for instance, only to the healthy and cheerful look of the surgical wards of the Royal Infirmary of Glasgow. Milan, the birthplace of Langfranc, the founder of surgery in Europe, is perhaps the last place at which one would care to have a limb amputated or an open scalp wound dressed.

The medical wards are antique in type, form and hygiene. The marble floors look bleak and cold for the tottering feet of the stricken ones; the walls are bare, no piece of green foliage in the room; all desolation, as if to render the distressed a fitter prey to that sorrow which already presses upon them. Upon festival days the external appearance of this hospital is gay in the extreme. The religious bring their offerings to the priestly coffers and are duly besprinkled with a wet brush. Portraits of departed donors were exhibited around the arches, emblazoned with scarlet and gold; those of them who had bequeathed 100,000 francs or more were known from their portraits being painted in life-size; those who had left half that sum were done in half-size, and those who had given less were depicted according to the manner of their subscription in various degrees of artistic excellence down to the merest daub.

### THE GREEK THEATRE.

AT the Royal Institution, Albemarle Street, on Saturday, the Rev. Dr. J. P. Mahaffy, professor of ancient history in the University of Dublin, delivered the first of a course of three lectures on "The Greek Theatre according to Recent Discoveries." In his introductory remarks the lecturer said there was no part of the wonderful civilisation of the Greeks which had made a greater impression upon modern life than the drama as developed and perfected by them. If it were not certain that they actually discovered the form of literature it was certain that they dealt with it in such a way as to leave but little room for improvement in its essential features. He alluded to the absence of direct evidence on the subject of the Greek theatres, and said that the inferences to be drawn from the Greek plays were scanty and those from the Greek grammarians inconsistent. The theatres at Pompeii were, he supposed, by far the earliest excavated, but we had no certainty that these theatres were not Roman. It was not till 1862 that by the efforts of the German, Strack, the site of the theatre of Dionysus at Athens was cleared, and we found out what this famous structure was in the last stage of its development. The lecturer proceeded to describe his first visit to it early in the seventies, remarking that its curved rows of seats, the orchestra or flat centre, with its tessellated ornament, and the marble row of stalls around it, with the names of the official occupants, were unmistakable. There was something piquant in seeing the monumental evidence of the close connection of play-acting and religion; to see that what we might call the deans, canons and prebendaries at Athens had their stalls, not in the choir of a church or temple but in the front of a playhouse, where not only solemn tragedy but ribald comedy occupied the audience. The discoveries of other Greek theatres were next alluded to, and their ruins described with the aid of views thrown upon a screen. It was with these discoveries, he proceeded, that the comparative study of Greek theatres became possible, and it was to architects that we owed all our greatest discoveries in connection with them. There was good reason to believe that the Greeks, so great in sculpture and in architecture, were not great in music or in painting, and if nothing had been preserved in classical times but the music of the Greeks it would have been difficult to suspect their greatness in other fields. With regard to the plays, Æschylus, rude as he might have been in his scenery, made great advances upon his ruder predecessors.

### HISTORICAL EXHIBITIONS.

AT the opening of the exhibition of pictures and other objects illustrative of the Tudor dynasty which have been collected by a committee of the Manchester Art Gallery, the Duke of Devonshire spoke of the leading part taken by Manchester in the promotion of loan collections of art, beginning with the great example set at Old Trafford forty years ago. The Tudor exhibition was of a kind that must, not only from an artistic but from an historical point of view, lead to most instructive and interesting comparisons. Such an exhibition dispelled the popular fallacy and impression that history could only be learnt in books. It enabled men to better understand that which they could learn from books, and it made the knowledge more vital and gave life to the characters represented. When they saw the portraits of those who lived in bygone times and the pictures of the scenes in which they

acted, when they were brought into direct contact with the relics and mementoes of those times, they were put into touch with men and events, and the actors in those periods spoke to them directly, and not through the medium of the theories or prejudices of the literary historian. It was sometimes urged in these days that too much stress was laid by history upon the doings of princes and statesmen, and that the work of the scientific historian was rather to trace national development. The newest school of all would seek to attribute to economic causes much of that which had been found in religious or political movements. From that point of view it might appear that the division of our historical material into dynastic periods might be picturesque, but was somewhat unreal. On the other hand, he thought it was possible to hold, having regard, at all events, to our own history, that dynastic division was in the highest degree vital. Our Plantagenets, Tudors and Stuarts were more than actors; they were authors of the scenes in which they were actors. The Tudor period was one of the widening of learning both in the physical and intellectual world. Men at that period began to look with new eyes at much that had hitherto seemed fixed and immovable. The old order did not give place to the new without a struggle so long and so fierce and of such varying fortunes that in following its phases we were apt almost to forget the great principles and issues that were at stake. In the course of that struggle, as had generally been the case, much was lost and destroyed that might well have been spared. It was one of the advantages of the study of history from the view of contemporary movements and records such as that exhibition afforded that our tolerance extended as our knowledge and intelligence deepened and widened. When we heard almost the very voices of the men who acted in these scenes as they spoke to us in their idiom, strange to our modern ears, from the black-letter pages of their contemporary records, we could learn and understand something of the complexity and the difficulty of the circumstances in which they acted. We could learn how dark much must have appeared to them which now appeared to us as clear as day, how crooked were the roads which to us seemed so smooth and easy, how feeble and uncertain at times was the guidance which they could receive. When we looked at the history of the time in that light we should hesitate to pronounce that partial and hasty judgment on the action of those men which on imperfect knowledge it was too easy for us to form, we should accept with gratitude the results of their acts that they had bequeathed to us, and we should learn to understand much of that which we rejected, and should appreciate the difficulties of those who were not better able to forecast the future than we were ourselves.

### PHœNICIAN ART.

A LECTURE was delivered in the theatre of the Royal Dublin Society by Prof. Baldwin Brown on "Phœnician Art." He said the Phœnicians were known more in history as a roving, seafaring people, and it had been questioned whether they attained to anything of artistic importance. However, the theory that commercial development was incompatible with artistic excellence was refuted by the case of the Florentines and also of the Venetians, and scruples as to the artistic capacity of the Phœnicians were really set at nought by the account in the old writings of the works executed by them. The Phœnicians probably excelled any other of the old nations in producing grand effects in building by the use of very large materials. The biggest stones used in masonry were cut by their hands, and some of the stones used for the terraces on the Hill of Zion lay at the present day where they placed them. Some of these were 20 feet long by 3 feet in height, and remained there intact after the lapse of 3,000 years. From the accounts they had of their achievements, there could be no doubt of the artistic attainments of the Phœnicians. He then showed on the screen specimens of bas-reliefs and other types of Assyrian stone carving. The lecturer then turned to art as it existed in the early Greek age, and dealt with the recent discoveries on the site of the ancient Mycenæ. There was little, he said, of continuity between this older art and the later Greek art proper. Homer regarded the Phœnicians as holding the highest place in art in his age—800 or 900 B.C.—and appeared to regard the Greeks as copying from them. It had been said of Greek art proper that its groundwork was centred in the world of Olympus. About 650 B.C. the human form began to force itself in as a motive in their art, and soon became the preponderating feature. The commencement seemed to be in the shaping of figures in wood, and even in the second century before Christ they had the testimony of Pausanias that he had seen the remains of a wooden column. In conclusion, the lecturer showed types of early Greek vases and coins, and also views of the present site of Olympia, and the excavations carried on there by the German Government.



## NOTES AND COMMENTS.

THE remarkable success of "expanded metal" for fire-proof and various other purposes in building in this country is only a repetition of what occurred in America. The material seems to act like the web plate of a girder, and to convey for a time all the strains which come upon the structure of which it is a part. In its steadiness lies the safety, for the difference between the sustaining power of a wall, partition, or beam with expanded metal as a hearting, and one without that auxiliary, is surprising. According to the report of Sir JOHN FOWLER and Sir BENJAMIN BAKER, whose authority as engineers is unquestionable, "the use of expanded metal in the case of a 3-foot 6-inch span increases the strength of a flat concrete slab from six to eight times the strength for carrying a uniform load that it would have if made without the metal; and in the case of a 6-foot 6-inch span, the strength is increased to ten and eleven times." They also say:—"As regards strength, the slabs made without expanded metal did not approach those made with the metal, and that even with a neat cement slab the strength was much inferior." It would seem that the old experience of fitch beams is to be repeated in expanded metal slabs. There is security with the metal against the least approach to torsion, a sort of action which is much more common than is generally supposed, and to counter-balance it a mass of material is generally employed, which simply means the substitution of one inconvenience for another. The use of Mr. GOLDING's latticing or mesh work has given a new impetus to the demand for concrete, which is now applicable to purposes that were not foreseen half-a-dozen years ago. Full information concerning the material will be found in a little treatise issued by the Expanded Metal Company, Limited, which should be studied by every architect and builder in the country.

AMONG the additions to the section of ethnography in the Mayer Museum, Liverpool, is a facsimile of the "Codice Messicana Vaticano," presented by the Duc de LUBAT. It is one of a number of the ancient Mexican codices, executed at the expense of the duke, who has for many years taken the deepest interest in these Mexican antiquities, of which only a very few specimens have been preserved in some of the richer libraries. The Mayer Museum is fortunate in possessing an example of one of the finest originals of these books, which consist of ritual calendars, histories, and tribute rolls of the ancient Mexicans, written before the date of the discovery of America. The British Museum and the Bodleian Library are, it is believed, the only repositories in England, besides the Mayer Museum, of examples of these treasures, and on the Continent the chief are Paris, Rome, Dresden and Vienna. These codices are inscribed in hieroglyphics on pages made of pieces of deer skin of different sizes gummed together, having a white chalky composition spread over them, on which the curious pictures are drawn and painted in colours. To their interpretation we had, until recently, almost no clue. In 1895 Señor FRANCISCO DEL PASO Y TRONCOSO, the director of the National Museum of Mexico—a well-known scholar and authority on these documents—spent several weeks in studying and elucidating the Mayer codex, both in the Museum and at Oxford University, where the codex was, with the permission of the committee, lent to Señor TRONCOSO for several months for the purpose of enabling him to compare it with the codices in the Bodleian Library. In recognition of the committee's kindness Señor TRONCOSO gratuitously used his influence with his friend, the Duke of LUBAT, and induced him to present a copy of the Vatican codex 3,773 to the Mayer Museum. The reproduction of this codex is in absolute facsimile to the smallest minutiae of size, binding and coloration. Accompanying the codex is a small pamphlet (in Spanish and English) on "The Manuscripts of Anahuac," by Señor PASO Y TRONCOSO, giving an account of the "Nahua Book" (as the Vatican codex is called) and how it is to be read. The Duke of LUBAT, in presenting the facsimile, expresses, in a note addressed to the director, the hope that some of the rich merchants of Liverpool may be induced to provide the cost of producing a facsimile of the precious Mayer codex after the manner of the Vatican "Nahua Book."

## ILLUSTRATIONS.

## CATHEDRAL SERIES.—NORWICH: VIEW FROM SOUTH-EAST.

## THE EMPIRE PALACE OF VARIETIES, MIDDLESBROUGH, YORKS.

THIS Theatre of Varieties is immediately to be erected on one of the finest sites in the town, adjoining the Municipal Buildings in Corporation Road.

The site covers an area of 11,000 square feet, and is bounded on three sides by wide streets with a right of way in the rear, thus enabling an arrangement of approaches and exits in a most simple and complete form. The elevation itself practically discloses the principle of the planning, with its staircase towers at each angle leading from the circle and gallery. The main entrance to the stalls and dress-circle is in the centre, with saloon over. There are thirteen exits in all. The theatre is in two tiers and will accommodate 2,000 persons. Ample lounges and saloons are arranged, and particular attention has been devoted to the formation of convenient retiring-rooms and lavatory accommodation.

The dimensions of the auditorium proper are as follows:—Width, 60 feet; depth, 65 feet; height, 45 feet to sunburner.

The stage is 70 feet wide, 38 feet deep and 56 feet to the grid, giving ample space for spectacular sketches and ballets, and the dressing-rooms will be of the most convenient description.

A complete electric plant will be laid down for the lighting of the whole building by electricity. The building will be faced with terra-cotta of two tints, by Messrs. DOULTON, and the iron and steel-work will be by Messrs. DORMAN & LONG, of Middlesbrough. The hall will be opened about the end of the year. The original drawing is exhibited in the Royal Academy. Mr. ERNEST RÜNTZ is the architect.

## 5 QUEEN STREET, MAYFAIR. NEW DINING-ROOM FOR MR. CHARLES GRANT DUCROZ.

THIS room is panelled throughout with oak, having a velvet frieze above. It is lighted by a cupola and bay window, and approached through an inner hall of similar character.

This room and the general contract for other alterations was entrusted to Messrs. BRASS & SON. Mr. ERNEST RÜNTZ is the architect.

## THE BRITISH EMPIRE MUTUAL LIFE ASSURANCE COMPANY'S NEW BOARD-ROOM.

THIS room forms a part of the extensive alterations to the company's offices at 4 and 5 King William Street, London. It is situate in the basement, and light is admitted by a semicircular bulkhead cutting into and conforming to the design of the ceiling.

The whole of the room is in white enamelled panelling. The general offices have been completely revised and a great economy of space effected.

The general contract was entrusted to Messrs. SIMPSON & SONS, the hot-water engineering to Messrs. STRODE & Co., and the furniture and fittings to Messrs. DREW & CADMAN. Mr. ERNEST RÜNTZ is the architect.

We have been requested to announce that Mr. RÜNTZ has removed from 22 Moorgate Street to more commodious offices at 10, 11, and 12 Walbrook, E.C.

## THE ROYAL MUSIC HALL, HOLBORN.

WE illustrate the new terra-cotta façade to this well-known hall, necessitated by the enlargement of the approaches, increased saloon accommodation and the building of a restaurant and supper-rooms adjoining. The work is being carried out for Mr. JOHN BRILL, the proprietor, by Messrs. DREW & CADMAN, of High Holborn, the terra-cotta being supplied by DOULTON & Co., and the hot-water system by STRODE & Co. The works will be completed by Jubilee Day.

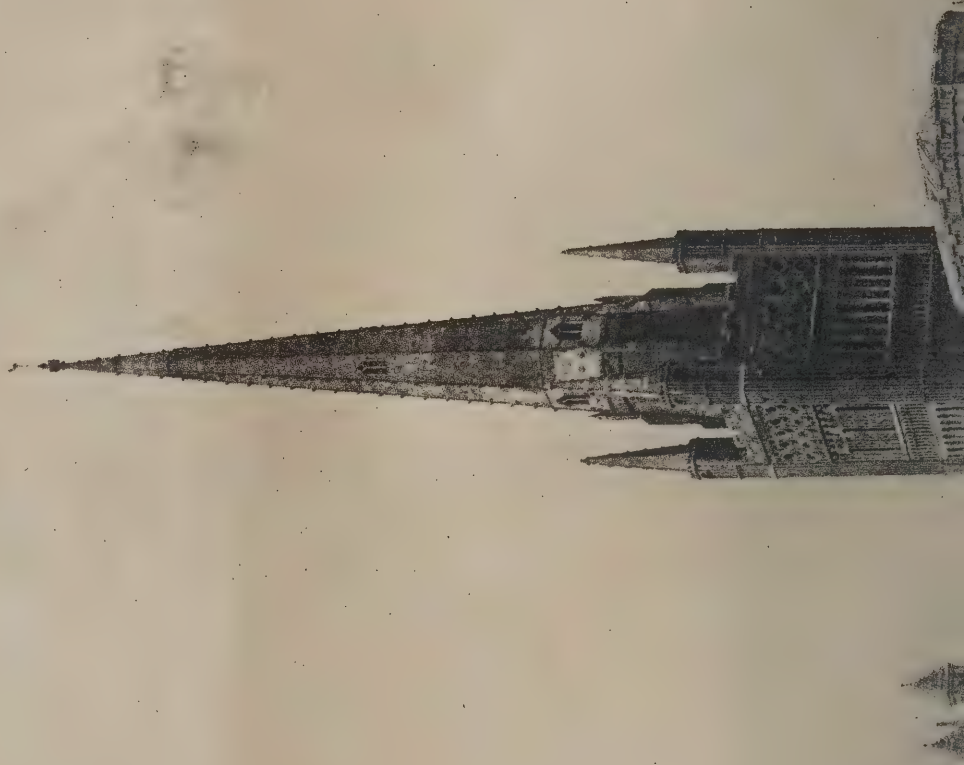
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The Architect, May 7<sup>th</sup> 1897.







PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

IN A PHOTO. SPRAGUE & CO. 1 & 5 EAST HARDING STREET, PETER LANE, E.C.

CATHEDRAL SERIES, No. 31.—NORWICH: VIEW FROM SOUTH-EAST.





















EMPIRE PALACE OF  
ERNEST

Royal Academy Exhibition, 1897



74 1897.



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IS, MIDDLESBROUGH.  
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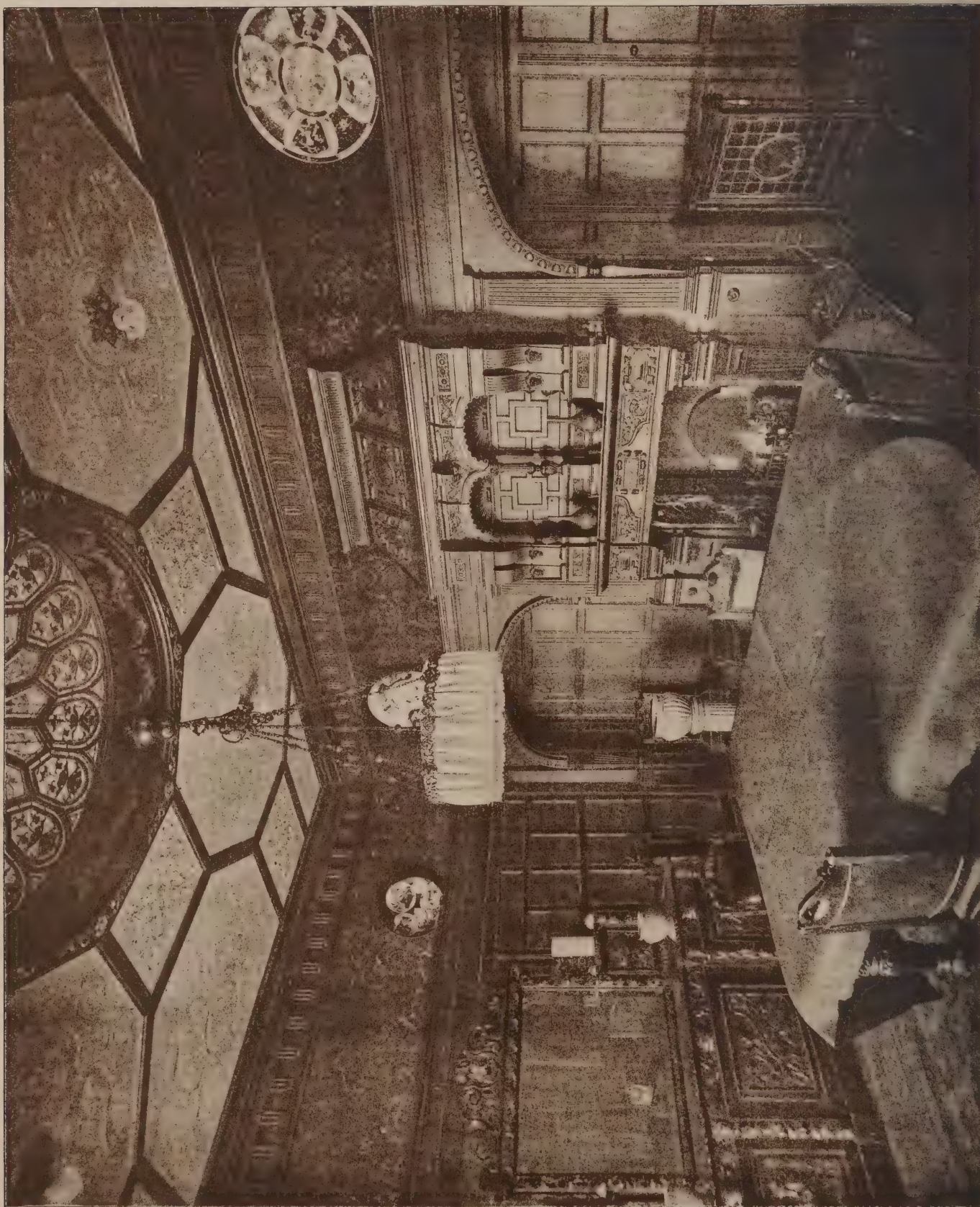








The Architect, May 7<sup>th</sup> 1897.



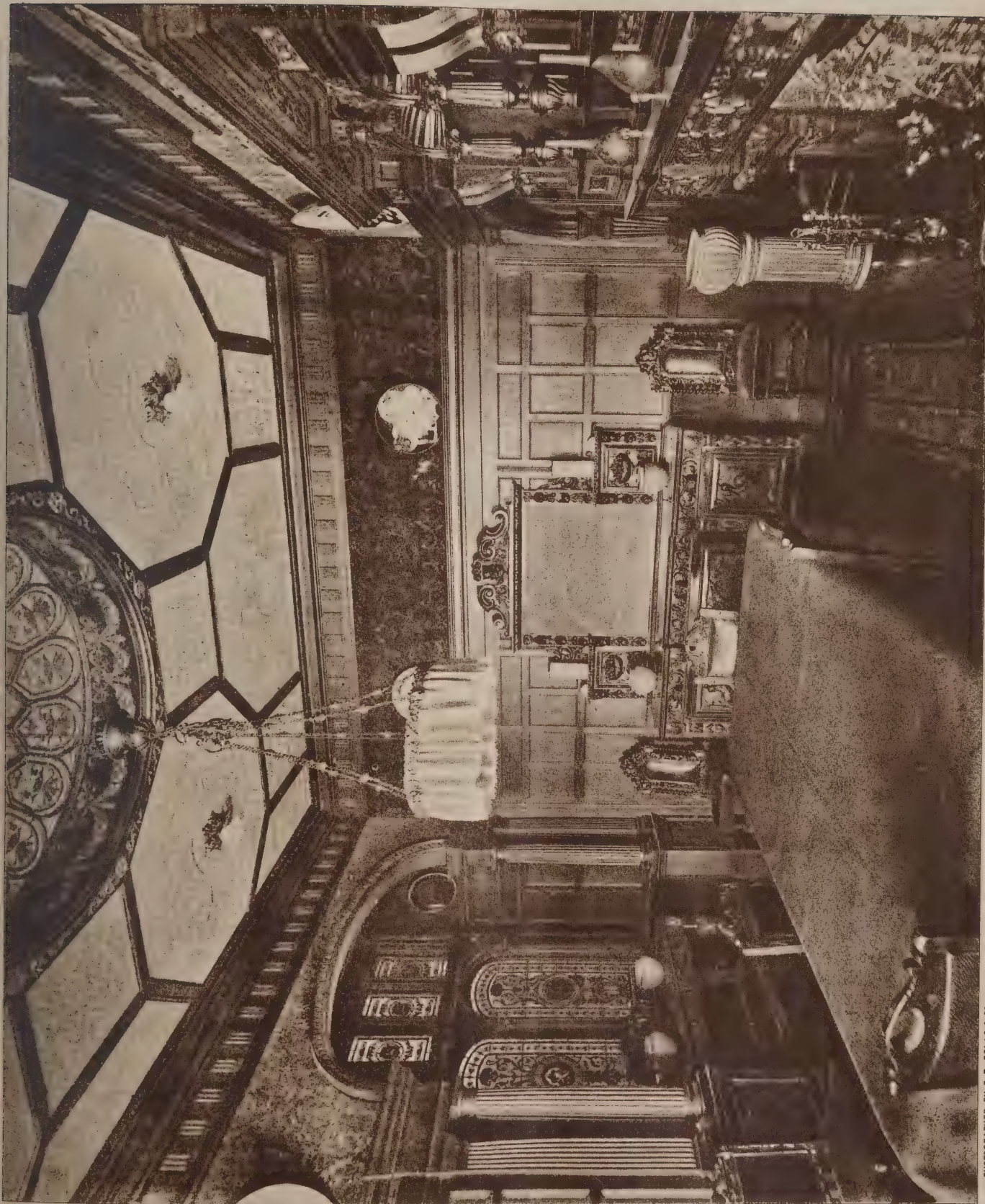
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5 QUEEN STREET, MAYFAIR: NEW DINING ROOM



The Architect, May 7<sup>th</sup> 1897.



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5 QUEEN STREET, MAYFAIR: NEW DINING ROOM.  
ERNEST RÜNTZ, Architect.









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THE "ROYAL" MUSIC HALL, HOLBORN.







## NORWICH CATHEDRAL.

ALTHOUGH Norwich Cathedral contains much work which is characteristic of the Norman period, and is classed among the oldest of the English buildings, it is well to remember that Norwich was not always the episcopal capital of East Anglia. In the seventh century King SIGEBERT persuaded a Burgundian monk named FELIX to come among the Angles as a missionary bishop, and his seat was set up in Dunwich. The king afterwards retired to the monastery of Bury. This gave PENDA of Mercia an opportunity to invade East Anglia, and during several years the country was subjected to all the misery he could inflict. SIGEBERT was at last induced to leave his cell, but it was too late to repel the invader. He and his son, who had succeeded him, were slain with many of his subjects. The position of FELIX during the wars was unenviable, but he contrived to hold his office for a term of seventeen years. He was succeeded by THOMAS BONIFACE, who was followed in 669 by Bishop BOSA. In his old days BOSA found he could not control the whole of East Anglia. Accordingly he arranged for its division into two dioceses. The cathedral of one of them remained at Dunwich, for the other North Elmham was selected as a site. In course of time the two divisions were reunited, and Elmham became the centre.

When WILLIAM of NORMANDY arrived, one of his cares was to make such a division of the country for ecclesiastical purposes as would be most advantageous to the interests of the invaders. In Elmham he placed one of his chaplains named HERFAST about the year 1070. But HERFAST was not satisfied with the accommodation, and seized on the abbey of Bury St. Edmunds, which he wished to convert into a cathedral and palace. The abbot, however, fled to Rome, and laid his case before the Pope, who decided in his favour. HERFAST would not surrender the abbey, and he was likely to have imagined he would gain the support of WILLIAM. But the Conqueror had too many ecclesiastical broils already awaiting settlement, and at a council in Winchester, which was held in 1081, he refused to recognise the claim of HERFAST to the abbey, and ordered its restoration to its former possessors. But the stubborn bishop, if defeated in one position, soon took up another. He could not hold Bury, but he declined to go back to Elmham. The bishop's seat was therefore removed to Thetford. HERFAST erected a cathedral and residence in that town, of which no remains have survived. When he died in 1085 he was succeeded by another of WILLIAM's chaplains, named GALSAGUS or BEAUFO, who held office for six years.

In 1091 HERBERT DE LOZINGA attained, or rather acquired, the bishopric. His name is more closely associated with the cathedral of Norwich than those of his successors, but he should not be judged by an apostolic nor by a later standard. HERBERT was a type of some bishops of his time who invested their money and their energy in the Church because they found an ecclesiastical office could become a most profitable speculation. He paid 1,900*l.* for the East Anglian bishopric and laid out 1,000*l.* in the purchase of an abbacy for his father. Such immense sums suggest how enormous were the revenues. But powerful as were the bishops, they could not act as they pleased. Intelligence of the purchase found its way to Rome, and HERBERT DE LOZINGA was summoned to appear before Pope URBAN II. to answer for his simony and various misdeeds. He was deprived of his crozier and other signs of authority. They were not restored to him until he had agreed to employ his wealth in the erection of churches and monasteries. He returned to England, and as a first step towards the performance of the penance laid on him he resolved to remove from Thetford to Norwich. In the year 1096 he began the foundations of the building which is now known as Norwich Cathedral, as well as a palace on the north side. Ten years afterwards a priory was founded by Bishop HERBERT. He died in 1119, having, according to BLOMEFIELD, erected the choir, transept, central tower and a part of the nave. His successor, EBORARD, is credited with the rest of the nave and aisles.

Although the Norman part is so plain in character, there is much difference of opinion about the extent of LOZINGA's work. Professor WILLIS was of opinion that it did not extend beyond four arches of the nave on the western side. One reason for his conclusion was that the mouldings of

the ante-choir were similar to those in the upper tier of the choir, and also to mouldings which are found in the Tower of London that was built by WILLIAM THE CONQUEROR. But it is supposed that those ancient mouldings have been tampered with, and are therefore less trustworthy for verifying dates than the Professor believed. The zigzag or chevron ornament, which is common on the more westerly part, was also supposed by Professor WILLIS, and other archæologists, to be an indication of a later period, but that circumstance is also controverted, for the chevron is found in eleventh-century work in Normandy. Some have also explained the peculiarity of the pair of massive cylindrical piers in the nave, which are covered with spirals, by suggesting that they indicate the boundary between LOZINGA's and EBORARD's work, but there is no evidence to support that theory.

It is remarkable that there should be two dates given for the commencement of the cathedral, viz. 1096 ("Norwicensis ecclesia fundata est"), and 1115 ("Fundamenta ecclesiæ Norwici"), and not one to record its completion. The next entry which has survived relates to a fire in 1171 ("Ecclesia Norwici comburitur"), and to the completion of restoration which came to an end in 1196 ("Joannes de Oxoniâ consummavit Ecclesiam ab Herberto inceptam et Infirmary ædificavit"). Whether Bishop JOHN followed his predecessors' work cannot be decided. But with the Norman race there was less of local variation than in later times. As the late J. D. SEDDING remarked:—

The first thing to note in this matter is, how much more akin the arts of the Northern races are in the early formative stage than in their formed stage—in their beginnings than in their endings. Starting from the common ground of the Romanesque, the various nations keep for a certain time in parallel lines. All their opening strokes are very similar in spirit and character, and when they begin to develop things the developments overlap one another, so that in passing from the early art of one people to the early art of another we get no sense of disconnected thought. Not that there is no real difference at the very first, but that the differences are not developed. The line of demarcation at starting is but as the separation of a narrow stream over which people can still touch hands; but as time goes on the banks widen, the lines of demarcation stretch indefinitely, so that by-and-by the points of contact have entirely disappeared.

If we allow for this similarity as a general characteristic of Norman, the difficulty of determining between the various works undertaken during the twelfth century at Norwich will be less incomprehensible. The next change was the addition of a lady chapel, which was erected by Bishop SUFFIELD between 1244 and 1257. It no longer exists. In 1271 the tower was injured by lightning, and in the following year the cathedral was partly wrecked in the course of a contest between the monks and the citizens. The repairs required six years to carry out. In 1278 the church was reconsecrated, a ceremony which we suppose was considered necessary to atone for the vandalism. Then in 1295 the spire was commenced, but it was not completed, apparently, until 1361. Another slow work was the erection of the cloisters. They were commenced at the end of the thirteenth century, but it was not until 1480 that they were ready for use. The spire was injured by lightning in 1463, but the damage was promptly repaired by Bishop LYART. It is supposed the great west window was erected by the same prelate. The stone vaulting of the choir is attributed to Bishop GOLDWELL and Bishop NIX. Several of the Norman windows were also transformed to be in keeping with the later additions, but in spite of all that was done the Norman work continues to be in the ascendant.

## THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday last, April 30, Mr. Beresford Pite, president, in the chair.

Mr. Hugh Stannus discoursed on one of his analytical diversions, viz. the Classic cornice. Several diagrams were explained, but without copies of them it would be impossible to convey an exact notion of what was said. Mr. Stannus described in detail the elements of cornices, and offered suggestions about the dispositions which would enhance their effect. But he was particular in emphasising that the theory or gospel was his own; however, he did not recommend anybody



to accept it as infallible. Although the theory might not be accepted to-day it was not impossible, he thought, that hereafter it would be adopted in principle.

The President said it was a practical subject, but one which the student would find he had to grapple with sooner or later. As a rule, clients were not disposed to interfere with such details, but they appeared characteristic of the designer. Mr. Stannus was silent on the subject of a freehand treatment when designing a cornice, but it would be an advantage in many cases to neglect the use of compasses, and trust to the hand as directed by that instinct which Mr. Street used to eulogise. For curves the principal source was to be found in those belonging to the human body, but the archaic Greek curves were admirable exemplars of form. Much subtlety was lost in the transition to Roman contours. He hoped some use would be made of Mr. Stannus's advice, as there was need for the consideration of the intellectual aspects of architecture.

Messrs. Brodie, B. F. Fletcher, and Pratt also spoke.

Mr. Stannus, in reply, explained the immense labour which had to be undertaken by Alfred Stevens before he could satisfy himself about any form. In some cases at least 150 attempts had to be made. Owing to his fastidiousness they were not valued, although to other eyes they would have probably appeared beautiful. There is no royal road to the designing of mouldings, and he would advise the student to be unceasing in copying Greek as well as Mediæval examples. It must not be supposed that he advocated T-square and compass work. On all occasions he had persistently advocated the advantage of freehand treatment. There could be little doubt that the Greek mouldings were originally freehand drawings, although they were probably matured by some geometrical process.

There was an unusually limited attendance.

## SCIENCE, ART AND LITERATURE AT THE ACADEMY BANQUET.

THE annual banquet of the Royal Academy was held on Saturday evening under the presidency of Sir E. J. Poynter. In responding for "Science," Lord Kelvin said:—

When I look round this hall, and when I see the galleries of the Royal Academy, I see the splendid results of science everywhere. Every picture, every statue is truly a scientific work. I believe the scientific eye alone can thoroughly appreciate the splendid success of the work of the Royal Academy and of artists throughout the world. It seems incredible to a person looking at a picture closely, and examining the grain of the rough canvas, that when he turns away and looks at it from another aspect it should blaze out with light and beauty. Science takes the humble position of servant and helper to art. I think it must be admitted that science has contributed in no small measure to artistic development. What would Raphael and Michel Angelo and their great predecessors who for centuries laboured through the geometric art of perspective have thought if they had seen a photograph? Would they not have said, "This is a masterpiece of art?" I do not venture to suggest a comparison between the beauty of a photograph and the beauty of a painting; but I do say that if the inventors of the art of painting had seen a photograph they would have been delighted and astonished. I hope I do not offend when I say that artists do think that in some respects a humble photograph gives them ideas as to possibilities of treatment which, without that aid, might not have occurred to them. I do not venture upon a comparison, still less would I say that the last development of science in relation to art, the automatic photographing of colour, is for one moment to be put in competition with artists' work. I am quite sure, however, from the liberality of mind always displayed by artists, that they will thoroughly appreciate the scientific marvel which has thus been realised. Two modes of photographing automatically in colours have come to the front within the last two or three years. To the science of Thomas Young and others, who have worked at and improved and illustrated the true theory of the composition of colours, who have taught artists that yellow and blue do not make green, who have taught artists what green is, what red is and what the primary colours are, we owe that admirable and in so many ways interesting development in photography. I need not mention in an assemblage of artists, and of the admirers of the work of artists, that it is only a rough approximation to that which is achieved by artists, but I do say that, as a scientific result and an automatic production, these photographs in colour are worthy of great admiration. But there are still more marvellous developments of science which have produced splendid results. There is the working-out of the undulatory theory of light and of the analogy between vibrations of sound reflected back from a wall and of light reflected from a mirror. I am perfectly sure that all artists look upon these results with intense interest. Some of the most recent developments of science during the last two or three years have been in connection with the sub-

ject so interesting to artists—light. Light is the means by which we see paintings and sculptures, and the effects of light and shade give the colour which art wishes to produce. Surely, therefore, it will interest artists to think that light is produced by means of vibrations. Among recent scientific discoveries there are not only the Röntgen rays but the uranium rays—a piece of scientific witchcraft. I do not expect that artists will go into a dark cellar and paint pictures by the uranium light, or that they will ever take advantage of the Röntgen rays, which enable one to see through a substance; but artists will feel an interest in these discoveries in regard to other kinds of light because they themselves do their work by means of light.

Mr. Alfred Austin, in responding for "Literature," said:—Ever since the day when Dante stood by Giotto's side as he fixed on the frescoed wall of the Arena Chapel every act and scene of the Divine drama from Bethlehem to Calvary, literature has inspired some of the greatest pictures in the world; and as to-day one feasted one's gaze and refreshed one's spirit with the latest and living proofs of the genius of British art, over and over again one was reminded that literature shares with nature the proud distinction of being to painting the true Fountain of Jouvence, the perennial well-head of its periodically-renovated youth. Would it not be strange were it otherwise? I never knew the artist who was not a lover of literature, and not a few great painters have been at the same time great authors. The literature of the Renaissance would be sensibly poorer if one, expunged from it the sonnets of Michel Angelo and the brilliant speculations of Lionardo; and English art has, in this respect, followed faithfully in the footsteps of those great precursors. The earliest president of the Royal Academy, the great Sir Joshua, wrote a work that remains a classic. Its great president of the present generation, Leighton of the many tongues, the many gifts, would be remembered by his speeches and his essays, had he never drawn a line nor ever mixed a colour. His successor, his too brief successor, dear genial Millais, whom we all loved even more, if possible, than we admired, maintained, it is true, a more concentrated, a more exclusive devotion to his fascinating vocation. But I never met the man more quick to appreciate or more eager to extol whatever verse seemed to him to have caught something of the music of the mountain stream, something of the colour of the mountain heather. Painters were the first to feel the magic of the poetry of Keats, the first to discover and proclaim the interpenetrating charm and finished felicity of Tennyson. And were anyone to assert that, thanks to a certain keen but disinterested sympathy, artists are the soundest and surest judges of the higher literature of their time, I should not be tempted to contradict him. There is thus a tie, there subsists a bond of kinship, between literature and art, compared with which this, your annual communion with principalities and powers, however natural and pleasing, seems fortuitous and transitory.

The President next proposed "Our Guests." He said:—I have already had the honour of welcoming by name, in the various special toasts which I have proposed, some among the many distinguished guests who have honoured us with their presence on this occasion. We are able to boast that besides these we have here gathered together representatives of most that is famous in every branch of life. Besides our royal guests, besides our sailors and warriors and statesmen, and those representatives of science, literature and commerce to whose interests and welfare we have already drunk, we have those distinguished envoys of foreign countries who come to us with the pleasant desire to reconcile rivalries and soothe jealousies, and among these, though we are unfortunate enough to be deprived of the presence of the recently arrived American Ambassador in his place at this high table, I am happy in having been able to secure Mr. Bayard's welcome presence before his departure from this country; we have the eminent men who represent to us our Empire abroad, the agents for our great colonies; we have dignitaries of the Church, statesmen of both parties, members of that great body of country gentlemen who contribute so largely to form the best of English social life, the owners of pictures, a class so indispensable to us as artists; and we have distinguished musicians, and our most representative actor—all brought together here through their common interest in the most widely appealing of all the arts, all of whom we are proud to welcome, and to whose health and welfare and continued success in their various walks in life I and my colleagues drink in this last toast of "Our Guests," which I now propose, and with which I am permitted to associate the name of the right reverend prelate whose recent translation to the See of Canterbury has given such eminent and widespread satisfaction.

The Archbishop of Canterbury, in proposing the health of the "President of the Royal Academy," said:—Painting is a very wonderful art, because it gives a peculiar kind of pleasure, greater it seems to me than can be derived in almost any other way, and a pleasure at the same time of the highest and purest kind. It has been said that of all the pleasures a man can enjoy there are few indeed that can be compared with the pleasure that is obtained by some new idea or thought of beauty,



or some new thought of truth; and of all the means that can be employed to give that pleasure to men the art which is cultivated by the Royal Academy stands in the very forefront. We have every one of us heard it said that art should be true to nature; it ought to be unquestionably, and there is no condemnation of art so great as that which declares that it is false to nature. But at the same time the truth to nature is of a very peculiar character. What is it that I see when I look at a beautiful landscape-painting? Do I simply see the same thing that I see when I look at the landscape itself? Do I with my eyes see that landscape as the painter sees it? What pleasure is greater than to perceive through the inspiration of the painter that which makes the scene at the same time new and true? There is, we are told, "a light that never was on sea or land," and this, which the ordinary man cannot see, is very often revealed by the painter. The painter depicts not only what the ordinary man sees when he looks at the scene, but something more, and his picture tells a tale which is not told to ordinary eyes by the original scene. There is in every true work of art this kind of inspiration. I believe that the world is the better for having received it, and I believe that there is hardly any pleasure that can be compared to the pleasure we so derive. It is in the capacity of one who derives that pleasure that I would thank all the artists who have invited us here to-night, and I would ask you to join with me, artists and guests alike, in drinking the health of the "Royal Academy," coupled with the name of the President.

The President said:—I must express how deeply I feel the honour which has been bestowed upon me by the choice of my colleagues in electing me head of this great and ancient institution, now in the 129th year of its existence. Since its foundation many distinguished men have occupied this position and have passed away leaving a noble record of well-spent lives and work achieved. But they have, so to speak, generally worked out their destiny, and their task has been accomplished before the end of their lives has come. No such calamity has ever befallen the Academy as the loss of the two great men who died in the past year, each in the fulness of his powers as a painter, and each, one may almost say, in the fulness of his vital powers, for disease and not decay carried them off. In each case strength and death had a battle—terribly brief with the one, painfully long with the other; but with them it was not as with Alcestis, for whom Hercules struggled with Death and strength came off the victor—Death overcame, and the English school was deprived of almost one blow of the two most distinguished artists of the last half-century—of its greatest painter and of its greatest president. I have said within these walls at the distribution of prizes shortly after my election as president what I had to say of the position which these two men, each supreme in his way, held in English art; and, though I could say much more, this is not the occasion to dwell on a subject which will only renew the painful sense of void left in the hearts of the public and of their many affectionate friends. Of that wonderful exhibition held last winter of Leighton's life-work it is needless now to speak, as it is fresh in all our minds. Next year we propose to do a like honour to the memory of Sir John Millais. As we all know, this anniversary dinner was omitted last year. The lapse of two years sees many changes, and since we last met this Academy has lost, besides our two presidents, four of its members—Armitage, Richmond, Hodgson (our librarian, a fellow-student of mine in early days at Leigh's), and Henry Moore; and of the many who have disappeared outside our ranks, four, distinguished above the others, are worthy of a special word of regret—Alfred Hunt, one of the most refined of our landscape-painters; Albert Moore, a brother of Henry, our deceased member, the third of that remarkable family of artists of whom all three are now dead; William Morris; and my earliest friend, and beloved by every one who knew him, the brilliant and popular George du Maurier. Our exhibitions will be the poorer for the absence of their works. This is a year of exhibitions. They abound everywhere, both at home, where every section of the community is putting forth its full strength to honour the second jubilee of our gracious Queen, and abroad also, where there seems to be an international exhibition in almost every capital. At Brussels, particularly, where an unusual effort was being made by foreign countries to make a display of strength, I thought it right that the English school should be seen to as great advantage as possible. Encouraged by the liberal grant from the Government towards the expenses, and assisted by an energetic fine art committee, I was able to get together a nearly complete representative collection of English pictures and other works of art; and through the indefatigable zeal of all concerned our section was completely ready and open to the public on Saturday last, the day announced for the opening ceremony—which ceremony has, however, been postponed through the general unreadiness of much of the exhibition. I take this occasion to thank most cordially those gentlemen who have so generously assisted us, whether with money or by lending us the pictures by which our school is so well represented. Others who have important collections and could not

see their way to help us on this occasion, may, let us hope, be reserving themselves for the great exhibition to be held in Paris in 1900. If they can then spare some of their treasures, we shall have nothing to fear in the great competition which will then take place. This year, already famous in the annals of art by that magnificent bequest to the nation of the Wallace collection, will witness the completion of another most munificent contribution of examples of English art, in the splendid building which Mr. Tate has raised on the Embankment to contain not only the collection of pictures which he himself has made, and with which he has so generously endowed the country, but which with far-seeing liberality he has made sufficiently extensive to contain a national gallery of British art, a gallery which will be under the Trustees of the National Gallery, and so form an integral part of it, and which I hope will be to the gallery in Trafalgar Square what the Luxembourg in Paris is to the Louvre. Besides Mr. Tate's own pictures, the collection purchased by this Academy under the Chantrey bequest will probably be housed there, and a certain proportion of the English pictures in Trafalgar Square may also be transferred to it. Those who have seen the galleries agree that they are admirably adapted for their purpose; and they well may be, for Mr. Tate has spared neither trouble nor expense in making them perfect in every respect by the adoption of every modern improvement. His Royal Highness the Prince of Wales has consented, with a graceful concession to Mr. Tate's wishes, to open the galleries and make over this splendid gift to the nation some time in the month of July. There are many other matters of interest on which I might touch, but I am sure that you will be glad that I should conclude, as is appropriate, with my heartfelt thanks for the kind indulgence with which you have listened to me, and for honouring us with your presence to-night.

## THE FORMAL AND INFORMAL IN ARCHITECTURE.

(Concluded from last week.)

WE have now pursued, we think, the philosophy of the subject pretty nearly to its limits, and if correctly, how false must be the supposition of those who would limit the perception of the picturesque to modern times, and deny it any place in the minds and the feelings of those ancients of Greece and Rome who have generally been looked up to in matters of intellect and taste as unapproachable models. To trace up the picturesque to an elementary principle of the intellect is virtually to assert the impossibility of its being thus limited. Who in point of fact can imagine, we will not say an Apelles, a Praxiteles, or a Phidias, not the author of the Belvidere Apollo, or the Medicean Venus, not that Homer, who could so vividly paint the scudding of a storm, or the moonlight upon the crags, or the wave gathering in the distance, and coming in and bursting on the shore—not any one of the great authors in poetry whose names are famous, but even any ordinary contemporary of theirs, with common taste and refinement, looking at a regular landscape composition of the present day by Claude or Turner, and not appreciating its beauty; or surveying, we will say, without pleasure the broken arches, the ivy-mantled columns and the half-shattered tracery of the windows of Tintern Abbey, or wandering "siccis oculis" along the Rhine, with no feeling for the charm of the conformation of those piles of Mediæval masonry on its banks, so regular at once and so irregular; so symmetrical, yet so relieved from formality in their fantastic accumulation of turret, or battlement, or pinnacle, on side or summit, that they have all the picturesqueness of the ruin without being such?

However, we may suppose an objector to be still unsatisfied, and his difficulty to proceed from a comparison which we may conceive him to institute between the classical temple and its proper correlative in modern times, the Gothic cathedral. He may point to the spires and to the towers, to the innumerable pinnacles, the flying buttresses, the pointed arches, the traceried windows, the quaint carvings, the deep porches and the clustering columns of Amiens or Strasburg, of Cologne or Milan, and pronounce the Gothic to be decidedly on the whole a picturesque architecture—picturesque according to the strict definition we have ourselves given, and commending itself in point of fact, to the artist, as something ready made to his hand if he wants a subject, without the absolute need of alterations for that purpose, such as we found to be necessary in the case of the Greek temple. If the Gothic architecture, then, he may argue, is picturesque, and the Classic unpicturesque, here is manifestly a phenomenon, which, notwithstanding all that we have hitherto said, has still to be accounted for; nay, which may safely be asserted to betoken some radical difference after all in the intellectual constitution of the originators of the two



architectures; for here he may naturally remind himself of the German distinction between the Classic and the Romantic, the inventors of which have ever specially appealed to the broad differences characteristic of the two architectures in question, as substantiating the distinction; and, though we are not sufficiently at home in the literature of the "romantic" controversy to know whether it has been done, we suppose that nothing would be more plausible at first sight than to press the picturesque into the controversy on the romantic side. But a little consideration will show that the difficulty is not so serious that we need be driven to any unsatisfactory theory of this kind in order to escape it.

It may seem a contradiction, then, to say it, but the truth is that the Greek architecture which we have been considering as formal owes the whole of its beauty nevertheless to the picturesque principle. But our meaning will be understood if the conclusion be remembered which was drawn when discussing the ruin; we then saw that the perfectly picturesque was as nearly as possible the equilibrium of the formal and the informal. For, this being the case, it will of course follow that every variety of gradation is possible from the formal onwards to the informal till we realise that equilibrium. Thus, if the ruin—to return to our illustration—be but partially carried out, the result will be something formal in the main, but with a tendency to the picturesque; if carried further, yet not sufficiently far, it will then be picturesque in the main, but with a tendency to the formal. Just in the same way, then, as the Greek temple, when decay first begins to operate upon it, is a degree more picturesque than it was when quite perfect, so, we say, is the perfect temple itself a degree more picturesque than it would be were it quite formal; or, in other words, in so far as it is not the perfection of formality, so far is it picturesque. Now it is certainly not the perfection of formality, for, were it such, then the pediment, being a triangle, should be equilateral, which it is not (for, the base of it being larger in every case than the two sides, it is an obtuse-angled isosceles); and the rest of the façade, that is, the parallelogram on which the pediment rests, should in like manner be a square, which it is not, the leading lines of the Greek architecture being horizontal, or, in other words, the width of the parallelogram being, as a general rule, greater than the height of it. In like manner, a more perfect formality would be obtained by the substitution of four-sided for round columns, or again of columns absolutely round like a ruler, instead of tapering upwards, as they do in the best architecture towards the capitals. Now as to the pediment, the isosceles triangle of which it consists was adopted by us above as the very symbol of picturesque beauty, on the ground of its being the simplest possible exhibition in lines of a disturbed symmetry, and as to the parallelogram supporting this pediment, it will be easy to point out that it is precisely the same sort of exhibition of the picturesque in four lines which the isosceles is in three. What is it that we admire in a fine specimen of this part of the façade, for example, in the portico (to take the first instance presenting itself) of the Pantheon at Rome, which is an oblong parallelogram of the kind here referred to?

We say of it that its proportions are admirable. Let us ask, then, exactly what is meant by this word "proportion." Now we have seen it stated that it is a common thing for an architect who would have a room in a house which he is planning well proportioned to secure his object by the following empirical rule:—He draws any square A B C D, as in the diagram annexed; produces the two sides A B and C D indefinitely to E and F; draws the diagonal B C; from C F cuts off C G equal to this diagonal; through G draws G H parallel to A C, and in the parallelogram A C G H has produced a figure the proportions of which satisfy the eye and answer his purpose; whereas any perceptible departure from this form, whether by protracting or reducing the length of the parallelogram here drawn, will, so far as the effect is concerned, distinctly injure it. What, then, is the explanation of what we call in this particular case a good proportion?

The word "proportion" might tempt us at first sight to imagine that there is some discernible harmony or correspondence, properly so called, between the longer and the shorter of the four sides of the parallelogram, as there manifestly is between the two pairs of sides opposite to each other. Yet not only is there no such correspondence at all, but even the charm of the effect is actually due to there being none, as a mathematician will at once see on considering the figure; for it being a mathematical truth that the diagonal of a square is incommensurate with the side of it, it follows that the longer side of the parallelogram (C G) being equal by con-

struction to the diagonal C B of the square of A C is also incommensurate with the shorter side, which is A C.

Now the above is the analysis of the entire front of the Pantheon below the pediment, and there remains a parallelogram of the kind just described, which itself is divided by pillars into a series of intercolumniations, consisting of minor parallelograms of the same character, at right angles to the main one. The comment, then, suggesting itself on the observation of these facts is the following:—Here is exactly, it would seem, the same sort of effect produced by the four lines forming the sides of the parallelogram which is produced by the three sides forming the sides of the isosceles triangle, which is the pediment above the parallelogram. Both the one and the other is an example of "disturbed symmetry." The parallelogram that is exhibits, as does the triangle, the combination of a certain correspondence with a certain discordance, the correspondence being displayed in the accurate equality of the sides parallel to each other, and the discordance in the disparity of the two sides touching each other, which in fact are mathematically incommensurate, as just said. On the other hand, had the parallelogram of the façade been so lengthened that the two longer of its sides should have been exactly the double of the two shorter, a harmony or common measure would have been then created between the two, but at the same time the "proportions," so admirable at present, would have been destroyed by the process.

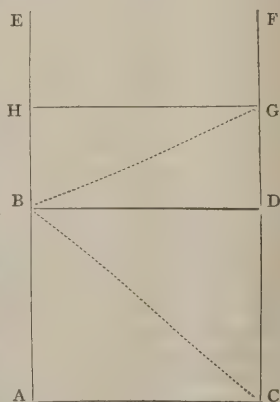
Remaining true, therefore, as it does, that the Greek architecture, speaking broadly and generally, is decidedly of the formal kind, and non-picturesque in consequence of so being, still it would not be what it is were it not for the picturesque principle. It is formal because the preponderating effect is on the side of formality. Thus the parallelogram just considered is absolutely formal so far as this, that it is composed wholly of straight lines, is divided into its component parallelograms by straight lines, that these lines are all of them arranged on a system of parallelism, that all which are parallel are also equal, and that the angles contained in the figure are all right angles. In all this, we say, the symmetry is so complete, and the effect thereof so formal, that the disturbance of this symmetry in the particular instance of the disproportion between the two sides touching each other in every parallelogram is insufficient to establish the balance on the picturesque side.

The Greeks and Romans, then, undoubtedly understood and appreciated the picturesque principle, since they used it to give the crowning perfection to a formal architecture; and the Gothic architect, in point of fact, did nothing more than develop this particular element, already germinant in the Classic, in like manner as he developed the simple colonnade and area of the Roman basilica into the multiplicity of pillars and redundancy of aisle and cloister of his own cathedral. This will be perceived, however, more distinctly if we consider for a moment the leading facts of the history of the formation of this architecture.

"Domus Jacob de populo barbaro;" the "Gospel palaces" came originally, there is no doubt, from Egypt, for from Egypt it was that their beginnings, the colonnade and the columnar temple, such as are to be seen amid the ruins of Thebes at the present day, were introduced into Greece; from Greece, where they underwent great modifications, they were transplanted to Rome and there further modified; and the final alterations which they received afterwards from the architects of the north produced Gothic. It is also notorious that the main element in that vitality by which the hall of Ozymandias developed in the progress of centuries into Cologne Cathedral, was the Roman addition of the semicircular arch to the Greek column.

Now, this addition was one especially calculated to assist the development of the new architecture in the picturesque direction. First, the place of the arch was above the intercolumnar parallelogram, which became, in consequence, to a certain amount less formal—that is, more picturesque, than it was previously. And further, as it so happened that this addition gave it an extension of form upwards, there followed, in due course, both the general substitution of the upward or vertical line for the horizontal, as the dominant one in the new architecture, whence the after-development of tower, pinnacle and spire; and there followed, in particular, that sharpening of the arch itself, hitherto semicircular, which was the culminating and crowning effect of Gothic development.

If we ask ourselves, then, the question, Why is the pointed arch so superior, as all acknowledge it to be, in this particular architecture, to any other variety of it; why is it the most especially Gothic of Gothic features; why is it so perfectly in keeping with the rest of the building? we shall find that what we have called the principle of the picturesque will supply the answer. The excellence of the pointed arch lies in its ministering to the expression of those two elements of sameness and difference which are the essence of the picturesque, and this, alike if we consider it in relation to the rest of the architecture, or as taken by itself. In relation to the rest of architecture, it is picturesque, because while in its sharpness and verticalness it is in harmony with the points, the pinnacles, the spires and, in a word, the upward convergence of the whole building, it





temper at the same time with a softening operation like that of the sun on winter frost-work, the angular rigidity of these masses, by the beautiful contrast of the flow of its own curves. Again, of itself, and independently of its position, it is picturesque also, for while there is symmetry in the two curves composing it—absolute symmetry, in so far as they are the counterparts of each other—there is also disturbance of symmetry in the fact that, proceeding as they do, either of them, from a different centre, they are each broken by the other at the point of collision. It is the semicircle with its centre cut out and the two sides approximated; and accordingly, while in the semicircle we perceive absolute uniformity and undisturbed harmony, the eye following its curve uninterruptedly from end to end, in the pointed arch, on the contrary, the sweep of the compass leads us inevitably away from the arch when we have followed half of it; whence we perceive it to be composed not of one curve but of two, and these both of them incomplete because antagonistic.

The pointed arch, then, being confessedly the special and representative feature in Gothic architecture, and being also, as we have now shown, the very sum and embodiment in itself of the picturesque principle, we may securely, we think, assume that the true key to the general analysis of the effect of that architectural system in all its parts is the principle in question; the same principle, as we have said, being the basis also of the combination of forms in the Greek system, but developed, owing to the invention of the arch, in a more abundant material, with more variety, and to a certain extent, in greater perfection, in the instance of the Gothic.

### PICTURE EXHIBITIONS.

ON Monday a free exhibition of pictures in the Stratford Town Hall was opened by Sir Henry Irving. In declaring the exhibition open the speaker expressed his pleasure at being permitted to take part in that ceremonial and to offer them his heartiest congratulations on the opening of such an exhibition. With the beautiful pictures he saw around him he had a profound sympathy, for they were like strolling players. He understood that they had already fulfilled a successful engagement in another part of the great borough of West Ham—at Canning Town—and he felt sure they would play at Stratford to full houses. In looking over some interesting figures he found that a similar exhibition there two years ago drew a total of 146,000 visitors in eighteen days. That was extremely impressive to a theatrical manager. They must excuse him if for a moment his mind was distracted by a vision of an average attendance of 8,000 playgoers at every one of his performances. He could not sufficiently admire the public spirit with which the people of West Ham had rallied to these exhibitions. It showed, amongst other things, how a work undertaken by their municipal corporation for the purely artistic pleasure and enlightenment of that community might excite an enthusiasm which, he was told, did not always reward the labours of corporations. That was an excellent augury. Twenty years ago there must have been citizens of West Ham who would have greeted with graphic expressions of incredulity a prophecy of the public work which had been there achieved during the last seven years. What was the record? He had a list of institutions, either completed or in progress, which had grown up amongst them in that period, including a public hall, free libraries, two recreation grounds, public baths, and they were rapidly extending the means and opportunities of rational and aesthetic recreation. These pictures had already enlarged the horizon of many minds. They had done incalculable good by giving impressions of beauty to men and women who toiled amidst conditions not always helpful to conceptions of the beautiful. They were true missionaries of civilisation, ministering to that eternal need of the ideal which was as instinctive in them as the craving for material happiness. The bane of congested life in great cities was the stunting of imagination, and it was for the culture of that precious faculty that the painter's art had so high a function. It was once a reproach that our social reformers laid so little stress on the value of this co-operation. There had been a pretty hard struggle to obtain the national recognition of the duty of opening art galleries and museums on the one day of the week which afforded unrestricted rest and leisure. They might congratulate themselves that no lingering prejudice could curtail the public enjoyment of their exhibition by treating nature and the artistic representations of nature as if they were doomed by original sin to turn their faces to the wall on Sunday. He supposed those pictures, after a while, would journey elsewhere, and he should be glad to think that they would be followed by equally distinguished vagrants. That would make a useful circulation of ideas, especially as it was not possible for everybody in West Ham to travel in search of the picturesque. Such an exhibition as the present

one did honour to the borough; it reflected the greatest credit on all those who had laboured for it as an expression of civic life and duty, and it gave infinite pleasure to a man like himself, whose busy moments were identified with the art of pictorial delineation, and whose leisure moments could not be better employed than in applauding similar endeavours in a kindred sphere. He thanked them for their kind reception, and had the greatest pleasure in declaring the exhibition open.

Mr. P. Alden expressed the hope that in time so populous a district as West Ham would be provided with a permanent picture gallery. The necessity for it was undoubted, as the population of the borough was now 271,000, and it was increasing at the rate of 10,000 a year.

### GOTHIC ARCHITECTURE IN NORTHERN ITALY.\*

TO understand Gothic architecture as practised in Northern Italy during the thirteenth and fourteenth centuries, and to be able to judge of its successes and failures when compared with the architecture of the same period as practised north of the Alps, it is essential that we understand the architectural environment of the Italian people.

As early as the latter half of the seventh century a style of architecture made its appearance at Pavia and elsewhere, in which features of construction and design mark it as distinct from the debased Roman architecture previously practised.

Owing to the disturbed condition of the country during the dark ages the new style made little progress, and it was not until the eleventh century that buildings of importance in the style were erected, but during the eleventh and twelfth centuries it held complete sway in every part of Northern Italy except in Venice, which from its insulated position and intimate commercial intercourse with Constantinople, sought its architectural inspiration from the east rather than from the west.

One other exception to the universal practice of the style is the church of San Miniato, in Florence, and in some other buildings in that locality, where we find a return to a more Classical style.

As this style was the immediate predecessor of the Gothic, and as some of its features were adopted by the Gothic architects, it will assist us in our study of the Gothic style of Italy if we briefly glance at some of its more prominent characteristics.

Before the advent of the Gothic style all the architecture practised, not only in Northern Italy but also north of the Alps, was characterised by the use of the round or semicircular arch, but though this important feature was common to the architecture of Italy, France, Germany, England and Scotland, each country employed it in such manner and in conjunction with other features as to give to it more or less of a national character. The national character of this round-arched architecture, while strongly marked, particularly in Germany and England, was, if possible, more marked in Italy, where it was practised in a style entirely different from the contemporary style as found on the north of the Alps.

The round-arched style which prevailed throughout Northern Italy before the introduction of the pointed arch is known as Lombard architecture, not that the Lombards who had established themselves in the land about the end of the sixth century had any architecture or produced any style of their own. They were, however, great builders, and there is little doubt that in the erection of their earlier buildings they employed native workmen who, knowing no other style than debased Roman architecture, would work in that style; but gradually under Lombard influence new features were introduced which in course of time produced the style to which their name is given.

During their sway, which extended over a period of about two centuries, the land was studded with churches and baptisteries erected under the auspices of their kings and queens.

Nearly all the buildings erected by them during the seventh and eighth centuries have disappeared; a few, however, remain as examples of their work, the more notable being San Michele of Pavia, San Frediano of Lucca and Sant' Ambrogio of Milan.

The Baptistry of Florence, it is claimed, was erected during the Lombard dynasty, but if this was the case it does not possess the characteristics of the style that marks the buildings I have named.

From the few examples of the early Lombard style which remain to the present day we can see the change in the proportions of columns and piers; the introduction of wild and grotesque imagery in their ornamentation of capitals and walls that mark the style as distinct from the Roman.

\* A paper by Mr. A. C. Hutchison, read before the Canadian Association of Architects.



During the two centuries which followed the rule of the Lombards Italy was in such a disturbed and unsettled condition that little or no progress in art was made, the erection of churches ceased, and only buildings required for defence were undertaken. In Venice, towards the end of the tenth century, the erection of the well-known St. Mark's was begun. Owing to the intimate commercial relations with the east, Greek architects were employed, with the result that in this city of the sea we have an independent development in architecture of a complex character that marks it as distinct from that of Italy.

As the development of the early architecture of Venice is foreign to my subject I will pass it by, and, returning to the mainland, we find that the darkness which had enveloped the land during the ninth and tenth centuries began to break and give place to a new era of activity in building. During the eleventh and twelfth centuries a number of buildings were erected superior in size and skill in construction to any that were built during the time of the Lombard rule. These buildings are marked by the leading features which characterised the early Lombard buildings, but in addition we find new features introduced that gave the style a step in advance and prepared it for the advent of the Gothic.

An examination of the work of this period will show that the uncouth and grotesque carvings which characterised the early Lombard buildings has given place to figures and groups in low relief of somewhat better workmanship but still crude in design.

The most conspicuous feature that marks the buildings of this period is one that stamps the Italian character upon the round-arched style as practised in Italy, and serving to separate it distinctly from the contemporary architecture north of the Alps. This distinctive feature of Italian buildings was the piling of tier upon tier of decorated arches differing from each other in design, and occupying the whole façade of the building to its very summit. The most notable examples of this arrangement are to be found in the churches of Lucca, but one that is better known to most travellers is the façade of the Duomo of Pisa.

Another feature introduced at this period, which always found favour with the Italians and which they continued to practise during the whole of the Gothic period, was the use of material of different colours in the construction of the walls and piers; sometimes it was applied to the outside of the building, sometimes to the inside and sometimes to both outside and inside. Usually the polychromatic effect sought for was obtained by the use of marbles or stones of different colours arranged in alternate courses.

I might mention other features that characterised the later Lombard buildings, and which, adopted by the Gothic architects, influenced them in their designs. These features I will be better able to describe when the views of the buildings are projected on the screen. It was not until the first quarter of the thirteenth century had passed away that the Pointed or Gothic style made its appearance in Italy, and when it did make its appearance in the first building erected in the new style—that of San Francisco at Assisi—we find it complete in its forms and details as then practised in the north. It appears that when the erection of the building to receive the mortal remains of the great St. Francis was determined upon, there was no architect of celebrity in Italy, and Elias, the favourite disciple of St. Francis, to whom the work was entrusted, obtained the assistance of a German architect named Jacobus. It was only natural that he should recommend and use the style of architecture then practised in his own country, with the result that in the crypt and in the interior of the upper church we have a style of architecture quite distinct from anything that preceded it in Italy. It is true that long before this time the pointed form of arch was frequently used as a constructive feature in the architecture of Sicily; its use there was no doubt owing to the influence of Saracenic art, which, along with Byzantine and Norman architecture, produced a strange combination that gives so much interest to the Mediæval buildings of that island. Though the pointed arch was thus used in Sicily, it did not in any way affect the architecture of Northern Italy; as I have already shown, it was introduced from north of the Alps. As soon, however, as it obtained a footing in Italy it supplanted the earlier round-arched styles, and the Italian architects were obliged to conform to the new style.

From the fact that it was an importation from a foreign country and was in a sense imposed upon the Italians, whose love for the round-arched styles was deeply rooted, it follows that we cannot in Italian buildings trace the gradual development from the round to the pointed arch as we can in France and Germany, and more particularly in England, where in many buildings we may mark the first use of the pointed arch in conjunction with the round arch. The struggle for supremacy between the old round arch and the new pointed arch in England was protracted, with the result that between Norman architecture characterised by the use of the round arch and the massive proportions of its piers and arches, and the Early

English period when the pointed style was supreme, we have a well defined transitional period that affords a most interesting study.

In Italian architecture there is no such transition period; when the Gothic was introduced it at once supplanted the Lombard style, and though the Italian architects never hesitated to use the round arch in connection with the pointed when it suited their purpose to do so, there is no building that I know of in which the change from one style to the other is defined as it is in buildings in the north.

As already remarked, Gothic architecture was an importation. The pointed arch, which is the basis of the style, was not an Italian invention, and though used by them, the possibilities of its use (except in a few buildings) were not developed as we find in the buildings of the north. This is not to be wondered at when we consider the environment of the architects of the Gothic period in Italy—on all hands they were surrounded by the remains of Roman architecture, with the result that Classic thought and design was never dead, but only slept, and was ever ready to assert itself in some feature or design, or in the appropriation of ready-made materials of ancient buildings.

The designers of the cathedrals north of the Alps were under no such influence; they knew nothing of Classic art, and pursued the practice of the Gothic, working on without a suspicion that any other style existed.

As an illustration of this, I remember some years ago examining some fine old glass in Lichfield Cathedral. In one of the panels there was a representation of the building of Solomon's temple. In this picture the temple is shown as a great Gothic cathedral, the artists who designed it probably never suspecting that it might have been in another style.

The vital principle of Classic architecture is horizontal, that of Gothic is vertical. One is that of the column and lintel, involving the idea of rest; the other is that of the arch, the flying buttress and pinnacle, involving the idea of life and motion.

The two ideas are directly opposed to each other: the moment Classic architecture admits the arch it ceases to be true to itself in any real artistic sense; on the other hand, if it refuses to use the arch it confines itself within limitations of construction.

Unfettered by any classical restraint the architects of the north carried the use of the pointed arch to its highest perfections, and in their great cathedrals have left us examples of skill in scientific and artistic construction which, though often imitated, have never been surpassed.

Italian architects, on the other hand, were always under restraint, and while forced by the fashion of the time to use the pointed form of arch, they were never able, except in a few instances, to do so with the boldness and skill of their contemporaries of the north. They often employed it for mere ornament, and in many instances in so faulty a manner that the arches had to be held together with iron ties from the day of construction.

While the Italians here failed to produce buildings in the Gothic style in the purity of design and skill in construction that are to be found in the north, they have, nevertheless, executed many noble buildings in which we can study their successes and failures in dealing with a style that was not indigenous to the country, and in which they endeavoured to reconcile the principles of two styles that are far apart, and which we are inclined to consider unreconcilable.

Besides the influences to which I have already referred, there are other two which we find more or less strongly marked in Mediæval work: these are first, local, and second, personal influences.

Local influence was a natural result of the division of the Italian people into two hostile camps of the Guelphs and Ghibellines; the adherence to one faction or the other not only kept the cities apart, but often at war one with the other. When we consider the disturbed condition the country was in, in consequence of these quarrels, we might expect to find art retarded and incapable of development; on the contrary, however, we find that progress was made, but owing to the lack of community and freedom of intercourse the principal cities developed the Lombard and Gothic styles of architecture in a manner peculiar to themselves. Thus we have well-defined local characteristics of the Lombard style at Pisa and neighbourhood, and of the Gothic style in Venice, Verona, Bologna, Florence, &c. These cities, along with others which might be named, became at a later date local centres or schools of painting, each marked by treatment of their subjects peculiar to the great masters of the respective schools. We thus have in the domain of the fine arts the Venetian, Florentine, Pisan, Milanese and other schools, and in like manner we have the local characteristics of the respective cities marked in their architecture.

The personal influence exerted by individual architects is more marked in Italian buildings than in those north of the Alps. In the great cathedrals of France and England the names of the designers is in most cases unknown, but in



Italian architecture individual names are brought prominently before us.

Among the more prominent I may mention Arnolfo, son of the German architect whom I have already referred to as giving the design for the first Gothic building in Italy. Arnolfo's name is associated with the great Duomo and the church of Santa Croce at Florence.

Pisa, a celebrated centre of Mediæval art, sent forth a number of sculptors and architects, but her most distinguished son was Nicola Pisano, whose sculptures adorn the cathedral at Siena and Orvieto, and who furnished the design for San Antonio at Padua and probably for the cathedral at Orvieto. His son Giovanni was scarcely less distinguished than his father.

In the following century Giotto, distinguished as a painter as well as an architect, constructed buildings in the Gothic style, of which the campanile of the Duomo, at Florence, is the most distinguished example. These men, with others I might mention, not only impressed their individuality upon their works, but formed centres or schools of design.

Apart from the local types of the Gothic style and the personal influence to which I have alluded, we have occasional buildings in which local influence is not evident and where the design is so unlike other Italian buildings as to suggest foreign influence: the most notable example of this influence is found in the greatest of all Italian buildings, the cathedral of Milan.

I might go on to mention in detail features of Italian buildings that attract the attention of the traveller who has previously visited the great cathedrals of the north, and who at once realises that he is in a different art atmosphere. He will notice the absence of buttresses on the flanks of the buildings, the absence of flying buttresses, the small size of the windows and the absence or meagreness of tracery with which they are ornamented, the absence of coloured glass, the absence of triforiums over the nave arches and the meanness of the clerestories. He will notice how columns are used singly or in pairs, and the use of colour on the walls. Of these details time forbids me to speak, but before closing I will mention one material used in the construction of Italian buildings that meets us at every stage in our study of Gothic architecture, that is, bricks and terra-cotta. Italian brickwork is remarkable for the skill shown in the use of what we are inclined to deem an inferior material in the elaboration of arches, tracery, cornices and mouldings, but as this is a subject somewhat foreign to this paper, and one that requires an evening for itself, I only refer to it.

## TESSERÆ.

### English Railways.

THE great cry in our day is that nothing has any right to exist which does not pay. The cry in some measure reproduces itself. If the beautiful has such attractions for humanity, humanity will exact its presence in every work whose existence depends upon its patronage. But humanity's appreciation of the beautiful is weak, while its appreciation of its pecuniary interests is strong. Hence the man who consults taste in his undertakings is miserably beaten by the man who consults his pocket. An engineer of the greatest capacity determined, at the outset of railways, to construct a line which would combine all the requirements of art with all the purposes of utility. He therefore built cyclopean engines and Acherontian tunnels. Every bridge which spanned a mountain torrent or a bridge road charmed the eye with its variegated coping. He piled colossal arches upon gigantic buttresses, to aggrandise as well as beautify the chasms through which threaded in graceful windings the rails of the broad gauge. The public taste was gratified, but the shareholders were ruined. While lines of cheaper construction, executed by men of far inferior ability, yielded a handsome dividend, the broad gauge would not pay. Since the failure of Brunel all railways have been constructed upon the economic principle of spending as little as possible consistently with the permanence of the traffic. The great struggle is to combine the minimum of expenditure with the maximum of receipts. In pursuance of this sublime object wherever railways establish their suburban quarters the trees are cut down and the country laid desolate. The fields disappear beneath grim erection-sheds and black showers of ashes. Blank walls and dismal bridges oozing with slimy filth start up in every conceivable variety of ugliness. These deformities are usually associated with sooty tunnels, yawning as if for more fields to swallow, and miles of mud embankment and lath-and-plaster desolations which greet us at every turn, until the mind associates railways with the very incarnation of unsightliness, as a sort of vampire whose breath blights the ground whereon it sets its foot. But railways are so useful we can tolerate the eclipse of the beautiful which characterises all their creations, though we suspect if such things had sprung up in ancient days they would, like those aqueducts which brought

the limpid waters of Terni and Clitumnus to the inhabitants of Rome, have harmonised with the beauty of the most delicate of landscapes, and displayed in their structure the weird grace and spiritual loveliness revealed in the dynamical forces of nature.

### The Venus of Melos and Raphael's St. Margaret.

No one can study the Venus Victrix of the Louvre without being almost enthralled with her loveliness. It is impossible to describe the mingled grace and dignity of her figure—the idea it gives of overflowing life and elasticity, the queenly pose of her head, the expression of freedom and of triumph, conveyed not in the face alone, but in her whole attitude. As far as such mingled power and loveliness can satisfy you, there is nothing more to be desired. But the merely earthly beauty of her face, the self-assertion of her attitude, the stony scorn on her lovely lips hardly satisfy one's ideal of pure womanhood, and certainly do not raise our thoughts to anything higher than that. She might very well stand for Venus looking on, whilst at her own command Psyche is being tortured at her feet. In one of the picture galleries above is Raphael's *St. Margaret*. Very young, younger than Venus, little more than a child, St. Margaret has come through the gloomy valley that stretches far behind her, and now at its end, amidst desolate rocks and gloom, she has met the Dragon who came out to drive her back or to destroy her. And she has conquered her foe: she, too, is Victrix. It may be the palm branch in her little outstretched hand, it may be her most innocently lovely face that has overthrown him; however that may be, he lies prostrate before her, gnashing his teeth and helplessly clutching the air with his tremendous claws, whilst he lashes the ground with huge coils of his serpent tail, vainly seeking to enfold her. She has conquered, but she is not conscious of her conquest, though her little feet are treading on his loathsome bat-like wing; she does not even see him. Forgetting all that is past, all her mind is bent on that which lies beyond, as with a modest childlike grace she steps carefully onward, without triumph as without fear. Her pure wide-opened eyes are earnestly fixed upon the upward path that leads her to her Lord. Setting aside Christian and Greek faith for the moment, we maintain it is worth while to consider how essentially different are these two types, not in degree, but in kind; how wide apart is the finite life expressed in the Venus, and the life foreshadowed in St. Margaret's wistful gaze, between the self-contented, self-regarding soul of the one, the purity and self-forgetfulness of the other. And which of these two is the highest, and therefore the truest ideal of womanhood, which ennobles our thoughts and elevates our aspirations the most when we study it?

### Dürer's Architectural Designs.

In the print-room of the British Museum is a very large square folio volume, nearly filled with drawings by Albert Dürer—at all events they are attributed to him. His drawings are done in moderately thick lines, either with black or dark brown ink, and betray most certain traces of compass points, ruling pens and bow pens. One drawing is the plan, looking down from above, of a most complicated fountain or pinnacle. There are pinnacles and pediments of an S-shaped plan, and indeed it resembles the almost impossible architecture that Israel Van Meekin designed on paper and Adam Kraft executed in stone. There are a great many compass holes in this drawing, as if it had been pricked off. It is most carefully done, and the sections of the mouldings have the beads turned in with the bow pen; the lines of operation, such as the centre lines, are merely scratched on the paper, as it does not appear that they had means of erasing the lead lines. Another drawing represents a tomb evidently Italian, beneath a vault supported upon four pillars; the drawing is done in black, and elaborately shaded with the same colour mixed with white; the lines are ruled. There are likewise designs for sundry pieces of jewellery; these are outlined in black or dark brown, and then very slightly coloured with light washes of colour, the raised parts being left white. One design would appear to represent a large vase or fountain of the most elaborate description; from it the various figures pour out streams of liquid, and being coloured red in one case may represent wine. There are two hands a little below the middle, which hold out cups, similar to those attached to the drinking fountains of the present day, to receive the noble juice. Indeed, this design would make a most charming drinking fountain if executed in copper and enamelled, or indeed even in stone, painted. Three or four leaves of the book are occupied with a coloured design for a baluster column covered with arabesques; the drawing is most vigorous, and the colouring leaves nothing to be desired. The other drawings are more remarkable as curiosities than as having relation to architecture. Thus, there is the figure drawn from the model which he afterwards used in his beautiful plate of *Fortune*. The original figure is covered with squares, drawn with sharp points, evidently for reducing or enlarging it. At page 143 is a bird remarkably like the dodo; and further on a full-sized elevation



and plan of a shoe of the period, and a most valuable drawing for the writer on costume. Dürer, in fact, appears to have had all the conveniences and appliances of modern times as regards his architectural drawing, but it is evident that his bow pen was none of the best, as his circles are the least neat parts of the drawings.

### The House of the Fountain, Pompeii.

Adjoining the north wall of the fullonica is a house, not particular from its dimensions, but adorned with a fountain of so remarkable a structure that the habitation was distinguished for some time by no other name. The house of the fountain is approached from the street of the Mercuries by a handsome and lofty door, and the atrium is not less than 50 feet in length by 40 feet broad. This atrium has its ala on each side, regularly disposed, with its tablinum in the centre, and beyond it a portico with a small court, the wall of which is painted to represent a garden. In the tablinum is a painting of goats. The whole ground-floor of the house consists of eleven rooms, without reckoning the alæ, the atrium or the portico; and it seems to have been the property of a person of consideration. The inner portico has only three columns, and those of a degraded Corinthian; nor are they at equal distances from what may be termed their antæ. The fountain also, though nearly in the middle of the garden, which is not rectangular, is neither placed opposite an intercolumniation nor opposite the centre of the tablinum, so that it must have lost much of its effect. The colours and the plaster have long since fallen. There was a private entrance through the faux, and a back passage from the vicus of the tragic poet. Near the faux was also the staircase for ascending to the upper floor. The fountain itself was, however, the great source of the modern celebrity of this habitation, presenting, in fact, several circumstances calculated to strike an observer. First, its form is precisely that which every citizen would erect as a fountain at the bottom of his garden, and such as may be seen at the present day in the courts of most of the palaces in Rome and throughout Italy, and proving that the worse the taste the better chance it has of being handed down for imitation from generation to generation. Secondly, the materials are of a singular description, the whole being covered or encrusted with a sort of mosaic consisting of vitrified tesserae of different colours, but in which blue predominates. These are sometimes arranged in not inelegant patterns; and the grand divisions, as well as the borders, are entirely formed by, and ornamented with, real sea-shells, neither calcined by the heat of the eruption nor changed by the lapse of so many centuries. It has been said that a boiler or cauldron in this house was so contrived that hot water could, if necessary, be conveyed to the cistern, or piscina, which advances in front of the fountain. We are exceedingly apt to accuse the ancients of ignorance in natural philosophy—an imputation which the excavations of Pompeii have contradicted. Pliny states that water in leaden pipes will rise to the height of the source whence it is derived; and in the *Sylvæ* of Statius it is clearly shown that the Aqua Marcia passed the Anio in leaden pipes. But Vitruvius gives instructions for the conveyance of water in tubes, and Pliny mentions the custom as common in his time. The two fountains of Pompeii confirm the written testimony. Neither does it seem that the use of shells in the decorations of a fountain is first noticed in the excavations of Pompeii; for Cicero, in his Formian villa, appears to have employed them.

### Greek Painting.

Greek painting perhaps would share all the praises bestowed on their sculpture, had time and the barbarity of mankind allowed us to be decisive on that point. All Greek painters are allowed is contour and expression. Perspective, composition and colouring are denied them; a judgment founded on some bas-reliefs, and the ancient (for we dare not say Greek) pictures at and near Rome, in the subterranean vaults of the palaces of Mæcenas, Titus, Trajan and the Antonini, of which but about thirty are preserved entire, some being only in mosaic. Turnbull, to his treatise on ancient painting has subjoined a collection of the most known ancient pictures, drawn by Camillo Paderni and engraved by Mynde; and these alone give some value to the magnificent and abused paper of his work. That Poussin much studied the pretended Aldrovandine nuptials; that drawings are found done by Annibal Carracci from the presumed Marcus Coriolanus; and that there is a most striking resemblance between the heads of Guido and those on the mosaic representing Jupiter carrying off Europa, are remarks long since made. Indeed, if ancient painting were to be judged by these and such like remains of fresco pictures, contour and expression might be wrested from it in the same manner. For the pictures, with figures as big as life, pulled off with the walls of the Herculanean theatre, afford but a very poor idea of the contour and expression of the ancient painters. Theseus, the conqueror of the Minotaur, worshipped by the Athenian youths; Flora with Hercules and a Faunus; the pretended judgment of the Decemvir Appius Claudius are, on the testi-

mony of an artist who saw them, of a contour as mean as faulty; and the heads want not only expression, but those in the Claudius even character. But even this is an evident instance of the meanness of the artists, for the science of beautiful proportions, of contour and expression could not be the exclusive privilege of Greek sculptors alone. In perspective there is no comparison between the moderns and the ancients, whom no learned defence can entitle to any superiority in that science. The laws of composition and ordonnance seem to have been but imperfectly known by the ancients; the reliefs of the times when the Greek arts were flourishing at Rome are instances of this. The accounts of the ancient writers and the remains of painting are likewise, in point of colouring, decisive in favour of the moderns. There are several other objects of painting, which, in modern times, have attained greater perfection: such are landscapes and cattle pieces. The ancients seem not to have been acquainted with the handsomer varieties of different animals in different climes, if we may conclude from the horse of M. Aurelius, the two horses in Monte Cavallo, the pretended Lysippean horses above the portal of St. Mark's Church at Venice, the Farnesian bull, and other animals of that group.



### R.I.B.A. Elections.

SIR,—There is an old saying that "Fools make feasts for wise men to eat." No doubt many of the members can afford 1*l.* 10*s.* as the price of a ticket for an Institute dinner, but on a recent occasion only 38 of the 1,600 members of the Institute attended.

But 1*l.* 10*s.* per head did not meet the necessities of the case, and the existing Council added about 30*l.* (from the funds of the Institute) that the select 38 might eat, drink and be merry with the wise men who patronise architecture.

It is to be hoped that a new Council may be elected who will consider that good fellowship and kindly association at the festive board should not be limited to those members with long purses. Under no circumstances should those who cannot afford to be present be compelled, as they have been, to contribute to the cost of the hospitality extended to non-members of the Institute; such hospitality should be at the cost of those members who grace the banquet with their presence and enjoy the company and compliments of their guests.—I am, Sir,

A PLUMPER FOR NEW CANDIDATES.

May 5, 1897.

### GENERAL.

**Mr. Percy Fitzgerald** will on the 13th inst. deliver a lecture before the Society for the Encouragement of Fine Arts on "Robert Adam." This will be his twentieth lecture on the subject.

**Mr. A. M. Butler**, of Finsbury Circus, has been successful in the competition for the higher grade schools at Wood Green. The Tottenham School Board has agreed to accept the assessor's award, subject to some necessary conditions.

**A Committee** has been formed to collect money for the purpose of shingling the spire of Stoke Pogis Church, cleaning the interior, ventilating the church properly, &c., but there is no idea whatever of doing anything that would involve any structural alteration. A large sum of money will, however, have to be expended on the works required.

**The Royal Commission** on the water supply of London has been constituted as follows:—The Right Hon. Lord Llandaff, chairman; the Right Hon. J. W. Mellor, M.P.; Sir John Dorington, M.P.; Sir G. B. Bruce, C.E.; Major-General A. de Courcy Scott, R.E.; Mr. A. de Bock Porter, C.B.; Mr. H. W. Cripps, Q.C.; Mr. Robert Lewis.

**The Restoration** of the north-west arch of Peterborough Cathedral, mentioned in the architect's report of August last as work which might be postponed, is to be proceeded with at once. The committee have also been authorised to carry out such work as may be found necessary to the pinnacles of the north flanking tower and the roof of the north-west gable of the west front.

**The Sale** of the last portion of the Goncourt collections took place in Paris on Saturday last, when the modern engravings realised 26,962 francs. The total amount received for the collections is therefore 1,367,992 francs, which will be available for founding the Goncourt Academy.

**Lord Lovat** has presented to the Council of Kilmorack (Beaulieu, N.B.) a site for the proposed public hall and parish offices.



# The Architect.

## THE WEEK.

THREE notable architects have passed away. The ablest was GEORGE GILBERT SCOTT, who died on the 6th inst. Notwithstanding that he was hampered by some of the waywardness which too often accompanies genius, he produced admirable works. He was a thinker, and probably no man of our time gave so much attention to the principle of evolution as exemplified in Christian churches. One of the fruits of his studies was the large and learned volume on Ecclesiastical Architecture, in which many points are considered which were neglected in ordinary histories. His principal architectural work is the church in Norwich erected at the cost of the Duke of NORFOLK. Mr. SCOTT was Sir GILBERT'S eldest son. He was educated at Cambridge, and won a Fellowship in Jesus College. He was one of the numerous architects who were trained in the Spring Gardens office, but he could hardly be considered as a representative of its Gothic. Mr. G. T. ROBINSON ("Metz Robinson") of late years devoted his abilities to industrial art as director of a large establishment. We published recently some illustrations of rooms in ocean steamers by him, and he took extraordinary interest in such work. He was engaged in preparing for *The Architect* some articles on the treatment that was desirable, which he was not destined to complete. Mr. ROBINSON was more than a designer, for he had a thorough knowledge of several kinds of craftsmanship. JOHN J. COLE was one of the few survivors of those architects who joined the Institute in its first decade. He was then living in Lambeth. His principal work is the Stock Exchange, which, owing to the difficulty of admission, is not much known to the public, but it is a worthy Temple of Mammon.

THE tribunal of appeal in connection with the last Building Act would be an absurdity if litigants could approach it without following a regular procedure, or, in other words, passing to it from an inferior tribunal. The judgment given this week in *Reg. v. London County Council* not only reveals that fact but also another no less important, viz. that the Council cannot be compelled to deal with cases which are supposed to be illegal. A Mrs. WEBSTER built a wall at a less distance than 20 feet from the centre of a road in Deptford, and then erected stables near the wall. The builder was summoned and convicted, but he did not remove the wall. Proceedings were then taken against the lady. She applied for the consent of the Council under section 13 of the Act of 1894. In cases where a departure from the 20 feet regulation is considered expedient the Council is allowed some discretion, and then an appeal might be made to the tribunal of appeal. The Council did not hear the defendant's case, and consequently a mandamus was applied for, and a *rule nisi* granted. The Council applied on a motion to have the order discharged. Mr. Justice HAWKINS came to the conclusion that the consent to a departure must be given before the building was erected, and that there was no clause to compel the Council to consider questions relating to structures which did not comply with the Act. A similar view was taken by Mr. Justice WRIGHT, and consequently it was declared that there was no right to grant a mandamus. The case is therefore important as suggesting what are the duties of the Council in extraordinary cases, and it is possible that the wall and stables may have to be removed.

ANOTHER case arising out of clause 13 was heard at the Lambeth Police Court on Tuesday. A large lodging-house for men is in course of erection by Lord ROWTON and his friends in Churchyard Row, Newington. As it was considered that the building came nearer to the centre-line of the roadway than was prescribed, a summons was taken out against the managing director by the district surveyor, Professor BANISTER FLETCHER, for failing to comply with a notice of irregularity. The Council required that the building should be set back so that every part of the external walls should be at the proper distance from the centre line. The company had the option of applying

to the Council for their consent to the erection of the building; but that course was declined, on the ground that there was no contravention of the Act. Judgment was reserved by the magistrate. This seems to be a case in which there would be no difficulty in invoking the tribunal of appeal after the consent of the Council had been given, for Section 19 says:—"Whenever any applicant under Part II. of this Act, for the sanction of the Council to the formation or laying out of a street, or the adaptation of a street or way for carriage or foot traffic, or for the certificate of a district surveyor, is dissatisfied with the refusal or conditional grant of such sanction, or with any condition imposed by the Council, or with the refusal of such certificate as aforesaid, he may appeal to the tribunal of appeal."

THE limitation of power in the English Courts in dealing with the acts of trustees of property was exemplified by an appeal heard before Lords Justices LINDLEY, LOPES and RIGBY on Wednesday. An application was made to Mr. Justice KEKEWICH by trustees under a deed asking the Court to authorise them to raise by mortgage a sum of 8,500*l.* for the purpose of pulling-down and rebuilding some houses in Grosvenor Street and New Bond Street, which form part of the property which is the subject of the settlement. The houses in question are old and very inferior, and if they were taken down and rebuilt as proposed the value of the property would be increased from 19,000*l.* to 32,000*l.*—an increase of 4,500*l.* beyond the 8,500*l.* to be expended. The settlement, however, does not contain any provision authorising the trustees to raise the money, and the Settled Land Acts do not apply. Mr. Justice KEKEWICH considered he had no jurisdiction to do what was asked, and declined to make an order. Mr. MONTAGU, the owner, who entered into the settlement for the benefit of himself and his family, appealed. The Court dismissed the appeal. Lord Justice LINDLEY said that no member of the Court could see his way to hold that there was jurisdiction, although the acknowledgment was a blot upon the jurisdiction of the Court. Lord Justice LOPES said there was no doubt it would be for the benefit of the persons interested in the property to authorise the trustees to do what was proposed, but that was not enough to give the Court jurisdiction. Lord Justice RIGBY concurred. It certainly does seem remarkable that a man who endeavoured to secure himself and his family by adopting every precaution which the law could furnish, by that act deprives himself of power, and moreover the Courts are helpless to aid him. The invincibility of a settlement is, however, once more declared.

UNDER the Plumbers' Registration Bill, by which powers are sought to establish a national council for the registration of plumbers, it is proposed to have a general council to carry out the provisions, besides two branch councils, one for Scotland and the other for Ireland. It is not intended to have any representatives of Government departments. The term of office for the Council is to be five years, but members can be re-elected. It is proposed that the first council should quit office on January 1, 1901. The president of the council is not to hold office for more than five years, and the first business of the council will be the co-option of twenty additional members.

IN the course of the experiments on materials which the United States Government have instituted, stone was not overlooked. According to the *American Architect*, it has been found that temperature and moisture have a very great influence in determining the resistance of stone. In order to measure the permanent expansion which is known to take place in stones after soaking in water, a large number of samples were soaked in water at 32 deg. Fahr., then in water at the boiling-point, and again in the cold water, and afterwards dried. On measurement, all the stones so treated were found to be larger than before, the actual linear expansion being from one-fifth to one-tenth of 1 per cent. On testing for resistance to various strains, however, the strength was found to be greatly affected by the water treatment.



## ARCHITECTURE AT THE ROYAL ACADEMY.—III.

THERE are some drawings of churches hung within a limited space which are suggestive of the variety of aims which are now in the minds of architects. Mr. J. O. SCOTT's new Church at Harrogate follows a severe type of Gothic, but still more severe is the new Church at Bentley, near Doncaster, by Mr. JOHN CODD. St. Thomas's Church, Exeter, by Messrs. HALL, COOPER & DAVIS, is more suggestive of a desire to make an exterior attractive, while in Mr. MOUNTFORD's new East End, St. Anne's Church, Wandsworth, we have undoubted Italian with an altar-piece. The last is one of the indications of a change in architectural fashions, and we see another, and one no less remarkable, in the Additions to Savoy Hotel, by Mr. COLLCUTT, in which we find a court with fountain and arcading which seem to be transplanted from an Italian town. Italian also is the design for a Stone Bridge by Mr. G. B. CARVILL, but we are afraid it is never to be realised, for the days of bridges in cut stone have passed away. Even the Parisians have substituted steel in the new bridge which is to serve as the memorial of the Russian alliance. Another student's work is Mr. A. G. QUIBELL's Municipal Buildings, which may be called English Classic in style. Mr. MURRAY ROBERTSON, of Dundee, follows the example of many of his countrymen who are architects in avoiding a Scottish treatment for the Lochee Free Library and Baths. Unless English architects come to its rescue, the northern style, with its tourelles and corbie-steps, will soon be extinct. The Girls' School, Hammersmith, proposed by Mr. R. BLOMFIELD, differs from the ordinary Board school, and forms a sort of educational temple which would be satisfactory in appearance. The same architect has a design for Parish Institute, Portsea, which looks as if it were intended to keep out invaders. We also see Penn Mill Board Schools, by Mr. J. N. JOHNSTON; House at Walton-on-Thames, by Mr. J. WATSON; and Stable at Harrow Weald, by Messrs. FORSYTH & MAULE, each being an ordinary example of its class. Mr. F. W. BEDFORD has a solid, cubical, old-fashioned and apparently comfortable red-brick mansion, Shirebrook Dene, Headingley. Mr. HUNTLY-GORDON has another example of his music-rooms, in which he usually insists on a high open-timber roof. The room shown is for erection in a house in Harley Street, where it must provoke contrasts.

The title of Mr. DYMOKE-WILKINSON's design, "A suggested drawing-room fireplace in coloured gesso-duro, stained alabaster and gilded bronze," may excite expectation of a gorgeous arrangement; in reality, the fireplace is a quiet black-and-white arrangement of the story of St. GEORGE and the Dragon. The design for rector's stall, Wallasey Church, by Mr. COGSWELL, shows a canopy supported by tall columns, but so slight, the occupant can hardly be said to be aloof from his congregation. In Mr. W. H. SETH-SMITH's new house at Eastcote, Pinner, red and white are commingled. The roof is in red tiles, the lower part is red brick, and between them is the upper part in white, diversified by half-timber work. The garden is of the formal type. The design for a font in cast and decorated lead, by Mr. G. C. CARTER, is worth notice. Any advantages which the material may possess are not easily made apparent in a drawing. The font looks heavy, and does not manifest any superiority to one carved in stone. The design for Queen's Palace, Empire of India Exhibition, 1895, by Mr. A. B. ROBB, recalls one of those Indian buildings on which Italian architects are supposed to have co-operated. The arcades are adapted without much difficulty for a row of shops in the lower part.

The New Boarding Houses for Westminster School, by Mr. T. G. JACKSON, recall some of the old houses which still survive in the neighbourhood of the Abbey. They are built of buff and red bricks, swags and shields are introduced between the windows, and the roofs are tiled. Mr. JOHN CASH has a long two-storey country house with capacious windows. Messrs. WIMPERIS & ARBER's Bungalows, Herne Bay, are also two-storey buildings of red brick and half timber, with a projecting porch. The Old Houses, York, drawn by Mr. F. L. GRIGGS, are curious as suggesting how small was the value set on light when they were erected, for unless the door was kept open the lower part must have been in semi-darkness. The billiard-room

appears to be gaining importance. In the example given by Messrs. HESKETH & STOKES the dais has a room to contain it. The principal room is panelled, with a curved ceiling, and suggests that it was built for its purpose. The Hall at Ford Manor, Lingfield, Surrey, by Mr. J. L. WILLIAMS, has groined ceilings supported by massive columns, and the recesses at windows are so large they could easily be converted into rooms. Mr. THOMAS GARNER has a fine design for the monument of Bishop DURNFORD in Chichester Cathedral. It is a canopy tomb very elaborate in detail, with a reclining figure of the bishop. The structure will be a desirable addition to the cathedral, where the deficiency of memorials is one of the causes of the lack of interest which tourists experience on visiting the building. The house, Vlierboom, Zürich, by Mr. A. KOCH, is a sort of combination of Elizabethan and Flemish, which can hardly fail to be impressive if realised as drawn. Less elaborate are the three houses by Mr. T. ALLEN, Mr. T. BALLANTINE and Messrs. SWANSTON & LEGGE.

For the proposed Church of St. Columb, Lancaster Road, Mr. W. A. PITE has adopted Romanesque. The piers are of red and white bricks, and in the apse the altar is covered by a ciborium larger than any of those used in English churches; the roof is a flat vault with parallel transverse ribs. The design is worth study, for Romanesque has many advantages to recommend it for a more general adoption in England. Vectis Lodge and Woodbourne, Edgbaston, by Messrs. BATEMAN & BATEMAN; the House at Buxton, by Mr. C. H. HEATHCOTE; Nethercliffe, Walton-on-Thames, by Messrs. NIVEN & WIGGLESWORTH, are examples of modern houses in red brick. Mr. J. F. DOYLE has a rather pleasing Wesleyan Chapel. Mr. C. A. NICHOLSON shows some originality in his Font for Cockington Church, Devon, owing to the arrangements for raising the cover, by which the whole assumes almost the appearance of a small baptistery. In the study for Municipal Buildings Mr. H. R. APPELBEE endeavours to cope with the difficulties presented by an awkward site. In the Market Hall, by Mr. H. R. GARDNER, there is a contrast between large and small windows, and by the introduction of armorial shields local interests can be expressed. King James's Grammar School, Knaresborough, by Messrs. HALL, COOPER & DAVIS, is a quaint group of buildings in which the various divisions are sufficiently marked without any incongruity. Messrs. HUMPHRY & HOPKINS's design for Municipal Buildings, Belfast, is as a drawing rather weak. The treatment shows none of the variety which is common among modern buildings of the class in England, but in compensation there is a large dome.

Mr. R. W. K. GODDARD's new church, Clacton-on-Sea, is remarkable mainly for the very large window which seems to emphasise the want of height in the building. St. Aidan's Church, Leeds, by Mr. H. C. HICK, may be said to be of late Romanesque style in the nave or bays, with semicircular arches, and there is an open-timber roof. There is also a rood with figures, a feature that is not derivable from the South, while the baldachino of the altar has spiral columns like those in St. Peter's. In the New Bonded Stores, Vauxhall, there is nothing remarkable, unless the boldly rounded junction between front and side. It is by Mr. A. J. VIGERS, whose house at Rowgardens Wood could easily be mistaken for a small terrace. The directors' private room, by Mr. CASH, shows a comfortable panelled interior in quiet colours. Several architects have co-operated in the Royal Palace Hotel, Kensington. The new ball-room is by Messrs. H. S. LEGG & SON; it is very showy, with ornament in all directions. The recesses on both sides form an arrangement which will be appreciated. Mr. BRIGGS's House at Crowborough is arranged to enable the inmates to enjoy the surrounding scenery; the area of the windows much exceeds that of the walls. The design for the Hotel, Cork, by Sir T. N. DEANE & SON, presents a building standing on the river side. It is simply Flemish in style, and the windows are high and narrow. It is a great improvement on the buildings in the vicinity. Wentley Wood, Yorkshire, by Mr. H. C. FRASI, is another building in which the garden is made to add to the general effect by its quaintness. There is a good deal of half-timber work in the front, which is agreeably broken up. The Prince's Restaurant, Piccadilly, is so generally appreciated since the opening, there can be no doubt the architects,



MESSRS. WIMPERIS & ARBER, have divined what was desired by the public, and their intentions have been efficiently carried out. There is no question of its effectiveness. In this case, also, we find figures forming part of the ceiling decoration, an experiment which not many years ago would have resulted in failure. MESSRS. GOTCH & SANDERS have employed several illustrations to explain St. Mary's Church, Kettering. The details are freely treated, and the large buttresses on the exterior add much interest to a building which is of a simple character. The view of St. David's, Exeter, by Mr. W. D. CARÖE, is taken from a point of view so close to the west front that the ecclesiastical character of the building is not so apparent as is desirable. MESSRS. GARDINER & HAYES have a design for the Clench-warton Board School, in which the parts are well balanced. A premiated design for the Agricultural School, Newport, by Mr. G. S. NICHOLAS, shows a rather severe building arranged round three sides of a court; but in this case a plan should have been given. Mr. FORBES GLENNIE has a west country church. Mr. T. W. CUTLER contributes a view of his Convalescent Home, Epping Forest. A fine drawing displays Mr. PEARSON'S design for the rood-screen in Bristol Cathedral. There is a solid base, and for the uprights, or piers, groups of figures are so arranged as to serve instead of ordinary capitals. Alvaston Hall, Cheshire, is a large building remodelled by MESSRS. SALOMONS & STEINTHAL. The sketch of a Dutch Renaissance Dining-room, by MESSRS. S. J. WARING & SONS, suggests the architectural skill possessed by the firm, which enables them to carry out architects' own designs with fidelity. Sculpture is used to increase the effect, and there is an absence of commonplace features which is satisfactory to see. Mr. TREVAIL'S Free Library and Technical Schools, Cornwall, is disappointing, but some of the defects of the building may be due to the drawing, which is not up to the average Academy standard. The design for a new Church at Exeter, by MESSRS. DEMAINE & BRIERLEY, is noteworthy for the tower, which looks as if the designers wished to suggest that it was a pharos. The view from the tower at Kincardine, by MESSRS. NIVEN & WIGGLESWORTH, is boldly drawn; the building possesses some northern characteristics. The Lecture Hall of the Technical Schools for the Corporation of Liverpool, by Mr. E. W. MOUNTFORD, has the roof arranged as a flat curve, in order to aid acoustic effects. There is a dais at one end, which will be of service on occasions when prizes are distributed. It might be expected, however, that so wealthy a corporation would authorise a larger expenditure of money to enable decoration to be introduced in so important a room.

We have not noticed the designs for stained-glass and other classes of work which are not produced by architects.

## PAINTING AT THE ROYAL ACADEMY.—II.

THERE is not much which can be considered novel in Gallery VII. It shows some courage in Mr. LOGSDAIL to introduce STERNE in a picture, and to suggest he was not the hypocritical sentimentalist which is now the current verdict. He is omitted, however, from the title, which is *Maria*, from the "Sentimental Journey," but it is evident that on STERNE most labour was bestowed by the artist. The luckless *Maria* has too much resemblance to a model to be altogether satisfactory. There is a contest for the position of fashionable portraitist, which is vacant since Sir J. E. MILLAIS'S death. If a suggestion of mind and character was of any importance compared with physical form, Mr. WELLS would have a chance, but he is likely to be outflattered. Mr. SARGENT has so many backers he may win the prize. Of all his portraits this year his *Hon. Laura Lister* is the best able to sustain criticism. The little maiden, in her old-fashioned black silk costume, has all the genuine *naïveté* of one who is not at complete ease before the artist, and the slight commotion has been caught with the rapid insight of a master. We see none of the pertness of the modern society child, and as a record of simplicity which will soon vanish in the world, the portrait is comparable with one of Sir J. E. MILLAIS'S representations of childhood. But the hideous

vase and pedestal could hardly be matched among the properties of a Whitechapel photographer. Mr. SARGENT apparently has yet much to learn. We have grumbled over the fascination which autumn exercises over Mr. J. W. NORTH, and from which he is unable to emancipate himself. He is a companion for Mr. FARQUHARSON, the snow painter, and if we could only discover two other painters for spring and summer the circle would be complete. But the most hypercritical cannot help enjoying so delightful a transcript from nature as *An English Western Valley*. The signs of change are hardly apparent; we see autumn in its ripeness, with so many subtle variations of green among the trees that the red apples which are introduced appear to be unnecessary, and only a painter's means to heighten effect. But Mr. NORTH cares little for such tricks; he does not even show a figure of man or beast to suggest scale; we have simply greenwood trees which have matured according to their own laws, and exist without any relation to other organisms.

In Gallery VIII. Miss HENRIETTA RAE, we are glad to say, proves that an effete mythology has not irresistible power over her pencil. We must get rid of the science which shapes our ways before we can paint or enjoy Greek legends. Like KEATS the poet, Miss RAE feels the necessity of representing beings in whose veins ichor has to give way to blood. ISABELLA of the pot of basil seems doomed to serve as a sign of a transitional period. For the pre-Raphaelites she stood between modern and scriptural scenes; in the present case she is not unlikely to come midway between mythology and modernity. The artist was always excellent in representing form; in *Isabella* she has proved herself to be an admirable colourist, whilst the infatuation of the lovelorn girl could hardly be expressed more ably. The only drawback is the mock antique table, which is too familiar in the cheap furniture shops to be worthy of reappearing in such a painting.

Gallery IX., as usual, is assigned to cabinet paintings, and is one of the most interesting, for there are over 200 examples and the percentage of unattractive works is smaller than in the other galleries. Mr. A. WATERHOUSE'S *Bamborough Castle* has little that is amateurish in any part, and the subject requires skill in painting water, sky and land, as well as buildings. *Battersea*, by Mr. E. BLOUNT SMITH, is a more pleasing subject than the name would suggest. Mr. ALMA-TADEMA'S *Her Eyes are with her Thoughts, and they are Far Away*, is characteristic, although there are signs of change in his work this year. He would be generous enough to acknowledge that Mr. C. F. LOWCOCK'S *Doubtful*, while suggesting his influence, approaches his standard of execution. A colourist is revealed in Mr. DUDLEY HARDY'S *The Favourite*, which at the first glance might be supposed to be an enamel.

Mr. KENNINGTON'S *Maternity*, in Room X., might be taken as evidence that he had not found the right path when he occupied years with pictures of the most indigent classes, and who as models could not present graceful forms or healthy tones. The subject is popular, and all the parts are painted with a breadth which is not found in the artist's earlier works. The most remarkable picture in Gallery XI. is the *Childhood* of Mr. CHARLES SIMS. It is such a scene as may often be witnessed during a summer's day on Ashted Downs and similar places round London. A big school is revelling in the novel liberty of occupation of ground where no gardener has sown seed and trespassers are not in danger. Mr. SIMS has endeavoured to suggest the haze which sometimes overspreads such places and does not avoid the visitors. A more difficult feat has not been attempted this year. There is perhaps a little excess in the effects, as if the ground and the children were seen through gauze, but it still remains one of those pictures which are full of promise for English art.

We hope it will not be concluded that we believe there are no more pictures in the Academy than those we have pointed out. That would be erroneous. We have simply mentioned those which appeared to be most remarkable for their novelty. Many others are to be found which will give pleasure to visitors. Among them are Mr. PETER GRAHAM'S *Where Naught is Heard but Lashing Wave and Sea Birds' Cry*, a picture so excellent as to atone for the length of the title; Mr. DRAPER'S *Calypso's Isle*, Mr. GOW'S *Waiting for Prince Charlie*, Mr. BRETT'S *Castel Moel and South Stack*



*Lighthouse*, Mr. ALMA-TADEMA'S *Watching*, Mr. H. W. B. DAVIS'S *Flowery May*, Mr. MACWHIRTER'S *Childe Roland* and *Alpine Meadows*, Mr. LESLIE'S *Day of Rest*, Mr. J. C. HOOK'S *From the Shore to the Field*, and portrait, *Alan J. Hook, Esq.*; Mr. A. GOODWIN'S *The King's Garden*, Mr. LOGSDAIL'S *A Winter Morning on the Mole, Venice*; Mr. CORBET'S *Vespers*, Mr. BLAIR LEIGHTON'S *In Time of Peril*, Mr. LEADER'S *Autumn Gleam*, Mr. MARGETSON'S *The Sea hath its Pearls*, Mr. JACOB HOOD'S *Little Swineherd*, Mr. G. HITCHCOCK'S *St. George* and Mr. T. GRAHAM'S *Young Crusoe* forming as liberal an allowance of enjoyable pictures as can be expected in prosaic times.

### "THE INSTITUTE ABROAD."

THE play-room is as indispensable as the school-room. To those who think of the future of English architecture, the members of the Architectural Association as actors or as auditors of "The Institute Abroad" at the St. George's Hall on the 6th inst. were as hopeful a sight as when attending classes or taking part in the conference on examinations. The whole session is, however, occupied with very hard work, and this year as on former occasions the dramatic and operatic performance was compelled to be almost improvised; libretto, music, study of parts and rehearsals had to be got through in less than a fortnight. It would be impossible to do so much if the Association were not provided with an inexhaustible subject for ridicule—to wit, the Royal Institute of British Architects, the possessor of two Royal Charters. The purpose of that body is not evident to its highest and oldest officials, for beyond serving as a registration office it is of doubtful utility, but it would be hard to match it as a subject for laughter. What adds to the piquancy of the occasions when it inspires an architectural Aristophanes is that those who mock and those who enjoy the mockery may one day act as councillors and committeemen, or, in other words, become responsible for carrying on the illusion. When that time arrives they are pretty sure to confess to one another that their fictions did not reach the reality, for the Institute is, to those who have had experience of its inner workings, a more absurd creation than imagination can present. Some courses of burlesque would, therefore, appear to be indispensable for all who aspire to sustain the responsibilities of office at the Institute with decorum and dignity.

This year the operations of the dramatists' Institute were supposed to be conducted in old Algeria. Under its auspices we find that women are not only freed from Moorish thralldom, but they take part in its architectural competitions. They produce such lovely designs as give the Council shocks, for those respectable judges can never discover what the drawings signify. But as there are not prizes enough at disposal, the Council have devised a new series to reward the fair votaries of the mother of the arts. The first prizewoman is to marry the president, to the second the secretary will fall, then the librarian, and so on to the end of the official list in the Kalendar. How long the marriage is to continue binding appears to be undefined, for there is no copyrighted form relating to espousals included among the Institute publications. The notice relating to dangerous structures probably suffices for the Algerines. The sweet girl graduates merit all the joys which can come to them, for they are genuine students. Rivington is to them a darling, Fergusson a duck, and Freeman a dear. But, as is natural, their affection for the authors of bound volumes is not satisfactory to those who get up Institute brochures, which have high prices imprinted on the covers. The jealous librarian accordingly offers to lend them back numbers of the Transactions, a strange periodical which is not supposed to be read by those to whom it is addressed, and never leaves the wrapper until it has found its way to the waste-paper shop. With the aid of Institute literature the fair students are expected to uphold the dignity of the profession.

While the conversation is in progress there enter three joyous A. A. Travelling Students, John Jones, Patrick W. Brown and Charlie Robinson, on a sketching tour. Of course they discover that even in Algeria there is cribbing from England, for at their first glance they perceive a finial which is manifestly related by its curves to the new entrance of the Alhambra in the Charing Cross Road. But characteristically

the Secretary of the Institute objects to the give-and-take principle, for a copyright has been secured by the Council in all the details of the mosques, however old. Soon the Emperor enters, who is a living statue and an adept in all the arts. The imperial duties were so multifarious, his Majesty was unable to be present at the Jubilee banquet on the night preceding, and he was unable then to continue a conversation, sing a song, or perform a jig. Mr. Charlie Robinson is, however, no less anxious to discover the whereabouts of that well-known public man, Mr. Blarney Barnooley, than to seek examples of English design among the Algerines. There is no record of such a name on the librarian's list of authors, and that official generously offers to insert an advertisement free of charge in some Institute publication. But Mr. Robinson considers it will be useless, an opinion in which some other people whose advertisements are not gratuitous would, no doubt, agree.

When officials and travelling students depart, Mr. Barnooley enters, accompanied by a delightful young lady, a student of the arts called Tricksey. They are first struck, not with Moorish details borrowed from London, but by an announcement that a President is wanted for the Institute, and offering the munificent salary of 15*l.* a year, all found (or 16*l.* if the successful man is an early riser), and one night out in a fortnight. A gentleman with some knowledge of architecture would be preferred; no beer is given, and no washing, but instead one annual excursion. No Frenchman or foreigners are eligible. With his usual decision Mr. Barnooley resolves to go in for the appointment. He addresses himself to the librarian, who offers to put his name down on the register for a shilling, but on learning the applicant's aspiration takes him in in order that he may fill up a form expeditiously. While the process of filling up the necessary form is in progress Mr. Robinson re-enters, and discovers that Tricksey is an old flame of his, who is more attractive than any finial. His demonstrations of affection are not, however, approved of by the ubiquitous and severely moral librarian. The President in posse somehow contrives to make behind the scenes the acquaintance of the Emperor, and they join in an interesting financial discussion, and exemplify their theories by playing with cards of a rare variety which no stamp duty can legalise. The Sultan loses, and is compelled to leave the ancestral signet ring in pawn with its jewel, beside which the Koh-i-noor is like unto a mustard seed.

Then comes that momentous event, the election for the President's office, and it is needless to say Mr. Barnooley is successful. The marriages are to follow. In the interval Mr. Robinson makes a pathetic appeal to Tricksey, in the hope of saving this modern Andromeda from the monster of a President. "Shall it be all in vain," he asks, "that I have won Soane medallions, Grissells, Pugin studentships by scores, storming the very battlements of fame in passing the Institute Exam., that I might lay them at your feet; and besides, have I not spent sleepless nights burning the candle of ceaseless diligence that I might qualify as a district surveyor, and earn a miserable pittance to support you?" He implores her to fly with him to some distant shore where they could spend their days in the pursuit of art, untrammelled by horrid necessities of practical construction. But the thought of becoming Mrs. President and receiving the guests at the conversazione is too much for the vain girl. Probably she imagines she may be concerned in settling arbitrations.

The first act of the new President is to endeavour to get rid of his ring. He offers it by auction, and is ready to accept 2,000 guineas for it; but as the biddings do not exceed five shillings, he thereupon promotes the Grand Diamond Jubilee Architectural Co-operative Syndicate, Limited, with a capital of 5,000,000*l.* The Sultan-Emperor is not satisfied with the arrangement, especially as he discovers that his wonderful diamond is one of the assets of the company. Accordingly his Majesty confiscates the ring and reserves to himself the nomination of President, with all the privileges belonging to the position. Mr. Barnooley is banished, although his financial dexterity would be useful in manipulating balance sheets. Mr. Robinson is rewarded with Tricksey, and a new era for the Institute commences, for the Sultan resolves that the members of the Architectural Association, being true artists to the backbone, are to rule the Institute for ever and a day, a consummation that would be desirable in other countries besides Algeria.



The success of "The Institute Abroad" was due to the co-operation of several members. Messrs. A. Stalman and G. B. Carvill produced the book, and Mr. Leonard Butler composed the music. Mr. A. Stalman appeared as the Sultan-Emperor, Mr. Carvill as Blarney Barnooley. Mr. Frank Collins officiated as secretary of the Institute, and Mr. Clapham as librarian. The travelling students were Messrs. H. Seton Morris, W. W. Furlong and S. Constanduros. Then there were members of the Council, Sultan's bodyguard, Moorish boys and others. Among the ladies were distinguished Misses Blanche Selig, Grace Wylde and Ada Yerbury. As all worked so well, it would be invidious to criticise particular performers; but it must be said their efforts to amuse did not receive the appreciation from the audience that was merited.

## ELECTRIC SUPPLY AND THE DESTRUCTION OF TOWN REFUSE.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

**REFUSE-DESTRUCTORS** may be found in most towns of fair size, and their adoption is now being contemplated in many smaller ones. Destruction of refuse by fire completely destroys the noxious gases injurious to health. The refuse must, however, be subjected to a sufficiently high temperature and burnt in properly constructed furnaces. These destructors may be erected in populous districts without causing annoyance if the furnaces are properly designed and managed, and they can also be made a success from a financial point of view, when compared with other methods of disposal.

It may be of interest here to describe one form of destructor, as the principle of the various types is not very widely different.

The destructor is essentially a sloping hearth with fire-bars towards the front. The refuse is tipped in at the back, and the hot gases from the hotter portions in the front pass over and dry it. It then gradually feeds into the hotter portions of the furnace and is completely burnt. The clinker is removed from special doors in the front. The method of charging these furnaces is responsible for the heavy costs for repairs, and many attempts have been made to apply automatic stokers, but they have not met with any large measure of success. An arrangement brought out by Mr. H. P. Boulnois, engineer to the Liverpool Corporation, dispenses with the handling of the refuse. This consists of a waggon 5 feet wide, 3 feet deep and any convenient length, which is divided into compartments, each being the full width of the waggon, and contains sufficient for one charge. Each compartment has a door, which is held in position by a pulley running on a third rail, and when the door into the destructor drying-hearth is opened the portion of the third rail on which the pulley runs moves away with it, the door in the waggon is opened, and the refuse falls on the hearth. The destructor door is actuated from the front. Thus the dust is never handled in the destructor station, as it is shot direct from the carts into the waggon.

It is found that a destructor worked on the drying-hearth principle is usually a nuisance. Dust and fumes come out of the chimney, the decaying matter being really destructively distilled as well as being dried in the process, and the large draught required blows the dust up the chimney, to be deposited on the surrounding houses, &c. To obviate this difficulty Mr. Jones, borough surveyor of Ealing, devised the "fume cremator," which is a separate furnace placed between the destructor and the chimney. It consists of a furnace having a reverberatory arch, with rings of fire-bricks projecting, which deflect the gases and directs them on the top of a red-hot mass of fire. An intense heat of from 1,000 to 1,500 deg. Fahr. is maintained at little expense, the fuel being ashes screened from the refuse and fine coke breeze. A supply of air is provided under the fire-bars, and a further supply of air is mixed with the gases as they enter the cremator. The contact between these gases, the fire-brick furnace and the red-hot fuel completes the combustion of the gases and dust, and it is found that the nuisance before mentioned is prevented. It may be urged that the cost of keeping the cremator going adds considerably to the expense of the destruction; but when the heat of the refuse is used for steam raising, this "cremator" is made the boiler fire-grate, and the fuel is not wasted in the least.

It is now my object to show how far the heat from the destructor is utilisable for electric supply, and in the first place it is to be ascertained how much heat may be obtained from 1 lb. of refuse, and the ratio of refuse produced to population and the ratio of population to 8 candle-power lamps required.

At Birmingham 179 lbs. of water have been evaporated per lb. of refuse, and at Oldham 138 lb. of water per lb. of refuse. The anticipated results are usually much higher than the realised, and Mr. T. Tomlinson, B.E., gives as a fair result from his own inquiries and tests that from 500 lbs. to 800 lbs. of

water can be evaporated per ton of refuse when burnt without sorting out anything except bottles, cans, &c., which fetch a fair price for other purposes. In fact, the quality of the refuse varies very considerably.

It is usually taken that 4 cwt. per head per annum is a fair figure for the production of refuse. This means that in a town each person will provide enough refuse to evaporate from 100 to 160 lbs. of water per annum.

Taking a town of 10,000 inhabitants, the quantity of water evaporated will therefore be 1,000,000 to 1,600,000 lbs. We will take it as 1,300,000 as an average. The demand which could be expected for some years to come will not be more than the equivalent of 6,000 8 candle-power lamps, and it is taken that the average consumption is 16 units per lamp per annum, that is to say, assuming 50 lbs. of water per unit are required all the year round, the water required to supply this is  $16 \times 50 \times 6,000 = 4,800,000$  lbs. It has been made out by many people that the refuse will supply *all* the power required, but in such cases high evaporative powers have been assumed. In districts such as Shoreditch, where cabinet-makers abound, no doubt such a high result can be attained, or in coal districts where coal is cheap and is wasted; but in the ordinary town I think that the result taken, *i.e.* just under one-third, is about the one that could be expected.

It will be noted that one-third of the power can be obtained from the destructor; this is an item to be considered, and if too much expense and labour is not entailed it may be worth while to use refuse. It is absolutely necessary, however, that it be burnt very regularly, in fact, day and night continuously, and if the load on a central station were fairly uniform there would be no great difficulty. But unfortunately this is not the case; the demand in the daytime and early morning is very low and the evening load is high, also the winter load is heavy and the summer load light. This unevenness in the demand must be met and smoothed over as regards the refuse-destructor supply of steam.

In many stations where an alternating current system is in use the day load is fairly heavy, because of the energy wasted in the transformers, which is constant day and night, summer and winter, and it may be taken that the destructors will supply this load, and there is no need of storage. The day and night load required by the exciting dynamos used for providing current to magnetise the alternators can also be run as well from these destructors by means of low-pressure engines if there is any difficulty in obtaining a high pressure in the destructor boilers. The use of electric accumulators with the exciting circuit is to be recommended, and the whole of the excitation for the evening load may possibly be supplied. In fact, it is in the alternating current station that the refuse-destructor and electric supply will combine most readily, owing to the necessity for continuous running and attendance.

When we turn to the continuous current station the problem becomes really difficult. It is the boast of some central station engineers that they lock up their station at midnight and do not appear again until after midday in the winter and in the summer 6 P.M. These engineers would view with great disfavour the proposition that two shifts of men should be provided to attend to the storage of the electricity generated by the steam obtained from the destructor boilers from 12 P.M. till the next evening. In fact, it certainly would not pay, as the saving in the coal bill would never equal the interest on capital of accumulators and the extra wages. It is necessary that there should be an automatic storage of the energy.

A method which is now being adopted is that of storing the energy in water, and is the invention of Mr. Druit Halpin.

There are two distinct forms of this storage—feed storage and steam storage.

**Feed Storage.**—If the boilers are worked under practically atmospheric pressure, and are capable of evaporating 1,300,000 lbs. of water per year, which is the average taken, and if this steam is passed into tanks of cold feed water, the heat can be stored. The total heat in 1 lb. steam at atmospheric pressure is 1,178 British thermal units.

If this is allowed to condense (by mixing with water) it will give off  $1178 - 212 = 966$  heat units, which will heat up a further  $\frac{966}{212 - 60} = 6.3$  lbs. of water to 212 deg. F. from 60° F.

This, added to the 1 lb. of condensed steam, provides 7.3 lbs. of hot feed water. The process can be carried on fairly efficiently by lagging the tanks. Taking the efficiency to be 80 per cent., 5.8 to 6 lbs. of feed water are provided. In the case taken there are required 4,800,000 lbs. of water per annum.

The 1,300,000 lbs. of water will provide  $1,300,000 \times 5.8 = 7,540,000$  lbs., or sufficient power is being given in any day to heat the feed for the heaviest winter demand (nearly double the average for the year). Thus it will be seen that even supposing some steam to be used for driving mechanical fire-bars, &c., in the destructor building, there will be sufficient steam to provide hot feed for every requirement of the station. The advantages to be gained by this method are:—(1) The carbonates are deposited from the hard feed water into the hot tanks and help



to lag them, and also keep the boilers clean; (2) the use of economisers is not necessary, and water-tube boilers (which are admittedly the most suitable for central stations and do not require economisers) can be used; (3) condensing plant is possible, with a large reduction in the coal bill; (4) the water from the condenser need not be used again, with a good result as regards the boiler; (5) the storage is automatic. The expense of these tanks is not very high, as they are little larger than are needed to insure continuity of supply in case of accident to water mains. This method of storage is being used at Shoreditch, except that the water is further heated to the actual temperature from which it is to be evaporated, *i.e.* it is put under pressure, the same pressure as that at which the boilers work. The water is pumped into these tanks cold, and the feed is gravitational. In the case where the water is under atmospheric pressure, the water has to be pumped into the boiler hot, but there is a considerable saving in capital expenditure on the tanks.

**The Steam Storage System.**—In this system the boilers are worked at a much higher pressure than that at which the engines work for, say, 16 hours per diem. The usual pressure being, say, 115 lbs. per square inch, the day pressure is, say, 250 lbs. per square inch. Drums containing water are connected to these destructor boilers and absorb the steam until the water is at the same temperature as that in the boiler, in fact, the temperature corresponding to the pressure. The amount of steam absorbed is easily calculated.

Suppose water at 115 lbs. per square inch connected to a steam main. The temperature at 115 lbs. is 347 deg. Fahr., at 250 lbs. it is 406 deg. Fahr. Thus the range of temperature is  $406 - 347 = 59$  deg. Fahr. The heat required to raise the water through this temperature is 59 heat units per lb. Suppose that  $\frac{1,300,000}{365}$  lbs. of steam are available at an average of 205 lbs.

per square inch per day, then two-thirds of this are available for storage heating per diem, *i.e.*  $\frac{2}{3} \times \frac{1,300,000}{365}$  lbs. of steam. Thus 2,374 lbs. of steam can be condensed, *i.e.* multiplying this by the latent heat 873, we get the heat units available, and this will heat  $\frac{2,374 \times 873}{59}$  lbs., *i.e.* 18,178 lbs. of water must be

provided to store the energy, or about 290 cubic feet. This 2,374 lbs. of steam, less waste, say, 12 per cent., or 2,000 lbs., will of course be recovered from the drum if the pressure is lowered to 115 lbs. per square inch. The 2,000 lbs. of steam will at this heavy time run an average of  $\frac{2,000}{8 \times 30}$ . Taking

30 lbs. of steam per horse-power hour, and eight hours' run = 8 horse-power for eight hours = 64 horse-power hours, the boilers themselves being capable of giving  $\frac{2,374}{2} = 1,187$  lbs. of steam, or  $\frac{1,187}{8 \times 30} = 4.9$  horse-power, or in other words there

are available 68.9 horse-power in any one hour, with 4.9 horse-power for the rest of the eight hours, or an average of 103.2 horse-power hours in this manner by storing the energy in 290 cubic feet of water during light load of sixteen hours. If, however, the heavy load is not so long the maximum power available for an hour is more.

In many cases the water in these drums is used for feed purposes as well, in which case more heat is capable of absorption in a less quantity of water. For instance, taking the 2,374 lbs. of available steam in the sixteen hours under the same conditions. Then if the water is 60 deg. Fahr. in the drum at the commencement, and let  $x$  lbs. of water be present, the range of temperature is  $406 - 60 = 346^\circ$  and  $x \times 346$  heat units are absorbed in heating this up to the temperature of steam at 250 lbs. per square inch, *i.e.* 406 deg. Fahr.; consequently,

$$x = \frac{2,374 \times 873}{346} = 5,990 \text{ lbs.}$$

The heat given out when the pressure is let down again, and the whole of the water has been used for feed purposes, is of course the same, but its distribution is different, the large portion being given back to the boilers as feed water, enabling them to do more work, and the balance as steam to the mains; but the result is the same as regards horse-power hours, *i.e.* 64 horse-power hours in this case. The reduction in the size of boiler made possible is very great, and consequently the less capital outlay is quite sufficient, and more than sufficient, to pay for the drums in a storage system, so the total capital outlay is less in a large plant and about the same in a small one.

As a matter of fact, it must be remembered that there is no reduction in the size of engines. For instance, a tank to store 75,000 lbs. of water will cost 600*l*.

$$\text{Water} = \frac{\text{steam supplied} \times \text{latent heat}}{\text{range of temperature}}$$

$$75,000 = \frac{S \times 873}{346}; S = \frac{75,000 \times 346}{873}$$

$S = 28,590$  lbs.; *i.e.* say, 714.7 units of electricity, allowing 40 lbs. per unit, can be stored for a capital cost of 600*l*. Now, an electric accumulator battery cannot be got for this sum, but it must be remembered that in the case of steam storage the engines and dynamos have to be the same as if the storage were not used.

Assuming the capital cost of this storage to be 600*l*., it is evident that the cost of accumulators, less the cost of extra dynamos and engines required, will be the equivalent cost of accumulators. The maximum load would be about 280 kilowatts. If the battery is to store 714.7 units, the dynamo power would be (assuming 18 hours charging and 60 per cent. efficiency between steam and discharge from accumulator) approximately 80 kilowatts. Such a battery would cost 3,740*l*.

Thus with accumulators two 80 kilowatt dynamos and engines would suffice costing 3,000*l*. With steam storage five 70 kilowatt dynamos and engines would be wanted (allowing dynamo reserve in each case), costing 6,500*l*. + 600*l*. for storage.

Allowing nothing for smaller buildings, the difference would be 7,100*l*. - (3,740 + 3,000) = 360*l*. in favour of accumulators.

As regards working expenses, as before mentioned, the accumulators would need two new shifts to be formed in the continuous current central station, while the steam storage would not. The successive drums could be turned on by the destructor stokers when they found the steam pressure rising above 250 lbs. per square inch.

A good method would be to have steam storage for the shift midnight to 8 A.M., and accumulators for the day, as there is usually some one present then, and also for filling up the load factor of the engines in the evening, and this would probably work out to be the most economical in the end, taking everything into consideration.

No one would dream of using accumulators or even storage drums to any great extent at the present time for central-station work, unless a constant supply of power, otherwise wasted, is available. The cost of these storage arrangements is rather high, and the trouble and expense of working is certainly higher, while they introduce an element of risk.

The coal bill in a continuous current central station is usually not very large compared with wages, standing charges, &c.; but if central stations are found to cost as little to work when refuse-destructors are employed as they would have cost without, there is no doubt that refuse-destructors will be combined with the continuous current central station boilers and the cost of disposing of the refuse saved. Figures are required as to the total saving to the local authorities found by adopting these destructors, (1) Not utilising the destructors for steam-raising, (2) utilising them for this purpose, then an opinion will be possible. In any case the quality of the refuse will be the determining factor.

To sum up. In a fairly small town, with an average quality of refuse, the steam available is sufficient, by utilisation of storage, to supply about one-third of the ultimate probable demand for light. That with an alternating current station great economy can be effected by the use of this steam, without any great storage or capital outlay; but that with continuous current stations the advantage is extremely problematical, unless more than one-third of the steam required can be obtained. It is also shown that feed storage is advisable, and that the feed need not be at more than atmospheric pressure to get a good economy. That the steam and feed storage combination is the most economical as regards water required, and that the ultimate capital cost is more than if accumulators are used, especially if cost of buildings, steam mains, &c., is taken into consideration. That at present an engineer would not recommend steam or feed storage unless dust-destructors were combined with them.

## ADVANCEMENT IN ART.

A LECTURE on "Sixty Years Advancement in the Fine Arts" was delivered by Mr. Herkomer, R.A., at the Crystal Palace. He said that, to his thinking, the characteristic changes that had been brought about could be broadly defined as, first, the development and destruction of the art of wood-engraving; secondly, the development of the art of water-colour painting to the highest capabilities of the material; and, thirdly, the change of front in the type of work from one essentially English, evolved by English painters of England, to one of foreign tendency. The development of any reproduction was stimulated, if not entirely brought about, by the requirements of the artist who did the original work. Having traced the history of wood-engraving as applied to illustrated newspapers, Mr. Herkomer reminded his hearers that in 1840 Sir John Gilbert, the father of all illustrative work, stood aghast when the late Mr. Ingram suggested the production of a weekly illustrated newspaper; yet to-day we had about 1,000 illustrated journals. With regard to the development of water-colour painting in the Victorian era, he would not touch upon such events as the pre-Raphaelite movement, or speak of Millais, who raised the whole status of English



art, or of Leighton, who raised the status of the artist. The most striking episode in this particular department was the advent of Frederick Walker. The so-called Walker school was made patent by the genius of a rare artist who died at an early age in 1875. He had many enthusiastic followers, but of those very few were left. "The Walker craze is over"—thus spoke a picture-dealer the other day. Although only twenty-two years had elapsed since his death, there was to-day only one in five that knew his work, and only one in twenty that really loved it. Yet the Walker period was a great period in the Victorian era. Mr. Herkomer next imagined a delightful picture of English country scenery, and went on to say that England to all goodly persons must appear lovable; that being so, they might surmise that that very loveliness would be a form of beauty that would never be neglected. We had, however, studied too much of French art, and had not even succeeded in welding the good qualities of those good paintings on to English nature. Why should painters try to play golf on canvas by getting into a hole with as few strokes as possible? It was cruel to strike at the chord of art in that way, and crueller still to malign England by such practices. Let them cherish their England, their cottage homes, farmsteads, village greens and shady lanes, and let their painters and poets paint and write in order to keep those treasures warm in their hearts.

### UNSUCCESSFUL ARTISTS.

ON Saturday evening the Bishop of London presided at the annual dinner of the Artists' Benevolent Institution. In proposing "Prosperity to the Artists' General Benevolent Institution," his lordship said that doubtless most of those present thought the best form of prosperity which the Society in whose interests they were gathered could attain would be that it should cease to exist, because the cause which had brought it into being should have ceased to exist. But until that ideal state of things arose—and he was afraid it was not likely to arise in our time—they could only moralise on the causes of human failure and human success, and admit that they were entirely beyond their capacity for calculating. He remembered once talking with a brother bishop about a man for whom they wanted to do something. They spoke at length about his virtues, they detailed his good qualities and considered what he could do and what could be done for him. At last his friend heaved a deep sigh and said, "He is as good as gold and he will go to heaven, but he is no use." He spoke from the conviction which had long been at the bottom of both their minds, but which they did not like to confess to one another. In olden times there was proper provision made for persons of that kind. There were monasteries to which they could retire, and if they were artists they could spend their time in decorating the walls of the cloisters with frescoes or in illuminating missals. But now the rise and development of modern society had swept away such admirable retreats, so necessary for a considerable part of the population and had substituted the less picturesque and, he regretted to say, the less popular institution of the workhouse. It was impossible for them to discover the causes that made for success or failure, and those present who had succeeded must very often wonder why they had done so, and must sometimes, in a cynical mood, think that the public taste was very incapable of proper discrimination. They must feel that there were many of the acquaintances of their youth who were really much better fellows and who could do much better work in a great many ways, but who, somehow or other, had not succeeded, and who, it was felt, might have succeeded if they had had their due. In all classes and in every pursuit they had the same feelings, but it had to be admitted that to artists those considerations particularly applied. First of all, the artist had to choose his career at a very early period, and he might do so, perhaps, on the inadequate grounds that he had a nice turn for drawing and a keen eye for the beauties of nature and of man. No one could foretell in what direction or to what degree those qualities would develop as he grew older. A poet who failed in outdoing Homer had, at all events, an opportunity of sinking back into a second-rate journalist. An artist was debarred from any such consolation. There was, indeed, very little for an unsuccessful artist to fall back upon. It was true he could do a little in the way of illustrating the daily papers, but not everybody who had art in his soul had capacity for that form of it. The nature of the artist's training was somewhat exclusive, and if he filled a mighty canvas by which he hoped to outlive Titian and did not succeed in that purpose—and he rarely did—the canvas was of no particular use. He could not even scrape the paint off and use it again. If he devised a statue which was to convulse the world, and only succeeded in convulsing the marble of which it was made, he found a hopeless difficulty in disposing of it, because nowadays, as the fashion went, people

did not care to put up statues even in their gardens. The unsuccessful artist could, indeed, fall back on little. It was more and more difficult even to sink back to the comparatively humble position of a teacher of drawing, for South Kensington now produced its young men adapted to that purpose. Nowadays, too, the public taste was so difficult to foresee that no one could venture to say who would be a success or failure. No one could say what would hit the public taste, all was a matter of chance. It was the object of this institution to rescue the unsuccessful artists from the most pitiable distress and to try to tide them over a bad year in the hope that better success might befall them in the future. Last year he saw that nearly 4,000*l.* was raised and spent in the relief of indigent artists. That sum was used for relief in nearly 250 cases. Such a work as that was one upon which they were to be congratulated and of which they might be justly proud.

The Chairman subsequently gave the toast of "The Artistic Societies," Sir E. Poynter, Sir Seymour Haden, Mr. Wimperis, Mr. Wyke Bayliss and Professor Herkomer responding. After the toast of "The Chairman," which was proposed by Lord Davey, Mr. W. Oules, R.A. (honorary treasurer), announced a list of subscriptions and donations amounting to nearly 2,000*l.*

### THE GREEK THEATRE.

AT the Royal Institution, Albemarle Street, on Saturday, Dr. J. P. Mahaffy delivered the second of his course of three lectures on "The Greek Theatre according to Recent Discoveries." A closer examination of the remains of the Athenian theatre discovered in 1862 was entered upon, and the evidences which they afforded of various ages explained. Describing the simple, rude theatre in which the great masterpieces of Æschylus, Sophocles and Euripides were performed, the lecturer remarked that the spectators sat in rising tiers on wooden benches; they had no protection from the sun or rain; the actors and chorus played below them on the orchestra in front of a temporary wooden and painted background. It seemed natural at first sight to suppose that the actors should be in some way separated from the rest and play on a higher level. That some temporary platform was stationed in front of the scene was not impossible, but from the evidence now accumulating very improbable. There were many good reasons for assuming that there was an altar in the centre of the orchestra and that the earliest actors had the altar steps from which to speak. The construction of all Greek theatres, seating spectators round more than a half circle, implied that the main point of interest was not at the chord joining the end of the horseshoe, where a stage might be expected, but well in front of this and on the east of the orchestra. The theatre at Athens was not merely enlarged or improved; it was wholly rebuilt during the fourth century B.C. As regarded the performance, when high tragedy went out of fashion genteel comedy, with its middle-class society, simple appointments and its absence of dramatic excitement took its place. There was the same kind of contrast as between the novels of Miss Austen and Mrs. Gaskell and the romances of Walter Scott and Bulwer Lytton. For these performances there was only required a shallow acting ground with a back scene capable of some small changes. The actors, who at first were only distinguished from the chorus by standing on the steps of the central altar, afterwards assumed high boots, masks and other devices.

### GLASGOW ARCHITECTURAL ASSOCIATION.

AT a meeting of this Association held in the rooms 187 Pitt Street, on Tuesday, the 4th inst., Mr. Geo. S. Hill, vice-president, in the chair, Mr. W. J. Anderson read a paper on the "Acropolis of Athens in the light of Recent Researches." The essayist, in the first place, showed the kinship of the primitive Acropolis of Troy, Tiryns, Mycenæ and Athens, and the indications at Athens of the pre-Homeric era, to be superseded by that of Hellenic Greece. The buildings of this period were severally considered in their purpose: the ancient temple of Athene Polias, the Parthenon of Pericles, the entrance gates of Propylæa, the megaron of Erechtheus, and his museum or heroon. The present aspect of the buildings, their architectural details, and their former magnificence were shown by a large number of lantern views and restorations. On the motion of Mr. Alexander McGibbon, a hearty vote of thanks was accorded to the essayist.

Mr. C. P. Ayres, of Watford, Herts, architect and surveyor, has been elected chairman of the Watford Urban District Council, and has been duly sworn in as a magistrate for the county.



## NOTES AND COMMENTS.

It will be remembered that in April 1895 there was a loss of life and property in the district of Bouzey, department of Vosges, in the east of France, owing to the failure of a reservoir embankment. An inquiry into the question of responsibility has been in progress from that time. The commission considered that a charge of homicide through imprudence could be brought against the engineer-in-chief of the department and three other engineers. The trial is being held at Epinal. The experts are of opinion that the cause of the accident was the defective construction of the embankment; but as the period of three years, which is the limit of responsibility for works of the kind, had elapsed prior to the catastrophe, the contractors could not be held responsible. The engineers, it is thought, should have detected the weakness at an earlier time. In no country is there more careful construction than in England, and yet the destruction of reservoir embankments is not an unknown phenomenon in English engineering. Imperceptible leakage may be weakening a bank or wall for a long period, although supervision is constant.

ALTHOUGH the death of the DUC D'AUMALE was sudden, the Institut de France was prepared for the contingency, having to take possession of Chantilly and its treasures on a short notice. Ten years ago, when the property was offered to the nation, the Conseil d'Etat made it a condition that a detailed inventory should be prepared. That work was done, and it can be tested by the special catalogues of the different departments, which were made out by the prince's officers. A few of his later acquisitions, such as the miniatures by FOUQUET, which cost 12,000*l.*, may have to be added, but that is an easy task. It will be necessary to appoint a staff to take charge of Chantilly. There is little doubt that M. DAUMET, who has had charge of the restoration, will be entrusted with the conservation of the buildings. The authorities will have to consider a problem similar to that now before the committee of inquiry into the adaptation of Sir RICHARD WALLACE'S house. It is not likely that Chantilly will be transformed into a museum, but will be allowed to remain as a château of a remarkable kind. But provision will have to be made for the exhibition of drawings which are now in portfolios, and of bijoux which are in closed cabinets. There may be appointments for scholars in the buildings, but only experts will be able to make the woods and lands yield a profit. It is calculated that 12,000*l.* a year was obtained by the Duc D'AUMALE, and the expenses are not unlikely to need that amount of money.

MANY theories have been formulated to explain the peculiarities of the ancient crosses which are found in Great Britain and Ireland, to which the Isle of Man may be added. The latest was explained in a paper which was read in Edinburgh on Monday by Mr. ROMILLY ALLEN, an archæologist who has devoted much of his attention to the subject. Referring to the peculiar style of decoration of the period known as Celtic, which was by some assumed to have had its origin in Ireland, Mr. ROMILLY ALLEN said it was no doubt true that Celtic art attained its highest excellence in Irish illuminated manuscripts, such as the Books of Kells, Armagh and Durrow; but it was a relevant inquiry to what extent the illuminators were indebted to foreign sources, and whether the similarities of design on the monuments of the eighth to the eleventh centuries in Scotland, Ireland, England and Wales might not be accounted for by development on parallel lines rather than by direct derivation. Instancing a series of rubbings taken by Mr. GRIFFITH-DAVIES from cross-shafts and fragments at Clonmacnoise, which closely resembled the slabs of Perthshire and Forfarshire, he proceeded to point out other resemblances between the Irish and the Scottish monuments generally, alike in their decoration and in the groups of Scriptural figure-subjects which appear on both. The Irish crosses are chiefly found in Leinster and Ulster, and are absent from the counties of Kerry, Cork and Waterford, which contain the ogham-inscribed pillar stones of the earliest Christian period, and the total number of crosses in Ireland, amounting to about fifty, was extremely small as compared with the 300 localities in Scotland, 250 in

England, 40 in Wales and 15 in the Isle of Man that were now on record. The conclusion seemed to be that the pre-Norman crosses of Ireland were later than those of Scotland, England and Wales, and that this phase of early Christian sculpture had its origin in Northumbria. The scrolls of foliage on the Irish crosses and the bird and leaf motives in the Book of Kells indicated Northumbrian influence. Scandinavian influence had not been detected on the Irish crosses, but was found on the metal-work. In conclusion, he considered that the Celtic style was a variety of the Lombardo-Byzantine style, from which its figure subjects, interlaced work, scrolls of foliage and many of its non-descript animals were obviously derived.

THERE can be no doubt that Mr. W. D. CARÖE'S evidence produced an effect on the Select Committee of the House of Commons and aided in enabling the members to arrive at the unanimous conclusion that the preamble of the County Council's Bill, so far as it related to the proposed embankment at Cheyne Walk, was not proved. A petition against the scheme was signed by Sir E. J. POYNTER, Mr. A. WATERHOUSE, Mr. BRITON RIVIÈRE, Professor AITCHISON and other artists. There were two great objections to the Bill. In the first place it introduced the principle of betterment, which cannot be said to have received universal approval; and, secondly, one of the few remaining views in the Metropolis that could be called picturesque was likely to be blotted out. The allegations about the insanitary conditions of the foreshore must also have appeared questionable to the members of the committee. They know that tests have been repeatedly applied, and it still remains uncertain whether there is any increase of danger to life from residence on a river bank. There may be occasionally sights and odours which are disagreeable, but there seems to be compensatory influences which keep the death-rate from increasing.

## ILLUSTRATIONS.

CLARIDGE'S HOTEL.

THIS illustration, which is reproduced from a drawing in the Royal Academy, shows the treatment of parts of the new hotel in Brook Street, the interior being designed by Messrs. ERNEST GEORGE & YEATES. The structure is practically complete, but the lofty ground floor, with its "winter garden" and reception-rooms, has been carried out with iron stanchions and girders, and was left for future development.

The large coffee and dining-rooms, separated by a screen, are to be arcaded, as shown in the drawing, with oak panelling and intarsia up to the springing of the arches. A stone chimney and beamed ceiling of the smoking-room is shown in the drawing.

49 PRINCE'S GATE.

THIS house, which contains the well-known "Peacock Room" adorned by Mr. WHISTLER, has been undergoing changes for Mrs. WATNEY. The drawing shows a range of windows in the music-room, the arcaded treatment giving a deep sill for palms, &c. The woodwork of this room is of walnut.

The oak panelling of the dining-room is also shown, and the fine old leather of the walls.

The hall, with its flatly-carved stone pilasters and intarsia doors, is not here shown, but it is the most important of Messrs. ERNEST GEORGE & YEATES'S late introductions to this house.

The work has been well carried out by Messrs. TROLLOPE & SONS.

VILLAGE OF BUSCOT, BERKS.

A DIFFERENT example of work from the same hands is a "parish-room," cottages and farmhouse, at Buscot, for Mr. ALEXANDER HENDERSON, who is also giving the oak lych-gate to the parish church.

This is part of a group of pleasant stone cottages, with their stone roofs that harmonise with the old work, in a beautiful corner of Berkshire. Mr. BEWLEY, of Lechlade, has carried out these buildings very satisfactorily.

The architects are Messrs. ERNEST GEORGE & YEATES.







The Architect, May 14<sup>th</sup> 1897

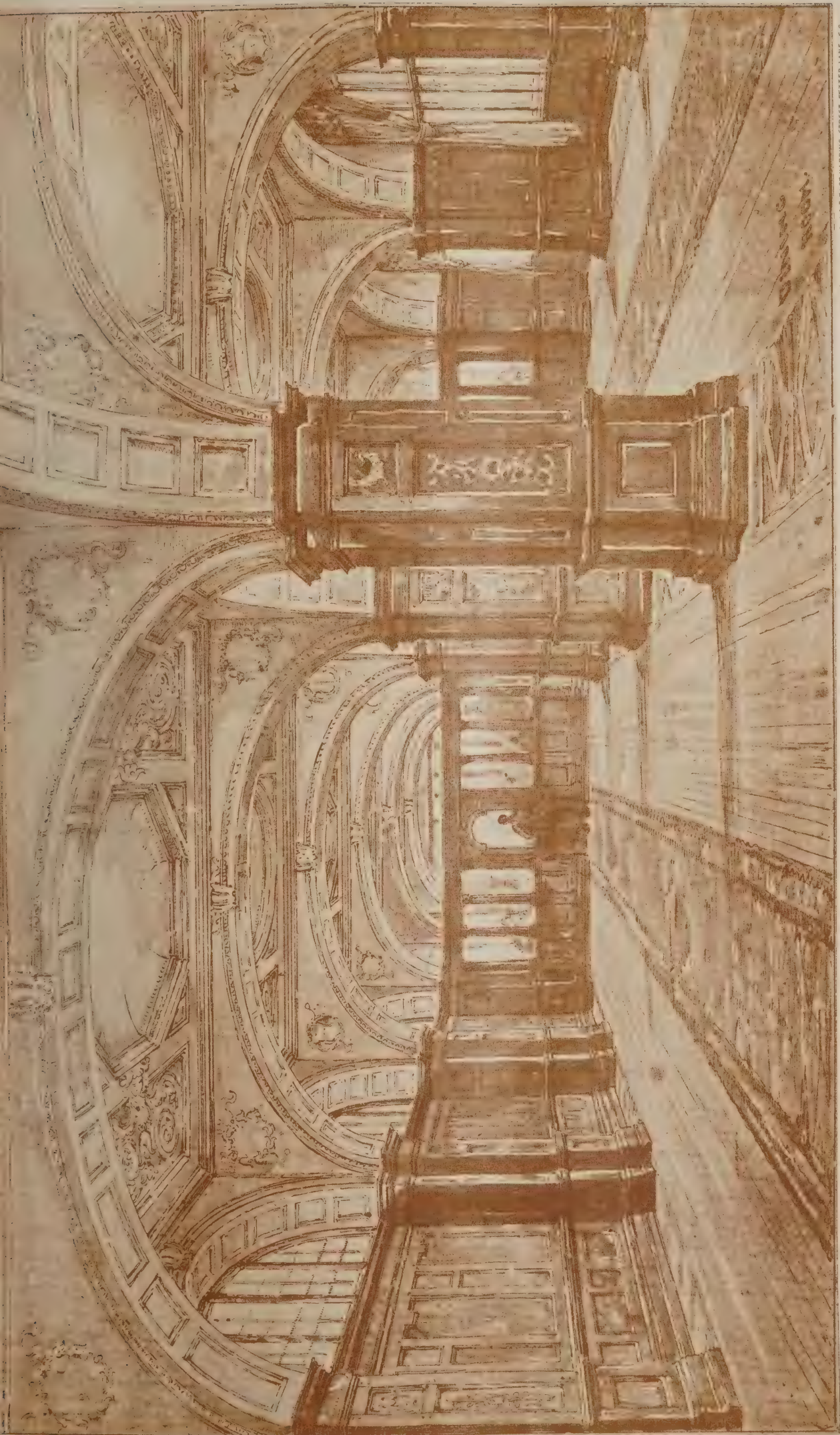


CLARIDGE'S HOTEL,  
THE INTERIOR BY  
ERNEST GEORGE YEATES.



SMOKING ROOM





INK-PHOTO, SPRAGUE & CO. 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.





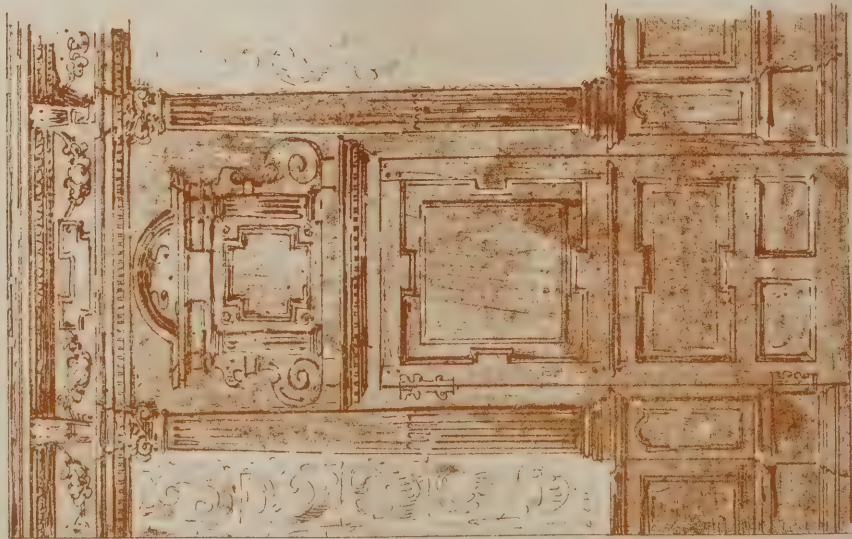




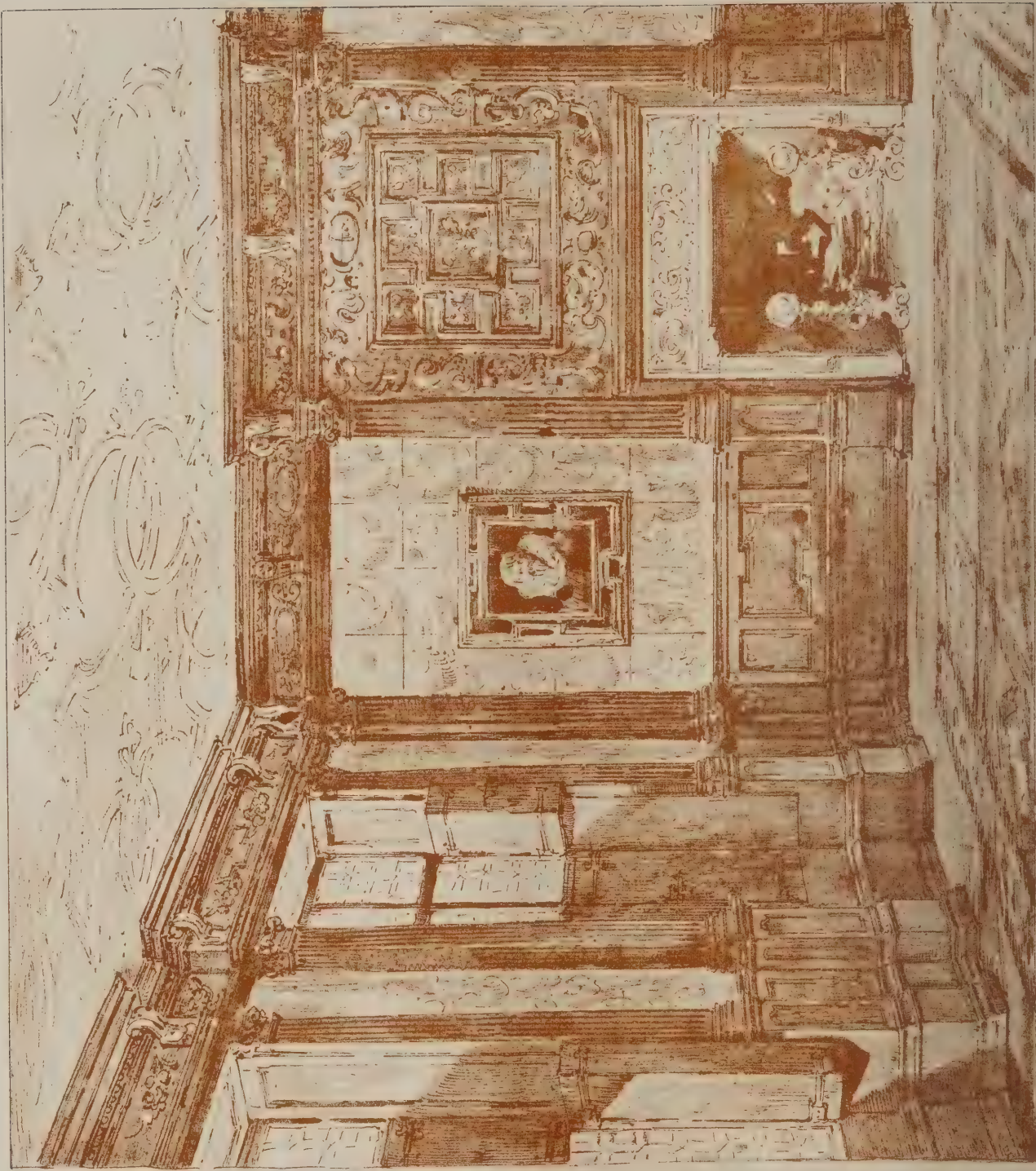


The Architect, May 14<sup>th</sup> 1897

19 PRINCES GATE  
FOR MRS WATNEY.  
ERNEST GEORGE & YEATES  
ARCHITECTS.



THE DINING ROOM







MOORE'S  
MUSEUM  
OF  
WOOD











*The Architect*, May 14<sup>th</sup> 1897.



PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 32.—NORWICH: THE NAVE.



*The Architect*, May 14<sup>th</sup> 1897.



PHOTOGRAPHED BY S. B. SOLAS & CO. 11, LUDGATE HILL, E.C.

INK- PHOTO. SPRAGUE & CO. 4 & 5 EAST HARDING STREET FETTER LANE, E.C.

CATHEDRAL SERIES, No. 33.—NORWICH: THE CHOIR.











IN THE VILLAGE OF  
BUSCOT, BERKS  
FOR ALEXANDER  
HENDERSON ESQ.

ERNEST GEORGE & YEATES  
ARCHITECTS



A SMALL FARM HOUSE.











## NORWICH CATHEDRAL.—II.

THE nave of Norwich Cathedral is divided in its length into fourteen compartments on each side, and built upon as many semicircular arches, of great solidity and depth, and supported by piers of the same description, excepting in two instances, where instead of piers are placed two cylindrical columns of vast thickness, ornamented with spiral flutings, one on each side of the nave and opposite each other. The arches of the nave have a few plain and very bold surfaces, and the outer one of all is adorned with a billet moulding. The triforium is of great and very unusual height; it is composed of arches and piers very similar to those on which they stand, and nearly the same height. This arcade is entirely open, and is not, as is commonly the case, subdivided in each arch by a single pillar supporting two smaller arches within the greater. The outermost surface of the arches is adorned with the zigzag moulding; the arcade above this is unusually low, formed by three semicircular arches, side by side, in each of the compartments of the nave, with very simple mouldings resting on short cylindrical columns, the middle arch being of three times the span of the outer ones, and through which are seen the windows of the clerestory. These windows are plainly the insertion of more modern times; the original window was round-headed, wide, and of one light; the round head has been walled up, and an obtusely pointed arch introduced beneath it, and the window divided into two lights by a plain mullion with corresponding tracery in the head of it. The roof of the nave is magnificent both in its design and extent, for though the choir obtrudes itself into the nave as far as the two first compartments eastward, this arrangement does not interfere with the vaulting, which is seen in all its length from the west window to the central tower. The roof was constructed between 1450 and 1472, during the episcopate of Walter Lyhart, whose rebus is introduced in the work. Had this vaulting been erected a century earlier it might have agreed better with the architecture of the nave, but in itself it is a beautiful work, and rich though it be, and elaborate in its design, it does not injure the effect of the whole. The side aisles of the nave are in their original state; the vaulting of them is plain and ponderous; it is semicircular, without any mouldings, or ribs, or carved keystones.

The transept is intercepted by the choir, which is partly under the central tower and stretches beyond it, as we have before observed, into the nave itself. When the choir screen was altered it would have been better to have removed it to the eastern arch of the tower, that the transept with its lantern might have been seen at once in its length and breadth and in connection with the nave. This portion of the cathedral is also original; it is singular in having no side aisles; it is of good length, rather deficient in breadth, but of the same height with the nave and choir, and like them elegantly and richly vaulted with stone.

The effect of the choir on first entering it is very imposing; coming across the transept, and into the nave, it is of unusual length. The lantern is set upon four semicircular arches with plain mouldings, and supported by four massive piers of the same plain, solid description. The first horizontal compartment above these arches is an arcade of semicircular arches resting on short cylindrical columns, behind which is an open gallery all round the lantern. The next compartment is adorned with a similar arcade, without the accompanying gallery, but it does not extend the whole length of each side, instead of which the spaces on each side of every one of the four arcades are pierced with a circle with a plain moulding round it; the third and highest compartment consists of a lofty arcade with semicircular arches, and of a complicated and curious character. This arcade has also behind it an open gallery all round. Immediately above this is a flat ceiling of stucco-work, with cornice and panels, adorned with wreaths and medallions, very good in its way, but we need hardly say totally out of place here, and spoiling the whole effect of the lantern.

The clerestory of the choir is of a totally different age and style, and yet the effect of the whole is exceedingly good. The windows are pointed, well proportioned of four lights each, with good tracery in their heads. Between the windows on both sides are lofty deep niches feathered and canopied, which doubtless once had statues. From the top of these niches spring the main ribs of the vaulting, which is similar to that of the nave and transept. The windows in the clerestory of the apse are of the same size and character with those on each side of the choir, but they are so close to each other that there is no room for anything between them but a cluster of three slender shafts, on the top of which spring the ribs of the groined roof of the apse, which is well designed and has the most charming effect. Indeed this part of the clerestory is very cleverly set upon the triforium of the apse, which is semicircular, while this is pentagonal. The lofty, wide and open triforium of this cathedral, both in the nave and choir, has a very majestic and imposing effect throughout, but more

especially in the apse where the arches are of less span and nearer together.

The side aisles of the choir are of the same age and style with those of the nave, and vaulted in the same plain and ponderous manner. In the side aisle to the south is the entrance into what was Bishop Beauchamp's chapel, a small oblong room with, groined roof, and a large window of decorated character opposite the entrance. A little further on at the south-western extremity of the apse is the entrance into what was St. Luke's Chapel. At the north-western extremity of the apse is placed the entrance to another chapel very similar to that of St. Luke, and dedicated to our Saviour, and in the middle of it is the tomb of Sir Thomas Windham.

## VILLAGE CHURCHES.

THE following paper was written by the late G. G. Scott, M.A., many years ago, and must now have some interest as an exposition of his principles respecting one important class of buildings:—

There is, as far as I know, no country in Europe where the village has retained so much of its primitive importance as England. Nowhere has the influence of the great towns been, until quite recently, so little felt. The Englishman is, after all, essentially a countryman, and country life is not more the birthright of the gentleman than it is the aspiration of the successful man of business. It is not, therefore, unnatural that our village churches should be the especial pride of our national architecture. Our cathedrals, with some noble exceptions, are surpassed by the great churches of continental cities. Our abbeys themselves, centres of agricultural life, which were once the glory of England, have passed away; but the village churches still remain, so far, at least, as the hand of the restorer has spared them, as the finest monuments of the architectural genius and the practical piety of the past generations of Englishmen.

The village is, next to the family, the simplest and least artificial of all the forms of social organisation, and it has continued through all the changes which religion and politics have undergone in the main unchanged.

It still consists essentially of the same elements which constituted the little primitive community from which it takes its origin, and it forms to this day, as it did at the first, the unit of all political association.

The village church has besides a peculiar interest of its own. It is the only public building which a village, as a rule, possesses. It is the central point of the common life, the building which typifies the oneness of the little community. Cities have beside their great churches or their cathedral, their town halls, their market halls, their assize courts, their theatres, all connected in different ways with the common life to which they minister and which they symbolise; but the village has only its church and its churchyard. Here alone all meet on equal terms and with an equal right, as members of one little society of which the church forms naturally the centre.

## The Site.

These reflections may serve to invest our subject with a proper dignity. They are considerations which were never absent from the minds of those who first founded and erected our ancient parish churches. They are not always, I regret to say, so prominently in the minds of their successors; and this will lead us at once to a consideration of a very practical character, and one which is too much overlooked—I mean the great importance of the choice of site. The old builders placed their churches with wonderful skill. In the flattest, the least accentuated country, they always succeeded in giving their building something of character and importance from a judicious selection of the ground. They almost always found some little knoll, some slight elevation, which might give to the church an advantage worthy of its character and impart a certain amount of dignity to the simplest erection. This point is far too much neglected now. As a rule the architect, the man who ought to be able to judge of such matters, is not called in until the site has been secured, and he has then to make the best he can of it. The site is too often some useless corner which can be bought cheap or be presented without sacrifice. The architects, too, I am bound to say, fall in only too readily with such a system, and design their buildings as if every site was an absolute plane. Should the site possess a decided slope or any marked configuration, it is specified that the earth is to be removed from the elevated portions and deposited to fill up the lower ground. The building so erected has the effect of a toy church set down upon a little tray prepared for it. You feel that the designer would have set it down upon the level if he could, or you may very easily fancy that the whole thing has been bought as it stands from a wholesale dealer in ready-made churches.



The look of an old village church is something quite different; the building and the site here belong to each other, the church seems to grow upon the hill side or the knoll, grasping, as it were, the ground with its great buttresses, like the spreading roots of an old tree. You could not readily imagine it on any other site; it belongs to the place just as much as the aged yews which grow beside it. Much may be done by help of a well-chosen site, even with a poor building, and this is one point which I would urge especially upon those who do me the favour to listen to me to-day, because the choice of site rests in most cases with the promoters of church building, with the clergy and gentry, rather than with the architect. It is perfectly astonishing what a difference may be made by a judicious choice of site in the effect which a building will produce, and in no case is this so important as in village churches, where we have no imposing dimensions to give dignity of themselves, and where, nevertheless, the importance of the building, as the centre of the whole village, renders it necessary to give to it the utmost accentuation that we can.

#### *The Tower.*

From the same point of view the position of the tower is the next most important point. It may be broadly stated that almost all ancient towers are placed in the centre line of the church, almost all the modern ones at the side. It is quite an exception to see an ancient tower which does not stand either in the centre of the crossing or in the centre of the west front; it is quite an exception to see a modern tower which does not stand somewhere at the side of the chancel. The tower of a new church seems to be placed in some corner which is wanted for nothing else, as a pendant on plan to an organ-chamber or a heating apparatus. Of all positions for a tower, next to that of a proper central tower, the west-end position is the noblest; it has even some advantages over the central position, especially in the case of a small tower. I cannot conceive why a plan which gives dignity to the smallest church should have been so generally abandoned. I think that the centre of the west front might well be assumed as the normal position for the tower, only to be departed from where there is some manifest reason for doing so, founded on peculiarities of site, or some very special practical convenience. A west-end tower is comparatively easy to design; a west end without a tower is always difficult. It demands a great west window, and this floods the church with such a quantity of afternoon sunshine as no stained-glass can control. A central tower placed at the intersection of the transepts is seldom advisable in a village church, except where, from some peculiar circumstances, the monumental character takes precedence of the practical consideration of convenience. Yet that form of it which is frequently found in Normandy, where the tower stands over the chancel and the sanctuary proper lies east of it, is often very suitable and is always beautiful, if only one point be attended to—the eastern limb must not be too short. Indeed, our sanctuaries are generally made too short; they are too often cramped to the minimum which the bare necessities of administering the communion require, and even so the clergy, if there are several, have often great difficulty in avoiding an unseemly jostling. This and many other faults of our modern churches are encouraged, I am sorry to say, by the church building societies, and until they alter their system and give their grants on the total area of the churches, instead of on the number of fixed pews which can be squeezed into them, it is, I fear, useless to preach improvement in this respect. It is none the less our duty, as architects, to protest against a system to which, more perhaps than to anything else, the unsatisfactory character of our new churches is to be attributed.

#### *The Chancel.*

It may be laid down as a general rule that our modern chancels are too short for a well-proportioned architectural effect, as well as for the proper performance of the ceremonies, and it is certainly the worst possible policy to curtail them still further both in appearance and in actual area by adopting what is called the apsidal termination. I should be the last to deny the marvellous beauty of a complete chevet, with its procession path sweeping round it, and its radiating chapels leading up to a fine climax in the lady chapel. But there are several things to be borne in mind when one comes to the question of small apses. One is the great difficulty of roofing them satisfactorily. They really require groining. I do not think that even those French ones which have timber roofs are ever quite pleasing, and the attempts which have been made to accommodate English types of roofing to apses are, in my opinion, great failures. Then, again, you require very much greater height to give dignity to the interior. The great east windows of our English type may spring at the level of the roof eaves, and sweep up boldly into the gable; the highest point of the windows of the apse must be some way below the eaves. Unless, therefore, the height is very much greater, the effect has nothing like the dignity of the square end. The internal appearance, too, is always meagre where the light is admitted,

as it is necessarily in an apse with a wooden roof at a much lower level than that of the highest part of the interior. I know that considerations of artistic effect weigh but little with architects, who are thinking of the graceful sweep of their compasses upon the plan, and clients to whose ears "apse" and "apsidal" have a pretty ecclesiastical jingle; but I think the fact that you require greater height, and therefore greater expense, to produce an equal result ought at least to appeal to our common sense. It should further be remembered that in an apsidal chancel the apse must be in addition to the length, not in deduction of it. The chancel should most certainly be as long as a square-ended one, with the apse additional.

This follows clearly from the admitted principle that the altar should stand on the chord of the apse, and not against its circumference. Nothing, indeed, can well be more awkward than an altar placed up against a curved wall, giving the appearance of an afterthought clumsily introduced. Nothing can be much worse than this, while, on the other hand, nothing in its way is more dignified than the altar standing free upon the chord; but this, as I have said, renders it necessary to treat the apse as additional to the length which is required by a square-ended chancel. The continental apses are always so planned, and the neglect of this obvious principle is one cause of the inferiority of our recent attempts in this line to their foreign models. Only observe that here, too, as in the matter of height you must have more length and more expense to produce an equal result. The apse ordinarily used in our small modern churches may be described as an expensive method of producing a poor effect.

The square east end is the most marked peculiarity of our national church architecture. It is a tradition venerable, both from its antiquity and its singularity. It may almost be said that there are no square-ended churches except in Great Britain and Ireland, and none but square-ended churches here. The number of churches with square east ends throughout the whole of Christendom (excepting the British Isles) is exceedingly small. It is this fact that gives to the universal prevalence of this type in our own country its especial and unique importance. The tradition is carried back to a date earlier than the Middle Ages, by the small churches or oratories of Ireland, and the supposed British church of Peranzabulee. I think that the prevalence in these isles at that early date of a type of church different in a most significant manner from the types prevailing both in the Latin and Greek communions, is a most singular fact. It is the more remarkable when we consider to what a great extent the existing Christianity of England is due directly to the labours of Latin missionaries, who brought with them, as we know by the accounts of the first cathedral erected at Canterbury, the basilican plan with its apsidal end.

From the chapel at Peranzabulee, and from the square-ended early Irish churches, which, whatever be their date, certainly show little or nothing of the Latin influences, I think we must infer that the square east end was the prevalent type in these islands before the overthrow of British Christianity by the Saxons. We may conclude from this, as from other reasons, that British Christianity was not so utterly enfeebled as has often been represented, and that its own peculiar traditions survived and leavened to a considerable extent the great revival which the Latin missionaries effected. The square end tradition had a second great struggle for existence at the Conquest. The Normans naturally introduced the continental fashion, a fashion which the Confessor had already followed at Westminster Abbey. I think it probable that most of the Saxon churches which have apses date from his reign. The apse became almost everywhere the rule as long as the influence of the Norman clergy and nobility remained fresh and distinct; but no sooner had the conquerors begun to coalesce with the conquered, and the conquest become gradually tided over, than the square east end began slowly but steadily to gain upon its rival. By the thirteenth century its triumph was complete, and although we have in Westminster Abbey one of the most complete and beautiful specimens of the type in Christendom, the circumstance of its rebuilding and the French tastes of King Henry, render it clearly an exceptional case. It is a curious fact that the language spoken in that monastery was, as Abbot Ware tells us in his Customal, neither Latin nor English, but French.

A tradition so ancient and so remarkable, one peculiar to our branch of the Catholic Church, and connected in all probability with its very earliest origin, is deserving surely of all respect, and ought not to be abandoned to a mere feverish craving after novelty, or to the affectations of a travelled dilettanteism.

#### *Chancel Screens.*

Upon the same principle on which I have attempted to defend the square east end, I shall also venture to say a few words in favour of the high chancel screen. This essential feature of a Mediæval church cannot indeed be claimed as exclusively English; but we may boldly state that no Church



in Christendom has sustained the tradition so steadily and so continuously as the Anglican. It is a very curious fact that while at the Reformation the rood-loft—those galleries which spanned the chancel arches of the greater part of our churches—were destroyed, with the roods which surmounted them, especial care seems to have been taken to preserve the screen itself. This is, in itself, an interesting fact, as showing how orderly and methodical, as a rule, was the work of the Reformation, as compared with the Deformation carried out by the Puritans of the next century. Not only were the existing high screens carefully preserved, but many new ones were erected during the reigns of Elizabeth, James, and Charles I. A complete list of these does not, as far as I know, exist, and its want is to be regretted, as their erection throws great light upon the tone and character of the English Reformation. A learned living prelate upon one occasion stated to me, not I hope *ex cathedra*, that the use of a chancel arch was to distinguish exactly that part of the fabric of a church for the repairs of which the holder of the great tithes was responsible. I can hardly believe that this purpose alone will account for the erection of those rich Elizabethan and Jacobean screens which are the ornaments of not a few of our old churches. I do not believe that the spirit which could inspire such admirable work was of this dry practical kind. I think rather that the notion embodied in the rubric, "The chancels shall remain as they have done in times past," was a real and living principle. It has borne good fruit even in dry and sterile days, and in these more favoured times may be expected to blossom again with a renewed vigour. A tradition which has lived through the eighteenth century and produced many fine works, even in those dark days, ought not to be abandoned thoughtlessly and from mere caprice.

There are two distinct types of church arrangement answering to the two modes in which, in an ecclesiastical point of view, the eucharistic rite has been regarded. The one is primitive and Mediæval, the other is modern and Roman. The early and Mediæval idea is to withdraw the mysteries more or less from too curious eyes. The modern to parade them boldly before all. In the primitive church the altar was surmounted by a baldachin, the whole intention of which was to support curtains somewhat in the manner, if I may be excused the comparison, of a four-post bedstead, by which the act of consecration might be shrouded from the eyes of the faithful. The Eastern Church, so tenacious of early customs that it may be said even to exaggerate them, conceals the whole action by a solid iconostasis. The Mediæval ritualists, upon a similar principle, placed the altar withdrawn at the extremity of a long chancel, the entrance to which was fenced by a lofty lattice, which we call the high screen. It can, I think, hardly be questioned that this tradition has had an exceedingly strong influence upon the feelings of English churchmen, and it is still, in spite of vigorous attempts to supplant it by a newer development, the most firmly rooted and the deepest.

It ought at any rate to be clearly understood that the principle of screens is of the essence of Mediæval church architecture. Pugin somewhere lays it down that the man who says he likes Gothic architecture and does not approve of high screens is simply a liar. The expression is forcible, but true.

The whole notion of a Mediæval interior is that every vista should be broken up. You ought never to be able to see from end to end of a Gothic church. It is the greatest mistake in the world to throw our long churches open from end to end. The very effect that the old architects aimed at producing was to make you wish to see it all open, to stimulate imagination; but they knew very well the old truth that the half is better than the whole. The effect which a Mediæval interior is designed to produce may be compared to a sunset seen through trees; the glory of it makes you wish the trees away, and you hasten forward through the copse that you may gain the open and see the whole unbroken expanse of sky; but the effect is not what you expected; it has a charm, but it is not the same. You have gained a quiet placid enjoyment, but you have lost the keen, intense, exciting pleasure of the first view. In gaining a new delight you have lost the first, and perhaps the higher joy—you have, in fact, exchanged the Mediæval effect for the Classical. Now I might fairly plead that, if we are to build Gothic churches, we should build them on Mediæval principles, and should not attempt to confuse the characteristics of the two opposed poles of art. I might appeal to the many attempts which have been made to reconcile the two, and to their failure, but I prefer to take higher ground, and to rely upon the traditions of the English Church, in spite of its reformation. Perhaps because of it the English Church is the most Mediæval of all the Western Churches.

Dr. Neale has remarked in one of his essays that in no church in Christendom are the Mediæval offices so generally kept up. Nowhere else are so many hour services, essentially Mediæval, and even monastic in their origin, recited publicly as in England. One may add that, upon the whole, nowhere else have the choral arrangements of chancels been so carefully

preserved, through generations of opposition and indifference, as among ourselves, and it would be a matter of deep regret if traditions which have survived through years of general neglect and disuse should be abandoned in the turmoil and excitement of an almost unprecedented revival.

I do not, however, wish to lay down a rigorous rule, either as to the exclusion of apses or as to the absolute necessity of the high screen. There are, no doubt, cases in which an apse may be allowable enough, and we have in England, even in the advanced periods of Gothic architecture, many beautiful examples. I may mention Madely in Herefordshire, the Priory of Winchester, the chapel of the Holy Ghost at Basingstoke, and that of the Vine in the same neighbourhood. The High Church at Stirling is another example upon a larger scale. In most of these, however, the native love of the east window shows itself in the greater size of the eastern face of the apse, which allows of the insertion of a central window larger than those of the sides. These examples are very well deserving of study, and in exceptional cases may serve as models. In the same way, as regards screens, there are exceptions from the general rule; there are instances of low screens in some of our ancient churches, as at Nantwich, in Cheshire, and Chipping Norton, in Oxfordshire. In refitting an old church the high screen is, no doubt, more imperatively required than in a new building. In a new church convenience may often be allowed to override tradition.

There would be less objection artistically to a low screen if we were allowed to erect above it a rood-beam and a rood. By itself a low screen looks insignificant and wanting in dignity, and is but a very poor and enfeebled descendant of the iconostasis and the jubé. There is no doubt the chancel screens had, in all ages, a practical purpose—the protection of the chancel from thoughtless or profane intrusion. This, too, was the purpose of the introduction, under Archbishop Laud, of altar rails and gates. These were ordered to be sufficiently close to prevent the entrance into the sanctuary of dogs, which, if we may judge by pictures, were as frequently to be seen in English churches as they still are in some Highland kirks. We have almost abandoned the use of close and gated altar rails, and no one will regret the change, but this makes it only the more necessary to have an effectual fence at the chancel arch. It is not seemly to see, as one often does, the sanctuary invaded by a party of ladies and gentlemen, however ecclesiastical, criticising the reredos and handling curiously the embroidery of the frontal—bringing to mind the line which ends "where angels fear to tread." And the necessity of a proper fence to the chancel will become more felt as our churches become more used. I hope the day is not very far distant when it will be quite the exception to find a parish church locked up.

It is told of Thomas à Becket that when he was withdrawing into his cathedral, followed by the murderous band, the clang of whose armour was audible along the cloisters, a monk who was with him closed the door by which the Archbishop had entered the church and began to lock and bar it. St. Thomas stopped him at once. "The church," said he, "is not a castle; it shall never be barred upon my account," and ordered the bolts to be unfastened. Upon what trivial grounds, for what paltry considerations is that too generally done now which St. Thomas even in the extreme necessity of self-defence forbade. It is pleasing to observe that the number of churches, even in the country, which are habitually kept open is everywhere upon the increase, but it is certainly undesirable to leave the chancel and sanctuary wholly unprotected from careless intrusion or even worse. It is further to be hoped that the naves of churches may be made more and more serviceable for other purposes than those of direct worship. I was present upon one occasion at a missionary meeting held in the nave of Ely Cathedral. Everyone present must have felt that the surroundings gave a tone of dignity to the assembly, which a concert hall or the ball-room of an hotel would not have supplied, and if the education of this country should unfortunately become separated altogether from any true religious teaching, I do not think that anywhere else so well as in the naves of our churches could the children be assembled for that definitely Christian instruction which the public schools had ceased to supply. The influence of the place would go a long way to take off from the dryness of school work, and would be the best set-off against the disadvantage of the divorce of secular and religious education.

It is not at all uncommon in France and Italy to see churches so used. I remember seeing at Milan a very fine church occupied entirely on the Sunday afternoon by what we should call the Sunday school. The aisles were left open as usual, but the whole of the nave, which was very large, was curtained off into many compartments, which formed, in fact, separate classrooms. Under such circumstances it would be very necessary to keep the chancel and sanctuary distinct from the nave, and protected by effective and not merely symbolical cancelli.

In planning a new church the utmost freedom will properly



be allowed in the choice of the type which may be adopted, even to the extent of a rather wide departure from any of the ancient models, wherever new circumstances suggest new arrangements; for it is not so much the forms of our ancient architecture which we should seek to revive as its spirit. The one belongs to the age which produced it; the other is more or less for all time. We cannot, however, forego a careful study of our ancient models, a study to which the judicious architect will recur again and again to refresh the first keen impressions, which else, from contact with prevailing commonplace, become deadened and lost, and it is greatly to be regretted that the attention which is bestowed upon our old architecture is limited too often to a mere study of details. Sections of mouldings and patterns of traceries are noted down with some care and with some approach to correctness, but we do not, as a rule, take half enough account of the general scheme of design, of the distribution of the plan and of the general proportions. The consequence is that not only is it impossible to mistake, even at a distance, a new church for an old one—this, indeed, is not to be desired—but there is too often nothing at all akin to the effect of a Mediæval church, nothing of the spirit of the old work, nothing of that masterly power of outline, and that full and satisfying sense of proportion which even more than the details charm us in our old buildings. It is curious that some of the earliest works of the Gothic revival have much more of this quality than their more correct successors. With details which are often beneath criticism, some of these early attempts show an insight into the essential principles of Gothic design which is rarely seen now, and produce at a distance a much more satisfactory effect than many buildings of greater knowledge and of more pretension. Not to speak of such works as the towers of St. Peter's, Cornhill, and that of the parish church at Warwick, Highgate Church, and St. Luke's, Chelsea, may be instanced as good examples of what proportion and outline can do, unaided by any beauty or correctness of detail. I am afraid that the falling-off in this respect is to be attributed to some extent to Mr. Ruskin's architectural works, as well as to the unfortunate fashion which has introduced among us so many spurious imitations of French and even Italian Gothic. However this may be, I feel certain that much would be learnt from the intelligent study of the plans and proportions of our old churches, and that until the same attention is paid to the higher qualities of our Mediæval architecture which has been bestowed upon its smaller details, little advance will be made.

It must, I think, be admitted that the later styles show more power of dealing with proportion and mass than do the earlier, and perhaps purer, varieties; and this is especially true of small buildings such as are most of the country churches. With all the high qualities which the thirteenth-century work undoubtedly possesses, I still think that the style shows to the best advantage in buildings of a considerable scale, and that in smaller churches the later styles compare advantageously with those of the previous centuries. There is generally more facility and freedom in planning, a more artistic distribution of parts, and above all a greater economy of means. The early styles are rather wasteful; they require very massive walls. It is quite impossible, as sad experience has shown us, to get the effect of early work with the shallowness which a reasonable economy generally necessitates. As the style developed the architects gradually learned how to produce fine effects with more moderate means. Their work became more scientific, and a skilful adjustment of thrusts and counterpoises enabled them to produce effects of wonderful elegance and beauty, showing great engineering knowledge and clever economy of materials. I must say it is rather affectation to close our eyes to the real progress thus made, the more so as the conditions under which the later architects worked are so very much more parallel to those of our own day than were those of their predecessors.

In the smaller churches, especially, we see in the more developed style a wonderful advance in the power of producing fine effects with small means. The great development of the clerestory shows a thorough grasp of the true principles of internal effect. Take an ordinary early church with lean-to aisles of no great height, and a high-pitched nave roof springing from directly above the side arcades. The result of this arrangement is that the light which is admitted almost entirely from the aisle windows enters at a comparatively low level, much below that of the roofs, and strikes upwards, a distribution quite inconsistent with a dignified internal effect. Such an interior, however large its scale, and however great its beauties of detail, must always have a somewhat unimpressive and homely character. The later architects, with a true perception and a real grasp of the matter, felt this very clearly, and what did they do? They carried up the nave walls as high, perhaps, as the ridge of the early roof, pierced them with windows to the utmost possible extent, and placed upon them a roof either flat, or of a very moderate pitch. The new windows they filled with glass of a beautiful silvery tone, treated with great breadth of effect in point of colour, and with a very large proportion of white. The principle of lighting is now reversed. A vast body of softly toned white admitted from above gives an

effect at once of dignity and of space, and with no very great addition to the cubical contents of the building, the whole tone is raised from one of mere simple homeliness to a character that is impressive and even stately. Indeed a flat roof, which it is the fashion to decry, has internally one of the great advantages which groined vaulting possesses, in that it enables the windows to run up to a level very little below that of the highest part of the interior, so that the whole building is lighted from above—a point of the highest importance in internal design.

In looking at an old church as it now stands we are too apt to think of it as made up of portions of different dates incongruously put together, and as owing that beauty of effect as a whole, which beyond all question it possesses, to chance and happy accident. We forget that in the vast majority of instances it was the later architects who deliberately impressed upon the building the character which now especially distinguishes it, that the church as it stands owes to them its general outline and proportion, and that unity of effect which makes it, in spite of all its varieties of style, a complete and satisfactory whole. The changes they made were done deliberately with the object of producing that result which, in spite of all our theories, we instinctively admire, and the fact that the earlier work which they retained, so far from producing incongruity, concords so well with all the rest only shows how thoroughly the later artists understood their work, how well they had mastered the problem of reconciling new with old, and multiplicity with unity, and of subordinating the variety of the parts to the harmony of the whole. Whatever style we may think well to adopt, these lessons ought not to be neglected.

There are, indeed, many early examples in which the same principles have been grasped. We often find, even in country churches of Decorated date, finely-developed clerestories, and it is by no means necessary to adopt a later style in order to profit by the experience of the later architects. Let us aim not at a mere antiquarian reproduction of any one period, but at a rational use of the best qualities of each. We shall then have art instead of dilettanteism, and architecture in place of archaeology.

#### STATELY SYDNEY.

A CORRESPONDENT of the *Scotsman*, writing from Sydney, N.S.W., on March 4, says:—

Stately Sydney sits enthroned on swelling hills by the margin of her lovely harbour. She extends her beautiful arms over every promontory and island in the sea before her. She is not a city of palaces, but she is a city of stately buildings. Looked at from the sea, she seems to rise up in clear perspective into the far distance. Red roofs alternate with the darker slate, and white buildings are scattered in all directions. When you enter her streets you find massive stone erections of all orders of architecture, but all in good taste. She has provided herself with splendid Government buildings, though they are not capable of accommodating all the departments of the administration. Some of these departments are housed in buildings scarcely less fine than the Government buildings themselves. Thus the Lands Department has a magnificent house of its own, while smaller divisions of the Government are housed in smaller houses grouped about the main buildings. From the windows of the Government buildings a magnificent panorama presents itself. Government House, which is the lodging of the Governor for the time being, is a fine picturesque building embosomed in trees on a point extending out into the harbour. The grounds adjoin the Botanic Gardens—perhaps the finest gardens of the kind I have ever seen. The Domain, so-called, extends in broad acres from the gardens still more to the right. All this can be seen from the windows of the Government buildings. Of course, there are glimpses of the harbour at every turn. Its blue waters seem to intrude themselves into the green leafage of the land. Not far away North Sydney is to be seen, and further away you catch glimpses of Manly and other suburbs of the great city itself. Everywhere there is evidence of the care and forethought of those who have had the planning of the city and of those who have its custody. Its municipal building might be taken as a model for a similar building in Edinburgh. It would not in any way disgrace your classic city, while it would afford to the municipal authorities ample room for the performance of their arduous duties. One of the features of this municipal building is a fine hall, into which as many as 6,000 persons have been gathered. A splendid organ is placed in it, said to be the largest in the world. In fulness of tone, in softness, in delicacy, in all that goes to make one of the noblest of musical instruments, it can scarcely be rivalled.

Close by the municipal buildings there has arisen a huge edifice in which the beautiful and the ugly are combined in the strangest fashion. It is intended for public markets. It might be a palace for a king. It would be difficult to say what is the precise order of architecture adopted, but the effect is excellent until you get to the roof. Upon this huge copper or brass



cupolas, something of a Moorish character, have been erected, and they seem to give an incongruous character to the whole edifice. The Post Office, again, is an extremely fine building standing well out, and affording ready access to all the departments of the business that has to be performed. One feature, interesting to a certain extent in connection with the buildings in Sydney, is the number of fine edifices that have been erected by the Roman Catholics. They are to be seen in all directions. Cardinal Moran lives himself at Manly in a huge building which is at once a palace and an educational institution. A great cathedral is rising in the centre of the city. Churches are found in all directions. Educational colleges are studded here and there—one of them forms an outlying adjunct of the University. Not only have public bodies erected fine houses for themselves and their businesses; commercial men have followed in their wake or have led the way. In every direction you find great warehouses, all built with regard to picturesqueness, and of more or less architectural excellence. The general effect is to give to Sydney a stateliness which can be equalled by few cities in the world.

But the chief glory of Sydney is the number and extent of its open places. In every public garden statues are found. They are replicas of more or less well-known pieces. They, again, afford ample evidence of the excellence of the climate and the absence of that dreary smoke which disfigures statues in London and Edinburgh and in every town in the United Kingdom. Being made of plaster, the expectation might be that they would become grimy and perhaps grotesque in their out-of-door appearance. They are nothing of the kind. They are perfectly white and clean, and look for the most part as if they had just come out of the sculptor's studio. The Governors of Sydney have thus had regard not only for the health and welfare of the people in providing great public open spaces; they have done something and not a little to cultivate the taste of the people by the artistic adornment of these places.

In furtherance of this part of their work they have erected in the Domain a spacious art gallery. It has in it many pictures of great and well-known excellence. It is admirably arranged and there is space in it for far more objects of art than it yet contains. In the course of a comparatively short time it need not be doubted the munificence of Sydney citizens and the Government will add to its art treasures and make it one of the finest galleries in the southern hemisphere. At present it is enriched by loan collections from South Australia and Victoria and other parts of Australasia.

It would be a misuse of language to say that the Houses of Parliament at Sydney are fine buildings. They were erected many years ago when money was not plentiful and wood was. Thus they are still of wood, and they seem to be altogether out of harmony with their surroundings. They face one of the finest streets in the world except Princes Street—Macquarie Street. There is talk of a proposal to erect new Houses of Parliament, and there need be no difficulty in crediting the rumour, for the public spirit of New South Wales men could not be content that their legislators should be housed in so comparatively insignificant a building as the one now at their command. It may be that the erection of a new building will be delayed or the plans in connection with it altered because of federation, which seems to be coming to the Australian colonies. Be that as it may, it is certain that the people of New South Wales will not be content to go on with wooden Parliament Houses having no pretensions to architectural excellence.

## THE COMPLETION OF SOUTH KENSINGTON MUSEUM.

THE following memorial has been addressed to Sir John Gorst on the subject of the South Kensington Museum:—To the Right Hon. Sir John Gorst, Q.C., M.P., Vice-President of the Committee of Council on Education.

We, the undersigned, practising various branches of the arts as a profession, seeing that a committee of the House of Commons, of which you are chairman, has been appointed to report on the South Kensington Museum, venture to address this memorial to you, trusting that you will bring it before that committee, and also that, as the Minister responsible in the House of Commons for the Museum, you will use your influence to give effect to our prayer.

The South Kensington Museum was founded in order that "all classes might be induced to investigate those common principles of taste which may be traced in the works of excellence of all ages." The extent to which it has stimulated an interest and educated opinion in art matters in this country, and the profound impression it has made on the progress and revival of what may be termed the industrial arts, is well known and acknowledged by all those in a position to judge, not only in this country, but on the Continent and America, where the South Kensington Museum has been avowedly taken as a pattern on which to found various national museums.

The extraordinarily valuable collections, which have been enriched by gifts and bequests valued many years ago at more than 1,000,000/., cannot, however, be properly arranged or seen, much less studied, owing to want of space; while the external appearance of the museum is a discredit to the nation.

We, your memorialists, therefore earnestly pray that active steps may be taken by Parliament to complete the building; and we share the opinion already expressed that no more fitting national memorial of the 60th anniversary of the accession to the throne of Her Most Gracious Majesty could be made than the completion of a museum which owed its existence to her Royal Consort, and which Her Majesty has declared that she has taken under "her special and personal protection."

Edward J. Poynter, H. H. Armstead, Edward Burne-Jones, Walter Crane, Kate Perugini, C. E. Perugini, W. Holman Hunt, W. B. Richmond, Laura T. Alma-Tadema, L. Alma-Tadema, Frank Dicksee, James C. Hook, Hamo Thornycroft, Henry T. Wells, Val C. Prinsep, John S. Sargent, David Murray, Hubert Herkomer, Briton Rivière, Luke Fildes, George J. Frampton, Geo. H. Boughton, Arthur Hacker, Ernest A. Waterlow, B. W. Leader, Jas. Sant, J. W. Waterhouse, John L. Pearson, J. McWhirter, Andrew L. Gow, John Brett, Peter Graham, Henry Woods, George Aitchison, W. L. Wyllie, E. Onslow Ford, Thomas G. Jackson, Stanhope A. Forbes, Alfred Parsons, H. S. Marks, Marcus Stone, Thomas Brock, Seymour Lucas, Edwin A. Abbey, Colin Hunter, J. W. North, Edward J. Gregory, G. D. Leslie, Alfred East, C. E. Hallé, Arthur Lucas, Edgar Barclay, G. P. Jacob Hood, Moffat Lindner, Robt. W. Allan, C. Napier Hemy, Arthur Melville, Henry S. Tuke, W. Graham Robertson, Feodora Gleichen, Philip Burne-Jones, Edwin A. Ward, G. F. Watts, John Parker, J. L. Pickering, Thorne Waite, J. Coutts Michie, Annie L. Swynnerton, Elinor Hallé, Frank Dillon, Herbert A. Olivier, Charles W. Wyllie, Philip Norman, Edward Stott.

A memorial to the same effect was addressed by the same signatories to the Duke of Devonshire. This contained an additional suggestion, namely, that the completed buildings should be "hereafter named the Victorian Museum."

## PYRAMIDS AND THEIR RELATION TO MONUMENTAL AND SACRED ARCHITECTURE.\*

MY first subject will be the pyramids of Egypt, second the pyramids or teocalli of Mexico and Central America, and last the pyramidal shaped temples of India.

There is no doubt as to the intended use of the pyramids of Egypt. They were strictly monumental, and were erected as a place of deposit for the remains of the person for whom they were built. The theories that they were astronomical monuments, or large storehouses, or memorials of a system of weights and measures intended to be universal, as claimed by some writers on the subject, are not supported by the accounts of the ancients or by the Egyptian inscriptions and other testimony.

The fact that the pyramids are found in the midst of a necropolis, that they contain sarcophagi and mummies, and that the inscriptions on the tombs of many priests mention as a special honour that the deceased officiated at the funeral services held at the pyramids, seem to prove that they are tombs and nothing else. As the Egyptian tombs have always borne one and the same character, and only the manner in which they were adorned varied with the tastes of the period, their epoch may be determined with great certainty.

For the first eleven dynasties, or previous to 3,000 years before Christ, the tombs were in the form of a "mastaba," or merely rectangular walls looking like unfinished pyramids, and their interiors were richly decorated with sculptures and paintings referring either to the life of the deceased or to the gods of the current religious system. During the middle empire and until about 1,600 years before Christ, the "mastaba" were superseded by small pyramids and by passages cut in the rocks, and the divinities were seldom represented upon them. In the next period, or until about 340 years before Christ, excavated tombs prevailed and statuary and images of the deceased were superseded by those of a mythological character. The pyramids are only enlarged "mastaba" and as such belong to the first period.

An hour's ride from Cairo carries us back through the vistas of history to the earliest monuments of civilised man. We have the mosque of the 'Ams, the oldest building of Cairo, which has yet seen only twelve centuries pass since its foundations were laid, and we stand before the pyramids of Gizeh which have looked down on the whole course of man's development from ages when Phœnician and Greek had not even a name, when

\* A paper by Mr. Cyrus K. Porter in *Stone*.



the oldest of all the Troys was still in the dim and distant future. At a time when our Aryan forefathers were pasturing the flocks and herds on the steppes of Asia, and when a tent or a reed hut was the highest achievement of architecture everywhere else, in the Nile valley the Egyptians were building those stupendous monuments which are still the wonder of the engineer, and were painting those frescoes and modelling those statues which represent a stage of civilisation to which the Greeks did not attain until thirty centuries later, and which half of the world has not reached even now.

The three great pyramids of Gizeh are the most remarkable and the best known of all those of Egypt. Of these, the first erected by Cheops or Suphis, as he is sometimes called, is the largest. The next by Chepheren, his successor, is scarcely inferior in dimensions; while the third, that of Mycerinus, is much smaller, but excels the two others in this, that it has a coating of beautiful red granite from Syene, while the other two were cased only with the beautiful limestone of the country. The dimensions of these three as ascertained by the copings are as follows:—

Cheops—Side of base, 760 feet; height, 484 feet.

Chepheren—Side of base, 707 feet; height, 454 feet.

Mycerinus—Side of base, 354 feet; height, 218 feet.

Each one was commenced over a sepulchral chamber excavated in the rock, and during the life of the ruler for whom it was intended the work of building up over this chamber went on, a very narrow passage way being kept open as the courses of stone were added by which access from the outside was secured to the central chamber. At the death of the monarch the work ceased, and the last layers were then finished off and the passage way closed up. The foundations for the structure were excavated in the solid rock, sometimes to the depth of 10 feet, and upon this the great stones were arranged and built up layer upon layer, and one shell succeeding another, and the spaces being filled in with small stones loosely packed. The piles were constructed of blocks of red or Syenitic granite from the quarries of Asswan, and also of others of a hard calcareous stone from the quarries of Mokattam and Turah. They were of extraordinary dimensions, their thickness varying from 2 feet to more than 4 feet, and when arranged one upon another, forming steps up the outer slope, the thickness of the stones determined the height of the steps. Those near the top are of thicker stones, but the blocks are of moderate length compared with those at the base. To quarry and remove the immense blocks of stone to the pyramids and then raise them to their respective places required no little engineering skill, notwithstanding an unlimited amount of human labour was at command. Near the summit the number of men that could aid in raising the huge stones must have been comparatively small for the want of room, and it seems that some mechanical power must have been employed, besides any which we know they possessed. The probability of this is confirmed by the fact that cavities have been found in the stones, which appear as though they might have been worn by the foot of derricks turning in them.

The three pyramids of the Memphis group stand on a plateau about 137 feet above the highest rise of the Nile, not far apart and about on a north-east and south-west line. Like the other pyramids of Egypt, the four sides are directed towards the cardinal points of the compass. The largest pyramid, that of Cheops, covers at present an area of between 12 and 13 acres. The dimensions have been reduced by the removal of the outer portions to furnish stone for the city of Cairo. Thus despoiled, the walls have lost their smooth even surface in which state they were left by their builders, who filled in with small stones the angles formed by the recesses of each upper layer and cut away the projecting corners of the great blocks, thus leaving an even surface on each side sloping to an angle of 51 deg. 50 min. By stripping off the outer casing the courses of stone appear in the form of steps, which though ragged and unequal can be ascended even by ladies. The Great Pyramid has 203 of these steps, the lower ones being 4 feet 10 inches in height. The horizontal surfaces were nicely finished and the stones were joined together with a cement of lime without sand.

The masonry of the Great Pyramid consisted originally of over 89,000,000 cubic feet, and its total weight is estimated at 6,316,000 tons. Its only entrance is on its north face about 24 feet east of its central line, and 49 feet above its base line. The masonry about it is much broken away, and the piles of broken stone reach from the ground nearly to its level. This passageway is only 3 feet 11 inches high, and 3 feet 5 inches wide. It leads down a slope of 26 deg. 41 min., a distance of 320 feet 10 inches to the original sepulchral chamber, commonly known as the subterranean department, and beyond this 52 feet 9 inches into the rock. This passage is 2 feet 7 inches wide and 2 feet 8 inches high. It is supposed that it was intended to excavate another chamber at the end of this passage, and that it was not done on account of the monarch continuing to live until it was found expedient to close up the mouth of the passage with the external casing of masonry.

The sepulchral chamber is 46 feet long, 27 feet wide and 11½ feet high. At 63 feet from the entrance a branch passage connects, which rises at an angle of 26 deg. 18 min., and thus extends a distance of 124 feet, where it becomes level and extends 109 feet further. This connects with several chambers and passages. One situated nearly in the centre of the pyramid and 67 feet above its base is known as the Queen's Chamber. It is 17 feet by 18 feet 9 inches, and 20 feet 3 inches high, and has a groined ceiling. It appears to have been intended for a sarcophagus, but when discovered was found empty, the only sarcophagus found being in what is called the grand or King's Chamber. This apartment is 34 feet 3 inches long, 17 feet 1 inch wide and 19 feet 1 inch in height. It is lined with red granite, highly polished, single stones reaching from floor to ceiling. The ceiling is formed of nine large slabs of polished granite reaching from wall to wall. Above the ceiling are five small chambers built apparently to protect the ceiling of the chamber from the immense weight above it. The room is perfectly plain and contains only a sarcophagus of red granite 7½ feet long, 3 feet 3 inches wide and 3 feet 5 inches high, which is too large to have been introduced through the passageway, and must therefore have been placed in the room when this was built. It contained a wooden coffin and the mummy of the king, which disappeared when the pyramid was first opened and plundered. In the construction of the pyramid arrangements were made for blocking up the important passages with huge masses of granite, and the obstacles thus interposed have greatly impeded their exploration, and sometimes rendered it necessary to open new passages around the obstructions. It is not improbable that the ancient Egyptians themselves violated the tomb of Cheops, or that Cambyzes, the king of Persia, entered it. Arab historians record that the caliph Momman, in the beginning of the ninth century, forced his way into the pyramid in order to rob it of its supposed treasures. He found nothing but empty chambers and a stone sarcophagus containing a wooden coffin which held a richly-decorated mummy.

The second pyramid stands on a base 33 feet above that of the Great Pyramid and in an excavation made for it in the rock. It has an angle of 52 deg. 20 min. The upper portion of its casing is still preserved. It has two entrances, one 37 feet 8 inches above the base, the other built out in front of the base, each leading by an inclined passage about 100 feet long to the same sepulchral chamber. This chamber is 46 feet 2 inches long, 16 feet 2 inches wide and 19 feet 3 inches high, and has a roof the shape of the pyramid. It contains a granite sarcophagus 8 feet 7 inches long, 3 feet 6 inches wide and 3 feet high. This pyramid was entered by Belzoni in 1818, who found a cufic inscription recording the visit of a caliph and the opening by him of the pyramid A.D. 1196. The only remains met with were those of a bull, the Egyptian god Apis.

The third pyramid, as before remarked, is much smaller than the others. It was explored in 1837 by Colonel Vyse, who discovered several apartments in one of which was a highly-finished sarcophagus, a mummy case bearing the name of King Menkara and the body of a workman. The last two are now in the British Museum, but the sarcophagus was lost on the passage. This pyramid, though the smallest, is the best constructed of the three, the style of the work being more costly than any of the other pyramids of Egypt. In the same vicinity are six smaller pyramids supposed to be the tombs of some of the relatives of the kings who built the larger ones. A pyramid is simply a cairn or burrow, only its stones are laid regularly and their edges are carefully finished instead of being roughly thrown together. The principle of the pyramid is almost always the same. A rocky eminence on a deserted tract of land lying between the Nile and the Libyan hills, and above the reach of the annual inundation, was excavated for the reception of the king's sarcophagus, and a sloping passage was cut to connect the royal sepulchre with the surface. Above the sepulchre, both to protect it from the inroads of the sand and to mark the spot, a large block of stones was erected, almost in the shape of a cube, but slightly tapering or battering towards the top. This was done early in the king's reign, and if he died at this point his mummy was inserted in the tomb, a small pyramidal cap was placed on top of the block and triangular pieces were added to the sides, and a small pyramid effectually closing the royal sepulchre was then complete. If the king, however, continued to reign, he deferred the cap and sides and instead of them put other blocks around the base, so as to form a second stage upon which he erected another casing to his cube, thus increasing its size. The longer the king lived the larger became his pyramid, so that it is possible to roughly estimate the duration of his reign by the height of his pyramid. It is quite impossible for me to give a minute description of individual pyramids within the scope of this paper. Volumes might be and have been written on this interesting subject and yet it is not exhausted. In this connection I will only refer to one other pyramid—one of the number included in the group of eleven in the second great cemetery of Memphis, the necropolis of Sakkorah. It is known as the pyramid of



steps. This pyramid is supposed by some writers to have been built by Uenephes, of the first dynasty. If so it is the oldest monument in the world. It was constructed of an inferior quality of limestone, quarried probably in the neighbourhood. Its six steps with the angles not filled up reveal the principle of pyramid building. It has the peculiarity of an oblong instead of a square base, and unlike the other pyramids it is not set square with the cardinal points of the compass.

Pyramids as monuments to the illustrious dead were not confined to Egypt. Ethiopia contributes three groups of monuments in the form of pyramids. The principal group is at a place called Dunkelah, in latitude 17 degrees north, which is supposed to be the site of the ancient city of Meroe. Another is at Gibel Borkal, and a third is at Nourri, a few miles down the river from Gibel Borkal. Compared with the great Egyptian pyramids these are most insignificant in size. The largest ones in each of the three groups are as follows:—That at Nourri is 110 feet by 100 feet at the base, that at Gibel Borkal is 88 feet square, while at Meroe none exceed 60 feet each way. They also differ in form from those in Egypt, being much steeper, as their height is generally equal to their base. They also possess a roll moulding on their angles and each has a little porch or pronaos attached to one side generally ornamented with sculpture, and forming either a chapel or more probably a place where the coffin of the deceased was placed. We learn from a celebrated Greek traveller and historian that so far from concealing the bodies of their dead, the Ethiopians had a manner of preserving them in some transparent substance which rendered them permanently visible after death.

I will close this part of my subject with the following extract from the writings of a learned and enthusiastic writer on Egyptian history. Mr. Stanley Lane Poole, in his valuable contribution to "Picturesque Palestine," says:—

The people who built the pyramids 4,000 years before Christ were no barbarians, no nomad tribes of lacustrine peddlers. They were people with a profound philosophy, a lofty religion, a remarkable and individual art, a refined and complex society. If the progress of man from savagery to civilisation marched then by the same slow labouring steps as in later times, the Egyptians must have been a nation for thousands of years before they could have built Memphis with its chain of grand sepulchres. It is like standing on the borders of infinitude when we think of this wonderful antiquity.

The immeasurable ages of geology and the weird traces of primitive man give one an overwhelming sense of insignificance, but these tell us only of a barbaric savage existence with scarcely the beginnings of a higher life.

The monuments of Egypt show us man living as civilised a life as ever Roman conceived. As civilised in some of the best senses as any life we lead now, and there they stop short and meet us like a closed door, bearing on its threshold the footprints of myriads of inhabitants, but suffering no man to enter and see them. It is not the age of the pyramids that awes one most, but the thought of the unknown past that preceded their mighty birthday. Five thousand years ago they stood where they stand now, but the men who looked upon them belonged to another immeasurable antiquity when pyramids were not, of which we see the end but not the process, and whereof there remains no record but the result.

In the brisk hustling bazaars where the traders and dealers meet to exchange goods, the brown Nile labourer may be seen bringing his produce. In appearance he is much the same being that he was when the pyramids were being built, but now he can neither build nor paint nor write. Turn into the museum close by and you will see the statues and pictures and writing on the walls, extorted from the grasp of the desert sand which people with the blood of modern Egyptians in them produced in lavish quantities and amazing perfection. A modern "fellah"—one of this very people's descendants—is looking at the works of his forefathers in stupid wonder. He does not understand them. He knows that he and his countrymen can do nothing like them now. How they ever came to do them and what took away the power of such works from them are some of the questions that crowd upon the mind as we contemplate the stupendous works. Surely "Time mocks all things, but the pyramids laugh at time."

(To be concluded.)

## TESSERÆ.

### Church Spires in Landscapes.

NO object has, perhaps, been more frequently praised and censured in its turn than the Gothic spire. In reconciling these extremes it must be observed that this object, when viewed from within an ancient town or city or near the suburbs, where it groups with the gables of antiquated mansions, with their varied and ornamented wooden pinnacles, over which they rise, partially obscured in smoke and misty grandeur, relieved and backed by sober, neutral and greyish clouds, their importance is principally evident; they are enlarged by the imagination, and act as a crown and finish to the whole, but please less if the upper lines of the towers on which they stand

are not visible, and in this case they gain more by being seen geometrically than perspectively, as great objects, like the heroes of the drama, approach the audience with unbending solemnity and measured step, while the playful variety of action is thrown on the minor characters. The spire also, seen as one grand object, rising over its rich western front, ornamented with pinnacles and smaller spires; the tower on which it stands, seen at its upper parts; these, then, make one consistent mass, and do less mischief to the grandeur and solemnity of the whole than thus seen behind the broader masses of the buildings; but when seen as an object in a landscape the spire should be humble and diminutive, bending in with age, and belonging to a village, its form best corresponding with the objects beside simple and quiet river scenes, such as frequently occur in pictures of the Flemish masters, accompanied with rustic cottages, pollard willows, elder trees and bending rushes; the yellowish or warmish green parts of distant meadows, relieved with lightish cattle, or figures in white shirts or frocks, and the skies principally composed of clouds such as may belong to fine weather, this choice being prevalent in fine works composed of neutral tint and a little purple, remarking that as neutral tint is no colour grey must be composed of neutral and a little blue, and to make a pearly grey a little lake must be added; this will serve for a shade to the darker parts of the sky, which may be more neutral if in great masses. Small spires, adapted to these kind of subjects, may help to form the most agreeable pictures belonging to the pastoral class; but if there be one object more than another repugnant to the eye of taste, it is the view of a lofty spire seen from fields and other places moderately distant from town, for as the awfulness and sublimity of attitude is admitted to owe much to lines which rise directly up towards the skies, the spire not only destroys, by comparison, the magnitude of all the trees and other objects with which it cannot harmonise, but instead of supporting the equal dignity of a tower, which only terminates its career while soaring, appears with its buttresses like a slender giant, who has outgrown his strength, and is propped up with a fool's cap on his head.

### Representation of Trees.

The great difficulty attending the representation of trees consists in the necessity there is for the application of general knowledge and rules of art, which must be added to great practice and a feeling for the beauties of form. Even industry and ability must be a long time exerted before anything like freedom and a general character of execution can be obtained, provided the student has only to rely on his own observation of nature, and has no access to the masterly performances of established artists, which may save him many years of labour, for by referring only to nature in the first instance the painter will be rather apt to imitate the infancy than the maturity of art, as it is not the number of leaves that give quantity, but variety in their sizes, tones, distances, depths and colours, for as there is more information to be gained by viewing six coins of various sizes and reigns than a thousand coins of the same date and impression, so will a small variety of weeds and leaves appear more numerous than a great quantity of the same kind. The neglect of this principle is one of the reasons why those trees which are so much laboured give offence rather than pleasure to an experienced eye; and it appears to have been in many instances the fault of Zuccarelli, who, though he executed his objects with masterly touches, yet was too apt to make the leaves of his trees equal in size on every side of them, which fault is perpetuated in many engravings from his works; and this always causes a tree, however well executed in form, to appear artificial. But if between two branches firmly executed in colours a third branch is seen of a greyish and paler green, with the leaves smaller and less definite in their forms, it will not only give the appearance of a great quantity of leaves, but will help in some measure to harmonise the tree with the blue of the sky, or with grey clouds behind the trees, which likewise help to prevent the foliage from appearing harsh. To acquire a freedom and facility of execution, it is requisite the learner should often, on a small scale, copy the regular and even formal representation of clusters of leaves, and such as small branches of ash or a rose-bush would afford, and should acquire the power of making neat oval leaves with one or two touches of a full sable hair pencil; and when he can do these quickly he may then relax from the regular forms of leaves, and by attending principally to the masses execute the leaves with the looseness of character observable at a small distance in nature.

### Orientation of Temples.

Nothing could bring out more clearly the full significance of the west as the region of death than the details of the consecration of the pickaxe by the murderous Thugs of India, worshippers of Kali, the death-goddess. In her honour it is that the victims are murdered; to her is dedicated the pickaxe with which the graves of the slain are dug. On that dreadful implement no shadow of any living thing must fall; its consecrator sits facing the west to perform the fourfold



washing and the sevenfold passing through the fire, and then, duly consecrated, it is placed on the ground, and the bystanders worship it with faces turned to the west. On the other hand, the thought of the deities as in the region of sunrise is familiar to the savage mind in South America, as when the Jumanas turn the faces of their dead to the east, where dwell the two great deities, the Good and Bad Spirit; and so the Guarayos turn their corpses to the east, to go to the happy country of Tamoi, the grandfather, the ancient of heaven. In countries where sun-worship prevails, there prevails with it the right of adjusting the temple and turning the worshippers to the east. One of the great ceremonial rites of the Apalaches was performed at sunrise, when the priest stood at the door of the temple hut and adored the eastern sun; the cave-temples of the Floridans opened eastward to receive the first rays of the luminary; in Mexico men turned to the east in prayer, and the kindred Nicaraguans declared the gods to be in the region of sunrise; in Peruvian sun-temples the doors looked east, so that at dawn the sun's rays fell on the golden disc, and the people saw and greeted their national deity. This is the rite which the prophet Ezekiel describes as he sees it in horror-stricken vision:—"At the door of the temple of the Lord about five-and-twenty men, with their backs toward the temple of the Lord and their faces toward the east, and they worshipped the sun towards the east." Predominant as sun-worship was in Aryan thought, what is more natural than that the Brahman should turn to the east, and that Vitruvius should give directions so elaborate for adjusting the temples and altars of the immortal gods by the same rule of east and west followed by church builders now? In speaking of the solar symbolism of east and west within Christianity, such exceptional cases are excluded as that Christian sect described by Leo I. in the fifth century as stopping on a hill and bowing to the rising sun before entering the basilica of St. Peter, which the Pope says "comes partly from ignorance and partly from the spirit of paganism, and afflicts us extremely." But such ceremonies as the baptismal rite about the fourth century, which contrasts east and west with the utmost fulness of symbolism cannot be passed over. Cyril of Jerusalem thus describes the scene:—"Ye were first brought into the anteroom of the baptistery, and placed standing toward the west (the sunset), and then commanded to renounce Satan by stretching out your hands against him as if he were present. . . . And why did ye stand toward the west? it was needful, for the sunset is the type of darkness, and he is darkness, and has his strength in darkness; therefore symbolically looking to the west ye renounce that dark and gloomy ruler." Then turning round, to the east the catechumen took up his allegiance to his master, Christ. Thus Jerome says:—"In the mysteries we first renounce him who is in the west, and dies to us with our sins, and so turning to the east we make a compact with the Sun of Righteousness, and promise to be his servants." This perfect double rite of east and west is retained in the Eastern Church, and may be seen in Russia to this day. The partial ceremony of orientation of churches and the practice of turning toward the east in worship, which quite naturally caused early Christians to be accused of being sun-worshippers, are common to both churches.

### The Westminster Chapter-house.

From the actual building accounts which have been preserved, it is evident that the chapter-house was erected in A.D. 1250-53, so that it formed part and parcel of the original plan of the church, though a separate structure. It stands over a crypt, which may or may not have belonged to a previous building devoted to similar purposes. It is approached from the outer cloister by an outer and inner vestibule, the former being of limited height, owing to its passing under the dormitory, the latter lofty, and containing the flight of steps by which the raised level of the chapter-house is reached. The outer vestibule is divided into two walks or aisles by small columns of Purbeck marble, and the arch in the cloister by which it is entered is exquisitely carved. The inner vestibule is divided into two unequal bays, pierced on both sides with windows; those on the northern side, however, look not into the open air, but towards the altar of St. Faith in the revestry. The building is an octagon, the diagonals of which measure 60 feet, and it is loftier than most other buildings of the same kind. The central pillar is of Purbeck marble, consisting of a column surrounded by eight detached shafts; it is lofty and light, and the groining which springs from it has been restored according to the original design. Seven bays of the edifice are each occupied by a spacious window, which nearly fills the whole width between the corner shafts. The spaces between the windows are arcaded with five arches in each of a trefoil form and richly moulded. The five arches against the eastern wall are much richer and more deeply set than the others. They probably formed the seats of the five greater dignitaries of the abbey, namely, the abbot in the centre, the prior and out-prior and the third and fourth priors. The seats all round are of stone, and on the backs of these was a series of paintings. The chapter-house,

as is well known, was the place where the monks and other dignitaries of monastic buildings met to transact the general business of their order, but that at Westminster has its political as well as its religious associations. Here, by the consent of the then abbot, in 1377 the Commons of England first held their meetings, as part of the King's Parliament, and here they continued to hold their meetings until 1547, when Edward VI. granted them instead the use of St. Stephen's Chapel.



### Royal Academy Exhibition.

SIR,—Owing to a clerical error, Mr. Arthur R. G. Fenning's name was omitted from the catalogue of architectural illustrations now in the Academy, as being joint architect with me of the design for the new Presbyterian College at Cambridge. In justice to him, I shall therefore feel greatly obliged if you can find space to insert this letter in your next issue.—Yours obediently,

W. HOWARD SETH-SMITH.

46 Lincoln's Inn Fields, London, W.C.:

May 11, 1897.

### GENERAL.

**Mr. F. J. Warden-Stevens, A.M.I.E.E.**, of 34 Victoria Street, Westminster, has, we understand, been appointed the consulting engineer to the Poplar Guardians, to advise in the electric lighting of the important workhouse buildings and offices and also to report on the present boilers and engines.

**The Private View** of the Society of Miniature Painters, second exhibition, will take place on Saturday, 15th inst., at Messrs. Graves & Co.'s gallery, 6 Pall Mall, S.W., and the exhibition will be open to the public from the 17th inst. to the end of June. All exhibits will consist of works by contemporary artists.

**The Twenty-first Ordinary Meeting** of the Society of Arts will be held on Wednesday, May 19, at 8 P.M., when a paper on the "London Water Supply" will be read by Prof. Percy F. Frankland, Ph.D., F.R.S. Sir Douglas Galton, K.C.B., F.R.S., will preside.

**Mr. Sydney A. Smith**, the winner of the Penfold medal for obtaining the highest number of marks, and of the Driver prize for conspicuous merit, in the professional Associate examinations of the Surveyors' Institution, is twenty-one years of age, and is possibly the youngest among the non-student candidates. He commenced professional life in the office of Messrs. Ernest George & Yeates, of Maddox Street, and is now with Messrs. Weatherall & Green, of 22 Chancery Lane. He served his articles to Mr. C. R. Thornton, of Westminster.

**The Oxford Municipal Buildings** were opened on Wednesday by the Prince of Wales. The building, which was designed by Mr. H. T. Hare, includes municipal offices, town hall, council chamber, mayor's parlour, assembly-room, public library, sessions court, and quarters for the police.

**The Obelisk** in Ludgate Circus is to be moved from its present position in order that it may more nearly coincide with the altered line of footway in Fleet Street, which is due to the recent widening.

**The New Exhibition** of the Grafton Gallery is devoted to theatrical portraits and other memorials, and was opened on Thursday.

**The New Public Halls** which have been erected in Selkirk at a cost of about 7,200*l.*, and which are to be known as the Victoria Halls, in commemoration of the Queen's Jubilee, were opened with much pomp and circumstance on the 6th inst. The buildings contain a large central hall fitted with a recessed gallery, a smaller hall and caretaker's house, a complete suite of retiring-rooms and other accessories, and several committee-rooms. The internal arrangements of the building are simple and excellent, and the principal elevations are characterised by chasteness and effectiveness of design. The architect was Mr. Hippolyte J. Blanc, A.R.S.A., Edinburgh.

**The Public Free Library** and news-room which has been erected by the free libraries committee of the Moss Side District Council was opened on Saturday afternoon by the Marquis of Lorne, M.P. The building has been erected from designs prepared by Mr. Acton, the surveyor to the District Council, the cost being about 3,000*l.* It includes a large public room which may be used for meetings, concerts, &c., a library and news-room, and, in the basement, classrooms in which some of the technical instruction classes held under the District Council may be carried on.



# The Architect.

## THE WEEK.

ON Tuesday next the Engineering Conference will be opened at the Institution of Civil Engineers, when the President, Mr. J. WOLFE BARRY, will deliver a short address. There will be six sectional meetings. In the railway section the subject of permanent way will be discussed, Mr. WEBB, of Crewe, being the first speaker. In the harbour section a paper on "Concrete in Marine Works" will be read. The transmission of power by electricity, water and other means will be the principal subject in the electrical section, and among the speakers will be Mr. PREECE, Dr. HOPKINSON and Mr. ELLINGTON. Water in shafts will come under consideration in the mining section, and experiments on models of merchant ships in the naval section. During the afternoon there will be visits to the Central Subway and other works. On Wednesday some members will visit Dover Harbour and others the Blackwall Tunnel and Woolwich Arsenal. Sanitation will be prominent at the meetings, for papers will be read on waterworks, sewerage, gasworks, refuse destructors, bacteriology, &c. On Thursday all sections will be busy, and the experiment is likely to be successful in revealing the latest advances in the most important branches of engineering.

ALL who can appreciate French acting of varied classes should not neglect the performances which are being given by Mdlle. JANE MAY at the Royalty Theatre. That lady holds a position of her own in Paris, and the general verdict which assigned it to her has been endorsed in London. Her command of her art is so sure, it is difficult to say whether she is more attractive in speaking or in mimetic parts. In both she can sway her audiences. Yesterday afternoon Mdlle. JANE MAY appeared in "Le Monde où l'on s'ennuie." It is an advantage to have the performances in the afternoon, and they merit the support of all who love refined acting.

IN his report which was issued this week Sir ARCHIBALD GEIKIE, the director-general of the Geological Survey, records that Mr. JAMES BENNIE has brought to light traces of two Arctic tarns that once lay among the sand-mounds over which the northern part of the city of Edinburgh has been built. The deposits which they have left behind them have been trenched in making a sewer several hundred yards long to complete the Water of Leith purification scheme between Pilrig Street and Broughton Street. The chief feature of each lake-site was the occurrence of a bed of lake-peat composed of peaty mud and layers of compressed mosses and other vegetable *débris*, but with no clay or sand intermixed. These deposits lay immediately under the vegetable soil. In both lake bottoms a fine-grained silt or sand with much peaty dust and single sprigs of mosses underlay the solid peat and yielded the remains of the same Arctic *Apus* which was found in the ancient lakes of Hailes and Corstorphine, near Edinburgh, and near Auchtertool, Fifeshire. At one of the two recently uncovered sites, which may be called the Broughton lake, no Arctic plants and only a few of the remains of the *Apus* were obtained; but in the other, or Gayfield lake, great numbers of this crustacean were found, consisting of all the different parts of the animal—mandibles, body and tail-segments, the swimming-feet and portions of the carapace and appendages. Arctic plant-remains, chiefly leaves of *Salix herbacea*, likewise abounded. The fact that the lake-peat was not protected by any overlying deposit, but was found immediately below the vegetable soil, suggests that while the peat itself and its plants were at least in the lower part truly Arctic, seeds and leaves of Temperate species might in much later time have found their way into the upper parts of the peaty deposit, and thus give rise to an apparent commingling of plants indicative of extremely different conditions of climate. Such appears actually to have occurred. Mr. CLEMENT REID, to whom the plant-remains were submitted, finds that either two distinct plant-beds, or at least two different assemblages of plants, occur

at the Gayfield locality—the one showing Arctic, the other Temperate conditions. In the one case the occurrence of three species of dwarf Arctic willow indicates a climate like that of the North Cape, while in the other stones of the hawthorn and wild cherry point to a climate as mild as that now enjoyed by the Scottish Lowlands. A further fact of interest has been observed by Mr. BENNIE. In the deposits of the Gayfield lake there was found below the peat a bed of soft white silt or marl, containing a layer of freshwater shells, with seeds of pondweed and water-crowfoot. The shells are all well preserved, retaining even their epidermis, and the *Limnæa* are remarkably large. By carefully washing the shelly marl Mr. BENNIE succeeded in obtaining a number of ostracods, which have been named by Mr. SCOTT, naturalist to the Fishery Board of Scotland. These species have a wide range of distribution. None of them are peculiarly Arctic, and they throw no light on the climate of the time when the shell-marl was deposited. With regard to the mollusca of this shell-marl Mr. REID observes that they are confined to three widely distributed species, and that this want of variety is a usual characteristic of the shell-marls immediately above the boulder-clay, both in Scotland and the North of England. The pondweed and water-crowfoot have as wide a distribution as the shells.

THE interesting subject of curves in Mediæval Italian architecture has been again treated by Professor W. H. GOODYEAR in the *Architectural Record* for the present quarter. As in former cases, he produces many remarkable examples of horizontal curves which cannot be attributed to thrusts or settlements. From the Egyptian, Greek, Roman and Mediæval employment of them it would almost appear as if curved lines in masonry were as common as cambering in modern girders. It does not always follow that the use of the deviations from right lines is as apparent in all buildings as in the Parthenon. Professor GOODYEAR'S conclusions are shortly stated as follows:—(a) The Greek refinements were not confined to curves. They included constructive asymmetry in apparently equal dimensions of all members and spacings. They included an avoidance of all parallels in verticals as well as in horizontals. (Even the curves do not have the same amount of deflection on the stylobate which holds for the entablature.) These refinements consequently included an avoidance of all exactly perpendicular lines in favour of constructed leans, both outward and inward. (These facts are also found in the buildings of Mediæval Italy, as being due to construction and not to accident or carelessness.) (b) The curves of ancient architecture are not confined to Greek temples. They are also found in Egyptian and in Roman temples. (c) The curves of ancient architecture are not confined to curves in elevation, but they also include curves in plan. This holds even of the Parthenon, where the curves in plan of the alignment of the portico columns of the Parthenon are convex to the exterior. (d) The theories of optical correction, as explaining Greek curves, are best known to readers of English publications, but they are not favoured by BOUTMY, the leading French authority on this subject, nor by the German art historians like JACOB BURCKHARDT and SCHNAASE. (e) Neither PENROSE nor any other authority has ever antagonised the view that an effect of "life" and beauty was one purpose of the Greek curves, and PENROSE has expressly mentioned this explanation. (f) It may also be mentioned that HOFFER and BOUTMY have supposed the purpose of the Greek curves to have included that of exaggerating dimensions by artificial effects of curvilinear perspective. Artificial effects of perspective were certainly intended by other devices used in Mediæval Italian churches, and there are, in Italian churches, some cases of bends in elevation (if not of curves) in which a purpose of perspective exaggeration seems to be clearly involved.

THE publication of the second volume of Mr. EDWIN O. SACHS'S work, "Modern Opera Houses and Theatres" (B. T. BATSFORD), due this month, will have to be postponed until June, on account of an unexpected delay in the process of production. The author has, however, in consequence, been able to include some plates of Mr. TREE'S new theatre lately opened, and also of the new Opéra Comique at Paris, which is nearly completed.



## THE ASSOCIATION SKETCH BOOK.\*

MEMBERS may come and members may go, but the "Association Sketch Book" goes on for ever. What is more, there are no signs of decadence. The plates in the latest volume will bear comparison with those in preceding volumes, both for style of drawing and interest of subjects. Facilities of communication have enabled the members to go beyond the usual routes, and in consequence there is no less variety than heretofore. But it is also satisfactory to find that the members do not consider England was exhausted by their predecessors, for nearly one-half the plates are devoted to English work.

Mr. BRYER supplies two plates of Cromwell House, Highgate, which is one of the best of the surviving seventeenth-century mansions in the metropolitan district, but the grey used is too faint for geometrical drawings. Mr. H. P. G. MAULE has no less than eight creditable drawings of WREN's portion of Hampton Court, comprising plan of state apartments, south-west and south-east elevations, garden and river fronts, sections of mouldings and entrance gates. They may be said to comprise the exterior of the modern portion, and we hope to see them supplemented by drawings as careful of the interior. It is not often so many plates of one building are found without showing signs of a diminution of interest in the work. The railings from 44 Great Ormond Street are represented by Mr. HEATON COMYN. They are excellent specimens, without any of the contortions which were introduced as tokens of loyalty to the House of Hanover. The Entrance Gates of Emmanuel Hospital, which Mr. A. J. RODDES has drawn, are a little earlier in date. In the controversy over the hospital they were among the work referred to as deserving of preservation. Mr. NEEDHAM WILSON's three plates of All Saints Church, Leigh, Wilts, have the advantage of indicating the works of different centuries. In the building timber is largely used, and the sections are particularly interesting. It is a model set, and worthy of imitation by those who wish to do a small building thoroughly. Mr. C. S. SPOONER has four drawings of Ely Cathedral, which entailed an enormous amount of work. Although he confines himself to the presbytery, they were all in pencil, and were evidently drawn with much precision. On another plate Mr. SPOONER supplies some details of St. Mary's, Worstead, and St. James's, Southrepps, in which flint panelling has been skilfully used. Mr. R. S. BALFOUR shows details of Higham Ferrers Bede House. He also gives a plate of one of the old houses in the Close of Salisbury, which still retain their dignity, and form a pleasing adjunct to the cathedral. His two plates of Montacute House contain a plan of the garden, and show the curious terrace and pavilion. The Granary from Steeple Aston is curious, for it is carried on timber beams which rest on circular piers. A very good example of old timber-work from Lavenham is given by Mr. SPOONER. Another timber structure, but of Italian style, is a screen and gallery from Christchurch Park, Ipswich. A plate from Hatton Hall, by Mr. DODS, shows details from a room over the entrance gateway.

Three buildings from Venice are illustrated. Mr. EAST gives an elevation of the hospital which was formerly the school of St. Mark, a building with some fine ornamentation and coloured marbles. Mr. EAST's view of the Grimani Palace would have looked better if he had trusted to outline or had completed the details. The mixture of two styles of drawing is always unsatisfactory. The Church of the Frari, by Mr. CORLETTE, partly suggests Northern Gothic and partly Milanese; but owing to the difficulties of site the building appears to be subjected to lateral compression. It is one of the most admired of the Italian structures in red brick. The beautiful Font has been drawn by Mr. NICHOLSON from the cast at South Kensington. Two drawings of the pulpit in the church of St. Cesareo, Rome, are supplied by Mr. HART. The church and its contents are not much known. The pulpit is constructed of white marble inlaid with porphyry, green serpentine and cosmati mosaic. The evangelistic beasts are introduced and very quaint figures are made to support the columns. It is a curious example of mongrel Classic. Some details from a church at Miniato

are drawn by Mr. NICHOLSON, and there is a Fountain from a cast at South Kensington by Mr. C. C. BREWER. Very elaborate inlaid wood-work from Naples has been drawn by Mr. BALFOUR. La Zisa, Palermo, and the apse in the Duomo of Cephalu are Mr. HORSLEY's work, who also supplies some early decoration from a pulpit at Grado, which seems to be produced by Moorish artists.

In Mr. LOUIS AMBLER's drawing the cathedrals of Noyon and Soissons are contrasted. Both are important specimens of Mediæval work, for, as VIOLLET LE DUC has remarked, the builders have dared to raise them with means that seem feeble, and yet the repairs which were found necessary arose from fires, neglect or overloading. In Noyon especially, rubble which has little resistance has been mainly used. Mr. C. C. BREWER has a picturesque view of the organ-loft at Lamballe, which forms a curious combination of details. Still more pleasing are his views of the entrance to the cemetery at La Martyr, in Finisterre. The temptation to exaggeration has been avoided, and the figures of the Crucifixion are on a scale which allows of the importance of the architectural work being apparent. Two views of the Château of Rochefoucauld, at Angoulême, by Mr. BOLTON, show a characteristic Renaissance building which is adapted to its position at the riverside.

Among the Spanish subjects the most interesting are three of figure decoration which have no right to be included in the series. They are from paintings on the dome of the Sala del Tribunal, and are described as taken from French pencil-drawings in the possession of ANDREW OLIVER, and as apparently possession is nine parts of authorship in English architecture, as it is in English law, Mr. ANDREW OLIVER duly appears as author in the index. An architect's fame is fleeting among his brethren, and the editors as well as the possessor are not aware that the plates are reproductions of careful drawings made by JULES GOURY, who co-operated with OWEN JONES in the noble work on the Alhambra. For the benefit of those concerned it may be useful to give JONES's description of the paintings, as there is not a word about them supplied in the Sketch Book, and the subjects are puzzling:—

Much difference of opinion appears to exist amongst the authors who have described the Alhambra upon the subjects of the three paintings which are found in the domes of the alcoves of the Hall of Justice. It is said by many that they are not the work of the Moors, but executed posterior to the conquest of Granada, by Spanish painters. This opinion is founded chiefly on the injunctions contained in the Koran, forbidding the representation of animated beings; but that this law was disregarded by the builders of the Alhambra is fully proved by the fountain of the Court of the Lions, and the bas-relief which forms part of a fountain now in the Alcazaba. The ornaments, moreover, which are introduced into these paintings are strictly of a Moorish character. Another strong presumption of their being the work of the Moors exists in the construction of the domes; the plaster ornaments round the curve and in the spandrels are original Moorish work, which the Spaniards in their restorations of the palace never attempted to imitate.

*Centre Painting.*—The subject of this painting is considered by the Spaniards to represent a tribunal, whence they have called this hall Sala del Tribunal. From the different colours of the beards and dresses of the figures they would appear to represent the heads of the tribes of Granada.

II. It is difficult to connect the several subjects of which this painting is composed into one probable story. The chief group, that of a Moor killing a Christian, may be taken as a strong presumption of the paintings being the work of a Mohammedan artist, as it appears unlikely that it would have been so represented by a Spaniard after the conquest of Granada.

III. It is quite impossible to offer any conjecture upon the subject of this painting, whether it be legendary or historical. One-half of the picture appears to represent a boar hunt undertaken by Christians, and the other half by Moors. The submissive manner in which the Christian knight presents his share of the spoil to his lady on his return, may be contrasted with the more commanding attitude of the Moor, as finely exhibiting the estimation in which women were held by their respective nations; notwithstanding the want of perspective and knowledge of drawing, there is much spirit in the details, and the female figures especially are most graceful.

These paintings are of bright colours, but in flat tints without shadow, and were first drawn in outline in a brown colour. They are painted on skins of animals sewn together, nailed to the wooden dome, a fine coating of gypsum forming the surface to receive the painting. The ornaments on the gold ground are in relief.

There are four drawings by the late HEBER RIMMER, mainly from Palma, Majorca. It was remarked by him that "a distinguishing feature of the Palma architecture is a double roof and clear passage of air," an arrangement which is carried out without loss of architectural effect.

\* The Architectural Association Sketch Book, Series III. Vol. II. Edited by William G. B. Lewis and John Begg.



Owing to the heat there is much blank wall-space, and the connection with Spain is suggested by heraldic insignia. Mr. HACK's Casa Monterey, Salamanca, shows very elaborate cresting and an unusual diversity of windows.

### MOTOR TRAFFIC.

AN excellent paper on this subject was read before the Society of Arts on May 12 by Sir DAVID SALOMONS, Bart., M.A., when several points were touched upon which are of general interest, although the paper is described as "chiefly technical."

The author commences by apologising for reading a paper on a "well-worn" subject, but the paper shows that he has touched upon matters which are anything but well-worn. He also discusses the subject in which he has special interest—the Patent Laws—and goes deeply into the abuses and injustice which exist in this connection. It is, however, impossible to summarise this part of the paper, and those who are interested in patent laws should read the paper carefully.

The chief lessons which are to be learned, says the author, from the study of the literature of the subject, old and new, are:—1. The want of originality of most of the later patents. 2. The fact that the design of the better road vehicles is gravitating towards those in existence between 1820 and 1830. These statements are qualified, of course, by the improved methods of construction made possible by the advance in engineering, and the better materials available.

He then goes into the reasons why the horse-power required by motor vehicles is greater than that when a living horse is employed. He first shows that the reason greater power is required on a rough road than on a smooth one is that the wheels tend to push themselves into the ground before surmounting an obstacle, and he shows that a horse drawing a cart helps to pull the wheel over the obstacle because the point of application of the force is above the axle of the wheel and in front of it. The self-propelled vehicle is likened to the case of a horse pushing a vehicle from behind, when the action would be one of driving the wheels more into the ground. He further points out how a horse uses its weight as well as the anchorage obtained by its feet on the ground while drawing a load. The undulatory motion of the body shows this. The body is raised, independent of the kind of road, &c., and in falling again the weight is used to move the load forward. This is why a heavy horse can pull a greater load than a light one of equal strength.

He then passes on to pneumatic tyres, and shows that they are the ideal method of reducing the draught on a rough road, by allowing the obstructions to sink into them, and preventing the load having to be raised. He points out the great mechanical disadvantages, one of which is that due to the heating of the tyre if the load is heavy. This may, no doubt, be novel to some. He attributes it to probably either the heating due to the successive compressions of the air, or to the air having to pass through the small opening in the tube where it rests on the ground, as well as to the friction generally. Solid rubber has been used frequently in these cases with great success.

He mentions, in passing, the advantages of pneumatic axles, but says they are not satisfactory as yet.

Returning again to the power needed, he very properly points out the disadvantages of motors which will not exert a large force at a slow speed, and therefore makes complicated gearing necessary, and also points out the necessity for the continuous running of oil-engines.

The electric motor and the steam-engine are the two motors which possess a large starting effort, and the oil-engine is out of the question for this purpose. The maximum horse-power required while hill-climbing or traversing a rough road is far greater than the average, and it is then that the advantage of the two forms mentioned comes in.

He (Sir D. SALOMONS) gives it as his opinion that steam is by far the most suitable and advantageous for real work.

Sir DAVID SALOMONS, we think, rather lets his enthusiasm for steam carriages run away with him when he imposes the condition of running—that the car should go at the same rate, say twelve miles, up the steepest hill that horses can

now climb. This of course makes almost every form but steam take a very second place. There is no doubt that steam has very many advantages under certain conditions, but to talk in a perfectly general way is we do not think fair.

The French manufacturers are gradually increasing the weight and strength of their vehicles, to conform more with the English patterns.

The unsteadiness of the oil-motor, especially at the lower speeds, is mentioned, and is due to the irregularity of the explosions and to the bad governing, and it is also clear that the engine will run steadier when the carriage is moving fast. With steam and electricity these are obviated entirely.

Sir DAVID then goes on to discuss the electric vehicles and storage batteries. He is of opinion that the weight is heavy and maintenance heavy, that they cannot be considered anything other than a luxury, and that benzine and steam are only a quarter the cost to run, without taking into account the cost of maintenance. He takes the supply of electricity at 3d. per unit, and brings the cost out to 4d. per horse-power hour. He says that electricity is at present useless for commercial purposes, and here again we think he goes wrong, owing to the general way in which the matter is discussed.

For town use, where roads are good, and for say parcels delivery, or an omnibus company, there is a great field for an electric system. In the first place, one man can drive with perfect ease, whereas with steam this is impossible in a London street and is not advisable with oil; thus there is a small saving of, say, 30s. per week. Then electricity can be produced at much less than 3d. per unit, not taking into consideration the charge made from central stations used for lighting, but from a small separate plant; 1½d. per unit is a reasonable figure for an engine working constantly charging accumulators, while as low a figure as 1d. per unit could be obtained. Thus, supposing a motor to be 3 horse-power average, the costs stand—steam-fuel, 3d.; wages, 1s. 4d.; electricity-energy, 4d.; wages, 8d.; the totals being 1s. 7d. for steam and 1s. for electricity per hour. The extra 7d. will certainly pay for extra capital and the higher rate of renewals. The mistake has been made of supposing the fuel to be the only expense, and this mistake was once made in connection with electric-lighting stations, to the temporary advantage of electricity, and it appears that the same process must be gone through in connection with electricity for power purposes, but this time to the disadvantage of electricity. Sir D. SALOMONS admits, however, that the electric car is the most comfortable.

With respect to Sir D. SALOMONS' figures, they are all taken on the twelve miles an hour uphill condition, and we are therefore unable to agree with him. For instance, he says that 10 horse-power should be carried per ton weight of vehicle—i.e. the engine should be capable of giving 10 horse-power without injury. Four horse-power is quite sufficient for ordinary use when people are content to go uphill fairly slowly—i.e. six miles an hour.

Sir D. SALOMONS very rightly condemns the action of the financial people—i.e. company mongers—who state that great results are attainable with their particular form of motor or other apparatus.

Statistics are given, the results of which may be of interest as they are taken from the experiments and calculations of eminent engineers. TELFORD's results show that a force of 33 lbs. was required to move a waggon weighing 21 cwt. on a paved road, 147 lbs. on a gravel road, and on a broken stone surface 46 lbs. BABBAGE stated the friction or resistance of roads to be as follows:—Well-paved roads, 1-77 part of load; gravel roads, 1-35 part of load; fresh earth, 1-16 part of load. In fact, the ratio of the resistances to motion along a hard macadam to a by-road is about as one is to three.

Sir D. SALOMONS has no hesitation in saying that the steam-coaches of HANCOCK and others used in 1830 could be run to-day with perfect success, and that the improvements are due to better and cheaper materials.

In conclusion, this paper is quite a refreshing one after the many historical ones that have been read and after the "puff" which has appeared in many descriptions of special forms. The author's opinions are expressed quite frankly, and perhaps some of them are very much in advance of the present time. There is at least a perfect impartiality displayed in the treatment of the subject.



## THE GRAFTON GALLERY.

[BY A CORRESPONDENT.]

AS all the world is a stage and all the men and women merely players, it could hardly be possible for architects to be without some affinity with the actors. The aims of both are alike. The actor has by husbanding his resources to do much with as little expense as possible, and what else is the object of architecture? Every client wishes to make as brave a show as he can for a moderate outlay, and in a great many cases outward display is preferred to convenience. Why, for instance, had JOHN NASH at one time the monopoly of directing the great transforming act of which the scene extended from Regent Street to Regent's Park? Those who had charge of the Crown properties knew that he was able to bring theatrical experience to bear on building, and he certainly produced for his employers one of the showiest and cheapest displays which were witnessed in Europe. It is well known that when CHARLES MATHEWS the elder obtained an engagement in 1796 at Carmarthen to play in "The School for Scandal," JOHN NASH was the Sir PETER TEAZLE. The scene-painter was AUGUSTUS PUGIN. When soon afterwards NASH obtained his great commission, he kept the French artist by his side, and to the two of them London was indebted for its first and most memorable effort at beautification. MATHEWS wished his son to follow in NASH's footsteps, and in consequence CHARLES JAMES was apprenticed in the architect's office, but after the term was ended he preferred buildings made up of painted cloths to any structures he could erect. How often during the century which has elapsed since those days have the architect's office and the green room helped one another we need not relate, but enough is known to remove any misgiving about the duty of noticing the Exhibition of Dramatic and Musical Art which is now open in the Grafton Galleries.

It is the misfortune of the exhibitions in these galleries to be entirely controlled by amateurs. There is generally a happy thought inspiring them, but there is not the competence or experience which is necessary for its realisation. But as it was announced that theatrical people, with Sir HENRY IRVING as president, were to aid in "getting up" the new exhibition, it was concluded that there would be fewer drawbacks than usual. Nobody who was acquainted with stage folks could have an expectation of that kind. The ignorance which reigns behind the curtain on art, science and literature is appalling to strangers. Mrs. SIDDONS, who, like some living actresses, wished to pose as a superior being, tells us how she asked Dr. JOHNSON's opinion about her great predecessor Mrs. PRITCHARD, and the moralist said:—"Madam, she was a vulgar idiot; she used to speak of her *gown*, and she never read any part in a play in which she acted except her own." Mrs. SIDDONS professed to be shocked, but to her account she added, "I was afterwards assured by a gentleman, a friend of Mrs. PRITCHARD's, that he had supped with her one night after she had acted Lady MACBETH, and that she declared she had never perused the whole tragedy." Mrs. SIDDONS could not believe it, but she herself was not as thorough in her knowledge of dramatic literature as was desirable. What was true in the last century continues to be true, for we do not believe there is an actor or actress in London, however prominent, who would be competent to sustain an examination in one of SHAKESPEARE's plays such as is prescribed for candidates in the local examinations of the Universities. The same indifference is characteristic of their acquaintance with much else relating to the drama—everything that is not personal or their own is ignored. If these facts are remembered the incompleteness and errors of the Grafton exhibition will be understood.

Personal considerations have, however, gained the upper hand. The primary object of the exhibition would appear to be the advertisement of a few living actors and actresses by full-size portraits in oils instead of by posters, and the space which is left is occupied by odds and ends which drifted to Grafton Street by chance. There is no systematic arrangement, no connection between the objects. There is not one period of dramatic art which is sufficiently illustrated to satisfy ordinary playgoers. One can hardly believe so many omissions were accidental. To have three life-size paintings and two statuettes of the President may be only

an official privilege, but in a collection where there is not a scrap of paper to suggest what kind of men were SAMUEL PHELPS, GUSTAVUS BROOKE, JOHN VANDENHOFF, BARRY SULLIVAN, LEIGH MURRAY, SHERIDAN KNOWLES, ALFRED WIGAN, CHARLES DILLON, HENRY COMPTON, T. CRESWICK, HERMANN VEZIN and others, it would surely be more worthy to sacrifice one of the presidential likenesses if necessary than to allow so many lives to become as it were blanks. Where are the dramatists of the century? There were other scene-painters besides CLARKSON STANFIELD, and is it possible that an architect who designed a theatre never existed in Great Britain? It is only fitting, we suppose, that if among us we have actors and actresses who can contrive to be painted in full, then precedence should be given to them regardless of abilities, and we suppose the same rule applies to the music-hall performers we see here; but if no more than an advertisement were needed that fact should have been announced. Musical art as part of the title is an absurdity. LABLACHE, PUGNANI, PAGANINI, HERR HENTSCHEL, JOSEPH HOFFMAN, were not the only foreigners who flourished in England, and we must have had other native composers besides Mr. HENRY RUSSELL.

The portraits of which the director and committee somehow got possession were often puzzles to them, of which they could not understand the interest. Take, for instance, *Macready as Henry IV.* There is no doubt it is a portrait, but everybody knows there is a caste system in the drama, and the king's part is one which a star would avoid. How was it MACREADY accepted it? Of course, the catalogue does not tell, for the compilers demonstrate repeatedly they are not versed in the history of the English stage. For instance, it is gravely said the late WILLIAM FARREN created the part of Sir PETER TEAZLE, which means that he enacted the old husband in some state of pre-existence, nine years before his birth in this world. But the origin of the portrait was worth recording. In 1834 it was decided to give a spectacle in Drury Lane of a coronation, in which the Italian singers GRISI, RUBINI, TAMBURINI, with BRAHAM, PHILLIPS, IVANOFF and others, should perform. The costumes were as varied as the musical medley, and the orchestra, to do honour to the occasion, were obliged to wear large shirt collars like modern negro minstrels. As a prelude, scenes from the second part of "King Henry IV." were played, and the man who was the proudest on the stage was cast for the dying king. It was a solemn mockery, but MACREADY went through it, and it helped to embitter him against the fate from which he could not escape. When the history of the picture is known a new interest in the subject arises. Near it is a terrible parody of an Italian *Holy Family*. Was it worthy of a theatrical directorate to admit such a profanity as *Sheridan, his Wife and Child*? The author of "The School for Scandal," "Pizarro," "The Duenna," and the lessee of Drury Lane did not deserve that sort of treatment. SHERIDAN was scampish, but there was a level to which he could not sink. We may mention a third case. All who are acquainted with the subject of theatrical portraits or engravings from them know there was an artist who lived until 1832 named SAMUEL DE WILDE. The unhappy man has to pay dearly for his fidelity to the stage. Works against which he would revolt are ascribed to him. A number of actors, or amateurs, making obeisance to Sir HENRY IRVING with the words, "Please you, great sir, Bohemia greets you!" is credited to him as if he were living to-day. In another room we have, also by him, *Mr. Kemble and Mrs. Siddons*. It is a scene from "Macbeth," and as regards costume is more absurd than the representation of *Garrick and Mrs. Pritchard* in "Macbeth," for the lady is dressed in black with deep white trimmings, and wears a round black hat, while the Thane is in scarlet slashed with red. Now, the least acquaintance with the history of costume would be enough to convince the most unintelligent student that KEMBLE and Mrs. SIDDONS made it a boast to have never performed in the costume which was adopted by their predecessors. They began their reforms with "Macbeth." The picture, moreover, is not in DE WILDE's style; but we are afraid one style is the same as another to the Grafton committee. The *Head of Jack Bannister*, which belongs to the President, is described as by REYNOLDS. It is manifestly by LAWRENCE. It is also plain that the sup-



posed portrait *Inigo Jones* does not represent the architect. The subject was evidently a young courtier of the time of CHARLES I., who "made-up" after the king, while at the time JONES was at least sixty. There is also no resemblance with Mr. BUTLER's portrait, which has been often engraved. Another picture, called *Charles Kean as Richard III. and Wallack as Buckingham*, is no less of a puzzle. We do not believe that WALLACK ever appeared as second to the younger KEAN, but that is of no great importance. We see RICHARD talking to another man on a tented field. The President of the exhibition has his name on an edition of SHAKESPEARE; we should like him to point out for the benefit of students in what scene RICHARD and BUCKINGHAM are supposed to hold converse on the battle plain. According to the drama they last met in the Court, when the duke begged the king to keep his promise and grant him the earldom of Hereford. The picture apparently depicts either the last meeting between RICHARD and CATESBY or of the king and NORFOLK. There is a very fine portrait by HOPPNER, *Mrs. Michael-Angelo Taylor as Miranda*. Was the wife of the worthy member of Parliament an actress and when did she appear in the "Tempest"? It is generally understood the play was long neglected until MACREADY's revival. We believe the portrait is in no way theatrical, and is simply one of a lady who is supposed to be walking near the sea, to which the title "Miranda" has been affixed by accident. We need not proceed further in pointing out the weakness of the exhibition. Fortunately there are some objects over which the committee could not exercise any judgment, such as engravings with titles, play-bills and well-known paintings. The latter, on account of the miscellaneous and disorderly exhibition, appear deprived of much of their interest, but they are still worth attention.

There is a portrait of SHAKESPEARE by JANSSENS, and another of BEN JONSON which few will care to notice. The history of the British drama may therefore be considered as unrepresented until the reign of CHARLES II. There is a superfluity of engravings of NELL GWYN, and a painting which suggests her competence to play tomboys. The most interesting example belonging to that time is a pastel portrait which we would fondly believe is a record of THOMAS BETTERTON as a turbaned Turk. PEPYS believed he was a player who could not be valued enough. He championed one side in a contest that is still going on. In SHAKESPEARE's time most actors used to "mouth," and the practice has continued to our day. If anyone is eager to know what HAMLET desired when he wished to hear his lines spoken "trippingly on the tongue," he must go to Paris. Diction in HAMLET's and the French sense is unknown among us. BETTERTON took advantage of the French habits of the Court after the Restoration, and tried to naturalise it in London. "Conversation SHARPE" therefore looked on him as a pioneer. In a letter to HENDERSON, who was JOHN KEMBLE's great rival, he said:—"I think I have heard you remark that periodical changes have taken place in the taste of the audience, or at least in the manner of the great performers. Sometimes the natural and spirited mode has prevailed, and then the dignified and declamatory. BETTERTON, eminent both in comedy and tragedy, appears to have been an instance of the first. Then came BOOTH and QUIN, who were admired for the last. GARRICK followed, restoring or reinventing the best manner, which you have also adopted so fortunately and successfully. Mr. KEMBLE will be compelled by the hoarse monotony of his voice to rely upon the conventional stateliness that distinguished GARRICK's predecessors, which is now carried to inimitable perfection by his accomplished sister." In a few words there is the history of English acting. It is a counterpart of what we see in architecture—a struggle between conventionalisms and freedom.

We see no painting to recall QUIN or BOOTH in the Grafton Gallery, but there are more portraits of GARRICK than of any of the living actors. We can trace him at various periods of his career until we see him posing to satisfy the good HANNAH MORE. "It was only off the stage he was acting," said GOLDSMITH, and the portraits suggest the truth of the criticism. How natural the little man appears in the scene from the "Alchemist" by ZOFFANY, or even in the last scene from "Richard III." by HOGARTH, if compared the view of him embracing a bust of SHAKESPEARE or when playing picquet with his wife. The head in the latter

hardly seems to be human. The scene from "Macbeth" suggests how GARRICK turned opportunities to account. Mrs. PRITCHARD was a big woman of the Bermondsey-Manning type, and GARRICK therefore beside her assumed the rôle of a puppet. His legs hardly appear strong enough to sustain him, and he seems as if about to tumble out of the picture. Mrs. CIBBER was of another physique, and accordingly in the scene from "Venice Preserved" he appears as rigid as if cast in steel. His dissatisfaction with Mrs. SIDDONS suggests that in his old age he was wearied with the puppet rôle, and if he could have found an actress like Madame BERNHARDT (whose Lady MACBETH is one of her most remarkable creations), GARRICK would have been likely to have given a new version of the Scottish king's character.

Whatever may have been the shortcomings of their elocution, if compared with GARRICK's, JOHN KEMBLE and his sister upheld the dignity of the stage. He displayed no more hesitation in correcting the pronunciation of the king than with one of his minor actors. But then inelasticity of speech and action was as much out of place as Greek temples in London streets and at park gates. SHERIDAN hit off the weakness of the stately tragedian when he advised him to introduce music between the pauses in his speeches in "Hamlet." In the Grafton Gallery we see not only the brother and sister but CHARLES KEMBLE also in HARLOW's *Trial of Queen Katherine*, there is the second version of LAWRENCE's *John Kemble as Hamlet*, in which the head appears to be less out of proportion to the infinitude of the sky than in the picture at the National Portrait Gallery, and there are besides sundry small drawings and engravings of him.

In his childhood EDMUND KEAN, by his pranks, deranged the witches' scene in "Macbeth" which JOHN KEMBLE had devised, and he was destined to afterwards disturb the estimation in which his elder was held by himself and his contemporaries. KEAN was a phenomenon that seemed to be in keeping with a period which was acquainted with the French Revolution and the poetry of BYRON. He was as uncanny as MARAT, as much of a son of earth as DANTON, as overpowering as a volcano. He was deformed and yet appeared to be the most graceful of harlequins, while his dexterity as a swordsman made people assume he was a gentleman. His offences startled society, but he was not afraid to make himself out worse than he was. He never forgot he was a stroller, and that innkeepers obliged him to pay for beer before it was drawn. But his training was less perfect than that of the ordinary stroller. KEAN was compelled to amaze people at all costs: to play tragedy, to dance and tumble, sometimes to box and fence in the course of a night's performance, and if, as frequently happened, he was hissed as RICHARD, he had to win applause by the tricks of a monkey, or his dismissal was certain. When after years of wandering, during which he had to carry his child and his properties on his back, Drury Lane rose at his SHYLOCK, he was still treated as a sort of slave. His sphere was limited, for there were tyrants in those days. JOHN HENDERSON succeeded in FALSTAFF, therefore so kindly a critic as Sir WALTER SCOTT considered that all his other parts smacked of sack and sugar; audiences expressed themselves in a different style. GEORGE F. COOKE was kept to IAGO and SHYLOCK. KEAN was supposed to resemble RICHARD III., and in consequence it was accepted that he was unfitted to play any character which was without physical or mental defect. What do we see in the Grafton Gallery? An unfinished but vigorous head of KEAN, by CLINT, probably as Sir GILES OVERREACH; a well-preserved painting of him as RICHARD III., an engraving and a sketch in the same character, and a little coloured plate as SHYLOCK. But what a blessing it would be to English audiences if a man with KEAN's gifts were to appear among us with a repertoire equally limited.

KEAN was never impressive but when in the mood. MACREADY endeavoured to be always as intense, regardless of circumstances. He was the most painstaking and thorough of players. But he was most successful in subjective characters, and the public, who were indifferent to soliloquies, insisted he was at his best in ROB ROY and VIRGINIUS. His face was not expressive, it was as heavy as TALMA's, but the French actor played to an audience that



liked to see nature overcome, and were more satisfied in knowing he had prepared a scale of intonations for his HAMLET than if he presented as fine a head as KEMBLE's to their observation. MACREADY also left little to the inspiration of the moment in playing, but there is no painting or drawing at the Grafton Gallery to suggest his appearance on the stage, except one of him as ROMEO in his boyhood and the HENRY IV. The men who had any claim to be considered as tragedians in the years which followed MACREADY's retirement are carefully excluded from the walls. True dramatic art is becoming less appreciated every year. The theory of its representatives in our time is suggested when we find a portrait of MRS. LANGTRY "on the line," while one of Mrs. STIRLING in her prime is skied above it. Such spectacles are enough to make every earnest playgoer regret his visit to the gallery.

English portraits, and the contrasts they would excite would not be favourable to our insular art. There is a smaller portrait of M. COQUELIN, apparently as the Avocat DESTOURNELLES in *Mlle. de la Seiglière*, which is exquisitely finished by M. FRIANT. The French and the earlier English pictures are some compensation for the obtrusiveness and self-seeking which have inspired so large a part of the collection, making it as incoherent as a modern burlesque or adaptation from SHAKESPEARE.

### NORWICH CATHEDRAL.—III.

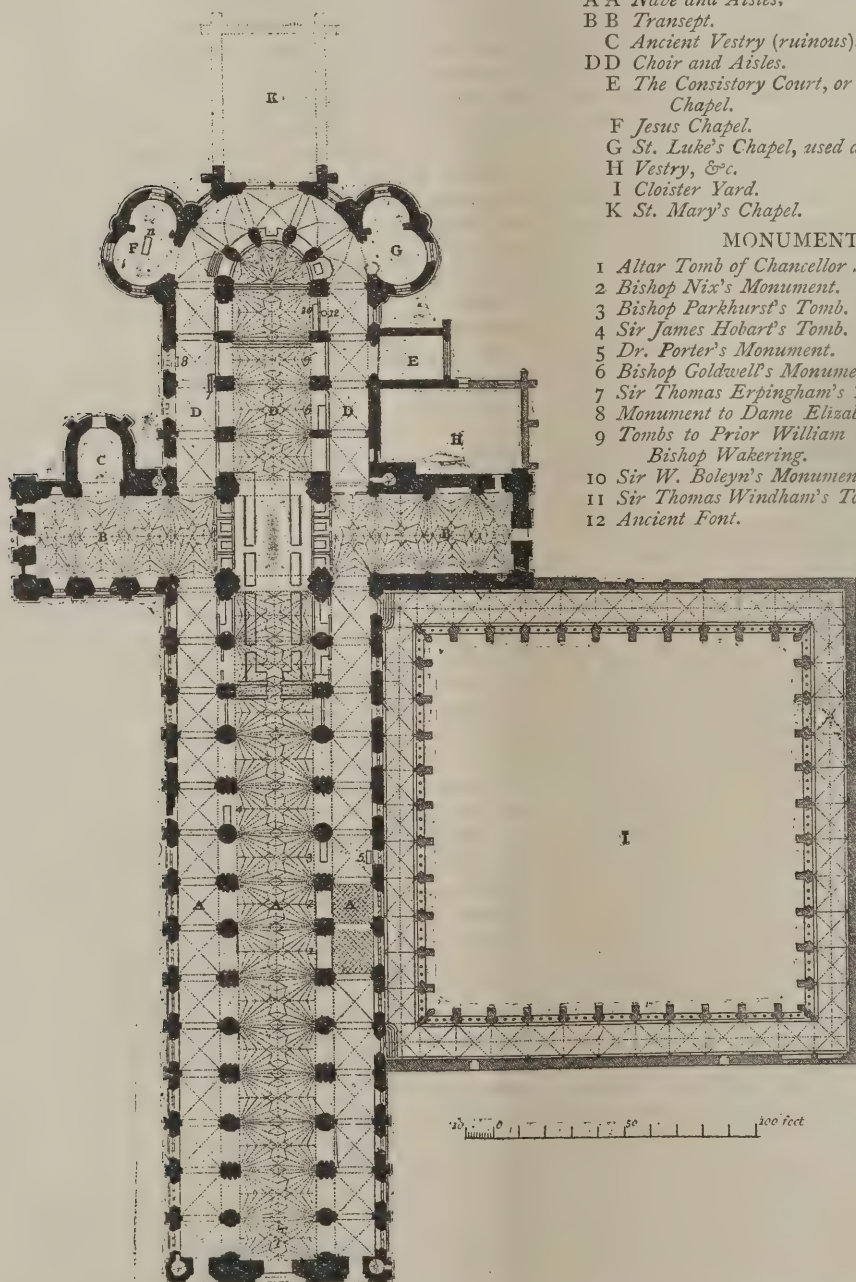
THERE is no cathedral in England so old as Norwich, which has been subjected to so few alterations of plan. It is now what it was in the time of Herbert de Lozenga, a cruci-

#### REFERENCE TO PLAN.

- A A Nave and Aisles.
- B B Transept.
- C Ancient Vestry (ruinous).
- DD Choir and Aisles.
- E The Consistory Court, or Bishop Beauchamp's Chapel.
- F Jesus Chapel.
- G St. Luke's Chapel, used as a Parish Church.
- H Vestry, &c.
- I Cloister Yard.
- K St. Mary's Chapel.

#### MONUMENTS.

- 1 Altar Tomb of Chancellor Spencer.
- 2 Bishop Nix's Monument.
- 3 Bishop Parkhurst's Tomb.
- 4 Sir James Hobart's Tomb.
- 5 Dr. Porter's Monument.
- 6 Bishop Goldwell's Monument.
- 7 Sir Thomas Erpingham's Tomb.
- 8 Monument to Dame Elizabeth Calthroppe.
- 9 Tombs to Prior William de Walsham and Bishop Wakering.
- 10 Sir W. Boleyn's Monument.
- 11 Sir Thomas Windham's Tomb.
- 12 Ancient Font.

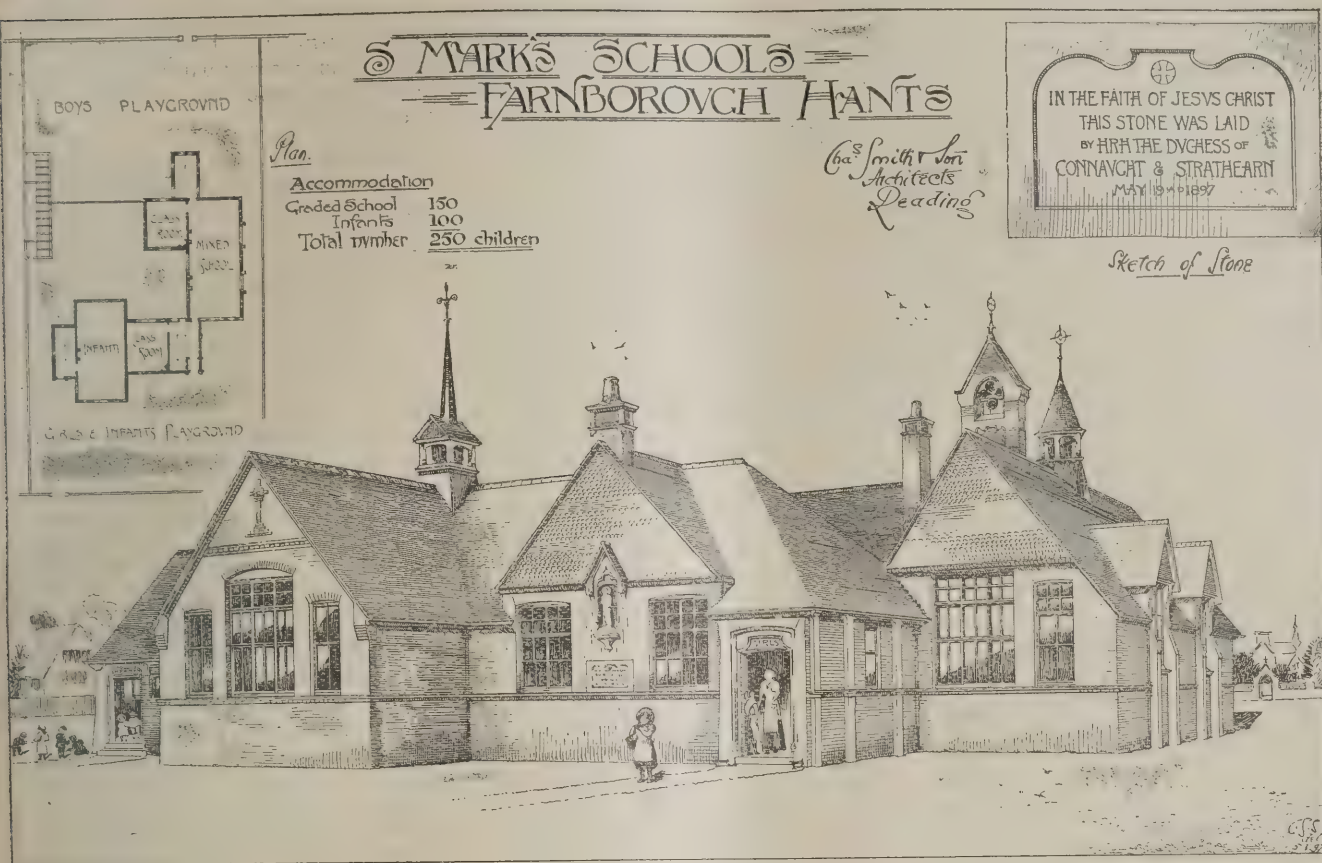


If we consider the modern portraits as works of art, priority must be awarded to M. CHARTRAN'S *Madame Sarah Bernhardt*. The background is almost white, and the scheme of colour is kept down in order not to provoke too violent a contrast. That the subject appears rejuvenated will rejoice all who can understand in what the art of acting consists. M. MADRAZZO'S *M. Coquelin as Don César de Bazan* is also admirable. It is most skilful in all its arrangements, and yet has the effect of a work that was dashed off at a sitting. The committee have taken the precaution to keep the two apart from the principal modern

form building with a choir and apse. Evidently nothing was allowed to diminish the importance of the high altar, or to distract attention from it, for the altars which were set up in the chapels were not visible to a worshipper in the nave. The simplicity of arrangement has advantages especially with the ritual which is now followed in cathedrals, the only drawback at Norwich being the length of the nave and aisles, for the preacher's voice cannot be distinctly heard in all parts.

An Excursion Meeting of the Northern Architectural Association will be held to-morrow, the 22nd inst., at the Castle, Castle Eden, by permission of Mr. Rowland Burdon, J.P.





### ST. MARK'S SCHOOLS, FARNBOROUGH.

ON May 19 the Duchess of Connaught, who was accompanied by the Duke, laid the foundation-stone of the above schools, which are in connection with St. Mark's Church, Farnborough. The ceremony was rendered all the more interesting from the fact that her Royal Highness laid the foundation of the church itself nearly seventeen years ago, that being the first public act performed in England after her marriage. The religious portion of the ceremony was performed by Bishop Sumner, of Guildford; and General Bancroft, on behalf of the building committee, thanked the Duchess for her attendance. The architects of the schools are Messrs. Charles Smith & Son, of Reading.

### THE AUCTIONEERS' INSTITUTE.

THE ordinary general meeting of the members of the Auctioneers' Institute of the United Kingdom was held in the lecture-hall of the Institute, Chancery Lane, W.C., on the 14th inst. Mr. James Frederick Field, the president, in the chair. The Council stated in their report that ninety-seven new members had been elected during the year. The income amounted to 1,608*l.* 4*s.* 7*d.* and the expenditure to 1,330*l.* 9*s.* 10*d.*, leaving a cash balance to be carried forward to the next year of 277*l.* 14*s.* 9*d.* The President, in moving the adoption of the report, congratulated the members on the continued progress and success of the Institution. The great expansion of the business of the Institute and the costs incurred in the action taken by the Council for the protection of the Institute had caused the expenditure for the year to be heavier than usual. The examinations were now being earnestly taken up by students. Efforts had been made during the year to remedy the present unsatisfactory method adopted by the Inland Revenue authorities of receiving estimates of value for probate and estate duty purposes from persons not competent to value. It was the opinion of the Council that a considerable loss of duty was sustained in connection with this matter, and they hoped that a change would be brought about at no distant date. Mr. James Green seconded the motion, which was adopted. The retiring members of the Council were re-elected, and other routine business having been transacted, Mr. Frank Everill, past president, invested the President with a president's badge and chain of office, subscribed for by members of the Institute throughout the kingdom, and to be worn by each successive President during his term of office.

The eleventh annual dinner of the members of the Institute was held at the Hôtel Cecil in the evening. The President

occupied the chair, and the company included Sir W. T. Marriott, Q.C., Mr. Christopher Oakley, Sir A. Blomfield, Sir W. W. Karslake, Mr. Causton, M.P., Mr. Atherley Jones, M.P., Mr. Richards, M.P., and Mr. C. Harris, secretary. Sir W. T. Marriott, in proposing the toast of the evening, "The Auctioneers' Institute of the United Kingdom," congratulated the Institute upon the standing which it had attained. The President, in response, said that during his period of office an effort had been made to obtain a charter of incorporation, and although personally he was not satisfied that the achievement of that object would be a wise step for the Institute, it was hoped that such a charter would soon be granted.

### THE GREEK THEATRE.

THE last lecture on "The Greek Theatre according to Recent Discoveries" was delivered on Saturday afternoon by Professor Mahaffy at the Royal Institution, and was mainly devoted to an exposition, illustrated by pictures on the screen, and to a vindication of the views expressed by Dr. Dörpfeldt as to the structure and arrangement of the Greek theatre before it was modified by the Romans. It had long been held, on the authority of a passage in Vitruvius, that, while the Roman stage was about 5 feet above the level of the audience—of the area which included what we now called the pit as well as the orchestra—the Greek stage was raised to a level of 10 feet or 12 feet. That statement had caused infinite trouble and sorrow to the critic and historian, and had occupied generations of commentators. But a Danish scholar had recently expressed doubts as to the authenticity of a statement which had hitherto been held to possess unquestionable authority, and these doubts seemed to be well founded. Dr. Dörpfeldt had proved by actual observation that it was the top of the back scene, and not the stage itself, which was thus elevated, and it was this which had been misnamed the *logeion*. Great credit was due to Dr. Dörpfeldt for the scientific study which he had devoted to the question, and to the way in which he had demonstrated the transition from the old Greek form to that of the Romans. The passage from Vitruvius, or whoever was the writer, had been a fruitful source of error. In the Roman development the whole theatre was covered, the stage lengthened, and the old entrance heightened. It was the universal habit of the Romans to adapt Greek things to their own taste and use, and it was not difficult to reconstruct what was purely Greek from the Roman enlargement and modification.



### NOTES AND COMMENTS.

IN the last number of the Occasional Papers by assistant surveyors attached to the War Department is one describing the brickworks which were set up four years ago by the Royal Engineers at the Curragh Camp in Ireland. It was found to be impossible to obtain an adequate supply from private yards, and the reconstruction of the camp must be delayed indefinitely unless the authorities become brick-makers. Accordingly an expert was brought from England to report on clays, and he recommended an alluvial deposit which is between 3 and 4 feet in thickness. It is not entirely satisfactory, for it is without uniformity of texture, and is mixed with pebbles, peat and bog oak. When dried the bricks are heavy and dark in colour. In order to diminish the risk of shrinkage the clay has to be dug out some months before use and allowed to dry in high heaps with steep slopes. The clay has some Irish peculiarities, for the bricks from one kiln come out of a colour which is altogether different from those turned out of the companion kiln, although the same fuel is used in both, and there is no difference in the process. About 3 yards of clay are used in the manufacture of a thousand bricks, and the machine produces about 20,000 in ten hours. In the hacks of the T house there is provision for 300,000 bricks; but, as in other places, work is not carried on from the beginning of October until the end of March. The bricks are brought to the camp by two traction engines, and about 26,400 can be delivered daily in fine weather.

TRAFFIC of all kinds in this country increases so quickly there seems to be no way of meeting the requirements unless by elastic structures, and they have to be invented. There is scarcely a railway terminus in London which has not been enlarged, and in the majority of provincial towns there is a like demand for an increase of space. Sea traffic also demands more provision, and in many ports there is a difficulty in obtaining it. Not only must docks have a greater superficial area for the accommodation of vessels, but they must contain deeper water than formerly. It is a remarkable fact that the Suez Canal should exercise influence on dock companies throughout the world, but every increase of depth in that waterway has to be met by a corresponding increase in all large docks. The question arises, How is that depth to be obtained? To remove the existing bottom of a dock, and to excavate the soil beneath and reset the masonry would be not only costly, but the time needed for the work might cause a diversion of traffic, for dock managers say they have to contend with competition in its strongest form. Accordingly in several places the difficulty is met by pumping an additional quantity of water into the basin. In Liverpool and Birkenhead the arrangement serves, and it is now being tried at Limehouse. Mr. WOLFE BARRY proposes to adopt it also at Hull. In the most modern docks at that port the maximum depth is 22 feet 6 inches, and in order to receive vessels that can pass along the Suez Canal it is absolutely necessary to have a depth of at least 26 feet under all conditions, and a depth of 28 feet or 28 feet 6 inches may sometimes be required. It is therefore intended by means of centrifugal pumps to pour sufficient water into the docks from the Humber to make up for their shallowness. Authority to execute the works is being sought from Parliament, but as the docks belong to the North-Eastern Railway Company there could not fail to be many opponents to the project.

THE appearance of Lord KELVIN as a witness on behalf of the Bill is an incident which deserves to be recorded. His lordship said he had at various times given a good deal of attention to the question of the currents in rivers and estuaries. He had examined the plans of the proposed new works in connection with the Hull Docks, and had gone over the site of those works and considered all possible influences that they might have on the channels and currents. He did not think they would in any way injure the channel. In his opinion it was impossible that such works can largely modify for the better or worse the great variability of the shores and channel of the river Humber, which existed long before the embayment, and has largely depended upon the forces of nature. The straightening of a river frontage, so far as it would exercise any influence,

would probably be favourable to the north channel. The Humber will probably be better off, and there will be less obstruction after the proposed improvements. Lord KELVIN, however, agreed that in the event of its being shown that injury accrued to the Humber in consequence of the works of the North-Eastern Company, those who produced the injury should be made responsible.

SEVERAL fragments of stained-glass have been discovered by Mr. C. B. FOWLER in the excavations which he is conducting in the grounds of Cardiff Castle, and which probably belonged to the Dominican and Franciscan monasteries which formerly stood there. According to Mr. FOWLER, the pieces are generally of fourteenth-century period, though several of the patterns are of later date. The glass tints are mostly of jonquil and citron yellow, light greys, browns and greens, lined with a dark red. The glass was discovered near the foundations of the churches at the west end, about a yard and a half in area and 3 feet underground, the pieces being piled one over the other in a mixture of clay and old mortar. The glass is very brittle in consequence of its burial for such a number of years, but many of the patterns and tints are still discernible and represent animals, birds and foliage, among which are the leopard, eagle and dove, the ivy, vine, fig, maple and oak; also the fleur-de-lis. What adds to the interest of the discovery is that the churches of Glamorgan appear to have been deprived of the advantage of stained-glass.

IF allowance be made for the difference between the subjects, all that we have said about the first part of "Architecture of the Renaissance in England," by Mr. J. A. GOTCH, will apply to the first of "Later Renaissance Architecture in England," by Messrs. J. BELCHER and M. E. MACARTNEY. The two (published by Mr. BATSFORD) are as uniform as if they were to be bound together as one work. It is unusual to find such fidelity to a predecessor in the preparation of books, and Mr. GOTCH has reason to be proud of the spirit of imitation which inspires his two followers. But while we admire the modesty we do not believe it is altogether advantageous in the present case. People are now less disposed to be satisfied with pendants or companions which are exactly alike, and editors of series of books are compelled to recognise various modes of treating subjects if they desire the co-operation of practised writers who can be considered as authorities. It would not be difficult to introduce features which would impart character to the new venture, and enhance the interest of the plates. But not one novelty appears in the first instalment, nor is one promised in the prospectus. The subjects illustrated by Mr. GOTCH were often not known beyond the districts in which they were found, and he merited credit for his discoveries; but examples of Later Renaissance like the Ashmolean Museum, Radcliffe Library and Trinity College Chapel in Oxford, Peterhouse College, Somerset House, the Home Office, Admiralty, Ashburnham House, Greenwich Hospital, New Palace, Ham House, the Hall, Winchester School, Townhall, Guildford, which are among the examples in the first part, may claim to be more or less familiar to all who bestow attention on architecture. With buildings of the kind the photographers could hardly go wrong, and hence something is needed to demonstrate the necessity for the names of two architects appearing on the title-page. There is no doubt an introduction, and there will be descriptions, but in treating of buildings of the period neither history nor philosophy has much scope. The authors do not attempt to be more than compilers in the sample which is given. As it is not imperative to make all the parts of a new work alike, there will be consequently opportunities in the succeeding numbers to compensate for the shortcomings of the start. It is claimed for Later Renaissance architecture that it is a development, and is not merely imitative, but is full of vitality and vigour. We hope we may see in the next number some evidence that the authors believed those qualities could be exemplified in their manner of presenting the buildings, and that their subject inspired them to produce a work that was superior to its predecessor. The prejudice against continuations and sequels may be unwise, but it is universal, and it is not to be overcome by seeking after the closest resemblance to the original which can be secured.







*Ghe Architect, May, 2<sup>d</sup> 1897*







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INN-PHOTO, SPRAGUE & CO 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

**SHEFFIELD MUNICIPAL BUILDINGS: TOWER AND WEST FRONT.**  
E. W. MOUNTFORD, Architect.



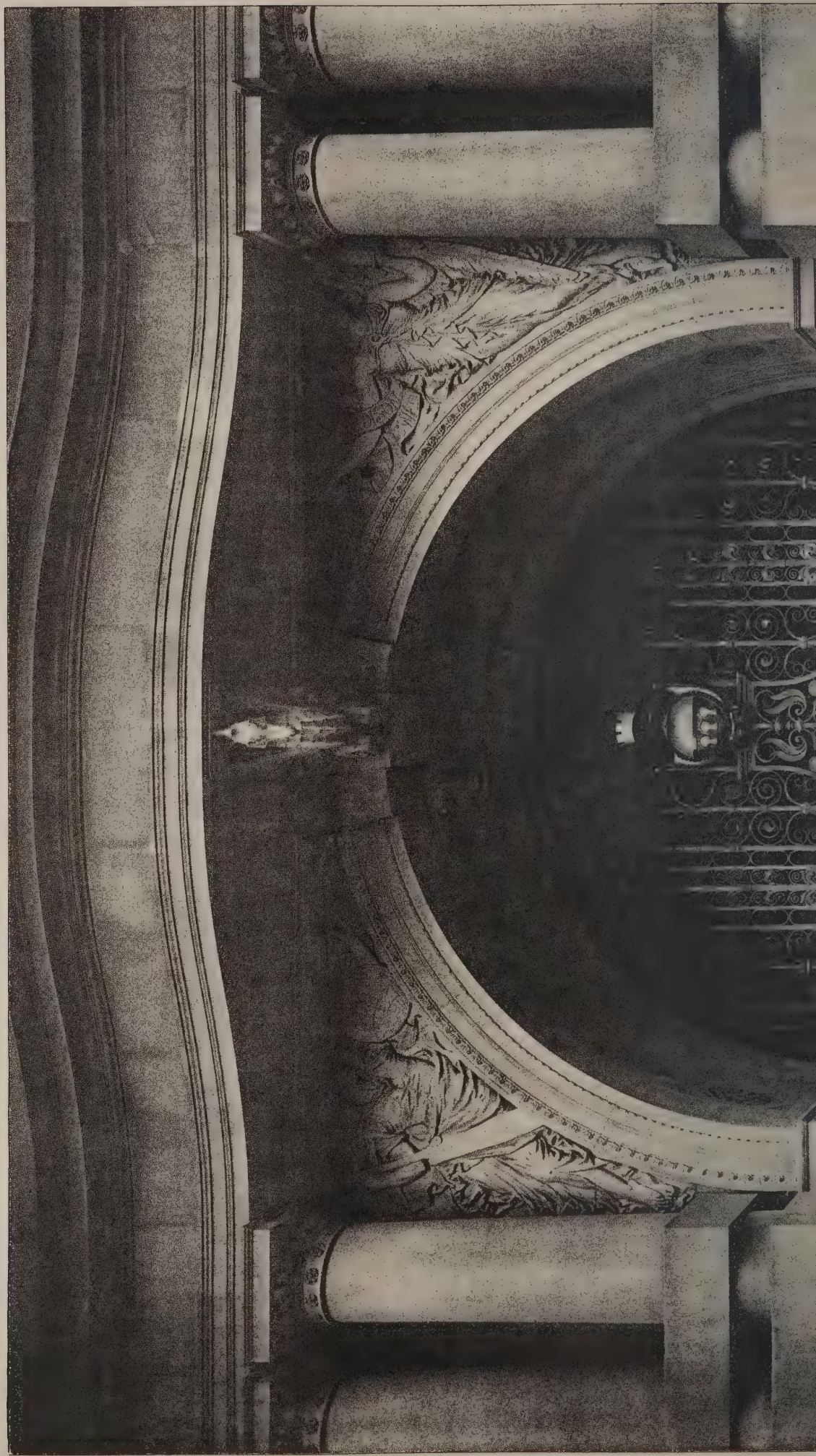








The Architect, May 21<sup>st</sup> 1897







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SHEFFIELD MUNICIPAL BUILDINGS: ENTRANCE GATES.  
E. W. MOUNTFORD, Architect.











The Architect, May 21<sup>st</sup> 1897



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CATHEDRAL SERIES, No. 34.—NORWICH: THE TRANSEPT.





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CATHEDRAL SERIES, NO. 35.—NORWICH: THE AISLE.













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21<sup>st</sup> 1897



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RECEPTION AND DINING ROOM.  
Architect.







## ILLUSTRATIONS.

SHEFFIELD MUNICIPAL BUILDINGS.—TOWER AND WEST FRONT.—ENTRANCE GATES.—RECEPTION AND DINING-ROOM.

THE Sheffield Town Hall, which is to be formally opened by the Queen to-day, stands upon a site almost triangular in shape, but the apex of the triangle is cut off, thus forming a short fourth side to Norfolk Street. The principal front faces Pinstone Street and is 200 feet in length, that towards Surrey Street being 80 feet longer. On the side next Cheney Row a part of the site still remains available for future extension.

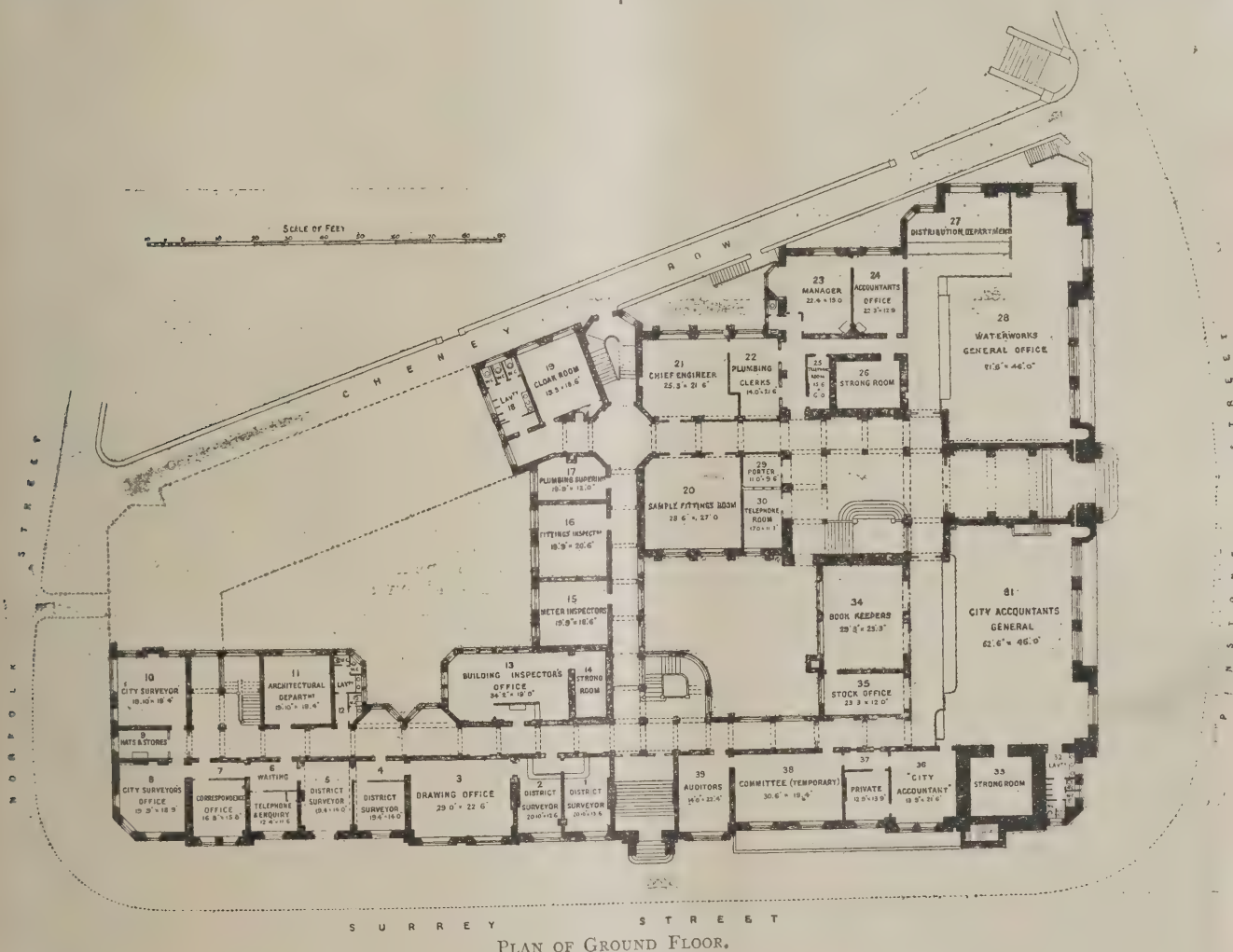
The main entrance, in the centre of the Surrey Street front, is 12 feet in width, a vestibule, 20 feet wide, leading thence to the hall, rather more than 40 feet square, from which rises the grand staircase. To the right and left of the hall are the offices belonging respectively to the water-works and the city accountant's department, the public offices of each department being fine rooms 46 feet in width, nearly 70 feet long and 16 feet high, both facing Pinstone Street.

room itself measures 60 feet by 40 feet, is 28 feet high and lighted by traceried windows upon three sides. A separate entrance and staircase to the public gallery are provided from Cheney Row.

On the second-floor are various offices connected with the different departments, and in a separate part of the building is a kitchen, with the necessary appurtenances, for use upon the occasion of banquets or receptions.

The tower at the corner of Norfolk and Surrey streets is 25 feet square and rises to a height of 200 feet above the pavement, measuring to the head of Vulcan on the summit.

The building throughout is faced with stone obtained from the quarries at Stoke Hall, about 12 miles from Sheffield. Internally the reception-rooms, council chamber and committee rooms have polished oak floors, the lower part of their walls is panelled in oak and they have decorated ceilings, that in the council chamber being the finest. The doors and other joinery throughout the principal floors of the building are also of oak. The grand staircase is 10 feet wide and entirely of marble, the pavements of the



That portion of the building fronting Surrey Street has separate entrances from both Surrey and Norfolk Streets, and contains on the lower ground floor the offices of the medical officer of health, the city surveyor occupying the ground floor, and the town clerk the first floor. The various departments are connected by two wide staircases, in addition to the staircase used in connection with the mayor's reception-room and the council chamber.

The mayor's three reception-rooms, namely, the reception-hall, the dining-hall and the mayor's parlour, are approached by the grand staircase and corridor, the latter being 160 feet in length and 10 feet wide. The rooms are divided from each other by solid oak partitions, so constructed that they can be easily raised into the roof, when the three rooms can be used as one, which then becomes 155 feet in length, 35 in width and 22 feet high.

The council chamber is approached from the grand staircase through a spacious ante-room, and is provided with a large cloak-room and convenient lavatories. The

vestibule, hall and grand corridor being of the same material. The walls of the hall and grand corridor are lined with marble and alabaster. In other parts of the building the corridors have floors of glass mosaic and a specially designed dado of antique glazed tiles. The secondary staircases are of York stone.

The various rooms and corridors are warmed by steam and lighted by electricity, the brass electroliers having been specially made from designs by the architect. That over the principal staircase is of bronze and is a fine piece of work.

All the principal offices are furnished and fitted in oak from the architect's drawings at a cost of nearly 20,000/.

Throughout the building there is much fine sculpture, the work of Mr. F. W. POMEROY, Royal Academy Gold Medallist. In the spandrels above the principal entrance are life-size female figures representing "Electricity" and "Steam." On each side of the vestibule are carved panels representing the various Virtues, the spandrels between the



arches being carved with flowers and foliage typical of the same qualities. In the hall is a fine carved frieze representing the destruction of the Dragon of Wantley (or Wharnccliffe) by Moor of Moor Hall. Above the door leading from the grand staircase into the antechamber is a fine panel illustrating the text, "Be ye wise as serpents and harmless as doves," while all round the upper part of the staircase are figures and emblems representative of the Sheffield trades. In the mayor's parlour is a fine chimney-piece containing a panel carved in alabaster, with figures representing "Religion" and "Prudence," while below is an illustration of the text, "Unless the LORD build the house their labour is in vain that build it. Unless the LORD keep the city the watchman waketh but in vain." In various parts of the building are carved shields bearing the coats of arms of the city, the Duke of YORK, the Duke of NORFOLK, the Cutlers' Company and the Earl of WHARNCCLIFFE.

Returning again to the outside of the building, there will be seen above the principal entrance the city arms, supported by heroic figures of Thor and Vulcan, while in the gable above is a life-size statue of Her Majesty the QUEEN (carved by M. RAGGIE), with the royal arms of England overhead and symbols of her sovereignty of the seas on either side. In the central block of the Surrey Street front are statues representing "Peace" and "War," and over the first-floor windows are heads of animals symbolical of India and the Colonies. In the upper part of the council-chamber gable towards Cheney Row is a statue of "Justice."

The architecture of the building is distinctly modern in character, and of the style known as Renaissance.

The comparative smallness and great value of the site prevented any considerable setting back of the various fronts for architectural effect, for which reason, and in order to counteract the peculiarities of the Sheffield climate, it was necessary to treat the building simply and broadly with comparatively small projections, and keeping the various mouldings and cornices somewhat flatter than usual. The whole of the materials, including the various coloured marbles, are British, and, as far as possible, local. The building has occupied over five years in erection.

The architect of the building is Mr. E. W. MOUNTFORD, of 17 Buckingham Street, Strand, a member of the Council of the Royal Institute of British Architects, and late President of the Architectural Association; amongst whose other recent works may be mentioned the Battersea Polytechnic, the Battersea Town Hall, the Northampton Institute, Clerkenwell, and St. Olave's Grammar School, Southwark, and who is just commencing the new museum and technical schools for the Corporation of Liverpool.

Additional illustrations of the Sheffield Municipal Buildings will be published next week.

Athens last year Professor Dürm and M. Magne had already made their reports. The former had gone very fully into the question of the defects and remedies, and his report was a valuable contribution to the study of the subject. That of M. Magne was a brilliant and well-illustrated memoir on the construction and ornaments of the temple rather than a more technical report on the defects and remedies; but he called attention to one very important detail, namely, the instability of the angles of the pediments. The local committee had already made arrangements for several 14-foot architrave stones being prepared on Mount Pentelicus.

The part of the temple which demanded the most immediate attention was the hexastyle portico of the Posticum. The state of the Posticum was such that it was impossible to execute any satisfactory repair without replacing at least five of the architrave stones. Of the six columns composing the portico, four only were free; two of them were more or less embedded in the mass of masonry containing a staircase which was once surmounted by a Turkish minaret. This mass secured the southern columniation. The architraves supported by the four free columns consisted of twelve stones. Of these twelve, only five were free from very great defects; but if five of them could be replaced with new material, two could be so pinned together to their neighbours that they might be supported sufficiently well. The worst defects were on the eastern side of the portico. With one exception the western stones were sound, which was fortunate, as they supported the portion of the Panathenaic frieze still left on the temple. With regard to the defective one, namely, that which once connected the north-eastern column with its neighbour, the simplest remedy would have been to replace it with new; but its removal would endanger a portion of the precious sculptures, and it would have to be keyed to a new stone placed alongside of it. Professor Dürm, in his report, suggested that the reason of this part being in so much worse condition than any other, was that the original builders had used for an interior part of the fabric a very much worse material than they had provided for the exterior. It was true that the marble of these architraves was more streaky than could be found on the exterior; but streaky marble of similar quality had endured well on the Temple of Jupiter Olympius. Another and more effective cause could be assigned to it, namely, fire, which had consumed all the inflammable part of the structure, and had very much calcined the whole of the superstructure of the Posticum, as the state of the surface of the marble showed. It had also weakened the lintel of the great western door, and some of the columns of the Posticum, especially on the eastern side, had also suffered. Many portions of the capitals and of the architrave stones in this part retained traces of iron plugs, which could only have been used to fix some material for the purpose of repairing the surfaces which had been split off by the action of fire. This completely explained why the architrave stones of this portion of the building, although much less subject to ordinary weather vicissitudes, had become so much more cracked than those of the peristyle. A large piece from the middle intercolumniation fell down in the earthquake of 1894, split off apparently at an ancient flaw. The course of deep stones above the architrave, which formed the back of the Panathenaic frieze, and ranged with it in level, was also very much cracked and dislocated, so much so that only two pieces in the whole length, very little more than a quarter of the whole, were in a fit condition to be retained. These pieces, however, were neither so difficult to handle nor to replace as the main architrave stones, which had a length of about 13 feet 9 inches each.

The lecturer then referred to the difficulties attending the removal of the condemned blocks and fixing those which were to replace them, and showed by the aid of diagrams how the operation could be performed.

With regard to the lintel of the great western door, the two ends remained in the wall, but the rest was gone, and the place was occupied by an exceedingly unsightly brick arch. This, it was hoped, would be replaced by marble; but there was not the slightest prospect of a 30-foot beam being found, nor could it be brought to Athens with existing appliances. The plan recommended by the lecturer, and accepted by the Athenian committee, and by Mr. Penrose's French and German colleagues, was explained by a diagram on the wall.

The insecure condition of the angles of the temple was to be traced to the great overhanging stones which supported the angular acroteria having a tendency to slip downwards and drag the neighbouring portions of the superstructure with them. The worst crack in the architrave was over the north-west angle column, where, owing to the fall of a large piece at the corner of the abacus, the bearing of the outer stone of the architrave was reduced to little more than a point.

In describing the north-west front, he said that between the fourth and fifth columns, reckoning from the south, a crack through the architrave had been produced by a cannon-shot, and the abacus of the fourth column had been so much shattered that it gave a bearing to no more than about half the thickness of the architraves which rested upon it. The

CATHEDRAL SERIES.—NORWICH: THE TRANSEPT.—THE AISLE.

## ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Institute of Architects was held on Monday evening last, Professor Aitchison, A.R.A., president, in the chair.

Mr. F. C. Penrose, F.R.S., read a paper on

### The Parthenon and the Earthquake of 1894.

Mr. Penrose said he had undertaken to describe the result of his recent examination of the Parthenon, the object of which was to advise the Greek Minister of Public Instruction, and the Archaeological Society of Athens, as to certain repairs which were required in consequence of the damage done to the building by the earthquake of 1894. Three international consulting architects—namely, Mr. Penrose himself, Professor Dürm (of Carlsruhe) and M. Lucien Magne (of Paris)—had been appointed to confer with a local committee, presided over by M. Cavvadias, the Government Superintendent of Antiquities, and consisting of several Greek members of the Athens Archaeological Society and some associated members, including Dr. Dörpfeld, M. Troump, a resident French architect, and the Government engineer, M. Balános, who was to superintend the repairs.

Having referred at some length to the principal events which had reduced the building to its present insecure condition, Mr. Penrose went on to say that when he arrived at



exfoliation of iron cramps connecting the architrave stones at the top had also injured all but one of the vertical joints, but beyond the breakages of the large splinters which had fallen the injury at these places from the iron cramps did not seem likely to extend. Among the diagrams shown by the lecturer was one illustrating the curious construction of parts, and another showing how the angles could be secured from slipping by connecting the great horizontal corner-stones by means of strong gun-metal cramps with the main cornice at a sufficient distance, so as to provide an adequate amount of weight to resist the tendency to slip.

Few of the new stones proposed to be introduced would make any difference in the general view of the temple, and scarcely any of the steel or bronze-work; and the new stone could be stained with copperas, as he had shown by experiment, so as to be almost indistinguishable from some of the old time-stained marble.

Professor E. Gardner said he first became acquainted with the Parthenon in company with Mr. Penrose. He was in Athens at the time of the earthquake in 1894. Some years before that an international commission was appointed to consider from the æsthetic point of view the restoration and clearing away of some of the added parts. The earthquake was not answerable for the cracks, as a minute examination failed to reveal new ones except in one or two minor instances. In fact, the earthquake did some good in calling attention to the necessity of strengthening the columns and the precarious state of certain portions of the building. Regarding the Turkish minaret, the great width of the door and the columns, he asked Mr. Penrose some questions. Nothing was more discordant to his mind than the rebuilding of the mangled columns, and the attempt to build up the old pieces had been very disastrous. It would be impossible to rebuild the whole, as there was not sufficient material, and to rebuild a few blocks would spoil the symmetry, and he hoped Mr. Penrose would ask for the demolition of those that had been re-erected. The jambs of the western door he thought might be removed for a time because the blocks had long inscriptions which would then be accessible. The staircase in the lower part of the minaret might possibly have belonged to a Christian church. It afforded a great deal of support to the architrave. Some years ago people wanted it removed as a later addition, but considering the support it gave it was considered dangerous to do so. He thought they would all be reassured after noticing the numerous cracks and the seemingly inadequate support of certain of the blocks when they heard from Mr. Penrose that the building could be repaired so easily.

Mr. R. Phené Spiers proposed a vote of thanks to Mr. Penrose. He felt, when he visited Athens, that all the measurements that were to be taken had been made, so he therefore made water-colour drawings of the ruins, every view of which seemed so different. He found, on examination, that later views showed very little change in the structure since he was there. He wanted to know the actual cause of the discoloration of the marble. Was it iron rust, decay of stone, or other causes?

Mr. T. J. Willson seconded the vote. He thought the whole architectural world was to be congratulated on the comparatively small extent of repair and restoration which the Parthenon required, and the small amount of damage done by the earthquake, which was not so bad as had been anticipated.

Mr. John Hebb agreed with the general procedure which had been employed; nothing could be better, he thought. The colouring of the marble to make it have the appearance of old work was wrong. The colouring should be left to nature, and very shortly the new work would be in harmony with its surroundings. He appreciated the ingenious way in which architraves had been raised, and the care with which the work of restoration had been carried on in other ways.

Mr. Hugh Stannus suggested a more general use of cement as a preservative.

Mr. A. Payne submitted photographs which were taken twelve years ago in order to suggest the progress of deterioration. He pointed out the difficulty of re-erecting the parts of the broken columns, as of course the bedding surfaces would not correspond and the outlines of the column could not be true.

Mr. J. M. Brydon took the opportunity of mentioning the difficulty which was still attached to the peculiarity of the frieze being placed in a position where it was not visible. One of the theories which had been suggested was that originally the frieze was intended to be more visible, but that the supply of funds caused outward parts to be erected which concealed it. He need hardly say he did not believe in that theory, but it was difficult to hit on one which would be convincing.

Mr. Penrose, in acknowledging the vote of thanks, shortly referred to the points raised in the discussion. He explained some of the precautions adopted by the committee, but as regarded the stains he believed they arose from the iron which was an element of the Pentellic marble. By the pointing with a dull cement it was possible that there would be no increase in the stains.

## EDINBURGH ARCHITECTURAL ASSOCIATION.

THE annual general meeting of the Edinburgh Architectural Association was held on the 12th inst. in the Royal Institution, Dr. Rowand Anderson, the retiring president, in the chair. The following were elected for the forthcoming year:—President, Mr. Thomas Ross, F.S.A., Scot.; vice-presidents, Mr. John Watson, architect, and Mr. James Bruce, W.S.; hon. secretary, Mr. T. Fairbairn; hon. excursion and syllabus secretary, Mr. A. Hunter Crawford, architect; treasurer, Mr. John Johnston, C.A.; and members of council, Messrs. J. A. Carfrae, J. D. Cairns, the Rev. P. M. Herford, David Robertson, A.R.S.A., William Rae Macdonald, and R. Morham. It was reported that at this time the membership stood at 302, which was practically the same as at the end of the year 1895-96.

Dr. Rowand Anderson then delivered the following valedictory address:—In the few remarks I have to make before resigning my office of president I do not feel I can do better than recapitulate and, if possible, emphasise some of the questions I have dealt with from this chair, firstly, because, if I have anything to say to you, it is better that I confine myself to such subjects as I have thought about; and secondly, because I consider that such questions as I have dealt with are of importance and should be discussed from time to time by our Association as an aid to forming public opinion on matters that every community must deal with periodically.

When I took office two years ago one of the questions prominently before the profession was that of education, combined with efforts to make our occupation a close one. I explained my views fully to you, and I have heard nothing on the other side since to lead me to think differently. At the bottom of this controversy lies a misconception of the nature of our business, as compared with the professions of divinity, law and medicine. The divine has to subscribe to a creed, his historical and philosophical knowledge of which must be tested. The lawyer has to administer the laws of the country, according to the fixed principles and form of those laws, and his qualifying knowledge of such must be ascertained. The physician or surgeon has to deal with disease in all its forms, and none can be successful unless he has acquired an intimate knowledge of the anatomy and functions of the body and all its parts, as also of the experience of the past and the various methods used in combating disease. They have not to provide what the public wants, in the same sense as a picture-painter or dealer, or as an architect in designing a house or other building has to meet the individual wants and desires of a client.

You go to men of the professions I have named for what they are certified to possess and to be able to do, and not to dictate to them in what manner you are to be spiritually consoled, or to have the law administered or modified in the settlement of your affairs, or to have your physical troubles alleviated, so that in each case your own wishes may be met. The public deal with us on a totally different footing. While it is true that a client may go to one architect rather than to another, because he is known, or believed to be a better educated man in his work than others, yet, taken generally, the architect is but the interpreter of the public idea of art at any given time, and he has to provide what the public wants and is prepared to pay for. No compulsory examination or diploma can alter this. The law cannot and will not protect the public from bad art, because the public can and must at all times protect itself, and if it gets bad art it gets what it wanted, and the only thing it is able to appreciate. The one hope for art, and I speak of art in its widest sense, is an educated public. When the public are able to distinguish good from bad, and when they come to look at art not as a question of mere ornament and as a thing apart from structural and functional truth, then the bad architect will naturally disappear, and no artificial aid will perpetuate his kind or find work for him.

While little has been heard lately of converting the architect into a certified professional man, our friend, the registered plumber, is still well to the front, and he is now asking the legislature to pass a Registration Bill as a means of protecting the public health against the ravages of the incompetent man. How the passing of such an Act can do this I cannot comprehend. If the legislature could insure plumbers good prices for their work there might be something in it. That registration will prove that a man is competent, and be a guarantee to the public that good work will be done, is a fallacy; nothing can make a good plumber or any other tradesman but employment on good work and under a competent foreman and master, and receiving proper payment for his work. Stuffing a lad's head with a lot of data about his work will no more make a good plumber than attending a class on navigation will qualify one to take a ship to sea. So far from the public requiring to be protected against the inferior plumber, it is the respectable plumber who requires to be protected against the public. The keen and excessive competition which is stimulated by the demand for cheap work; the pitting of men of substance, experience and character against men who have no



these qualifications is the real cause of bad work, and until that state of things is altered the registered plumber will only intensify the present unsatisfactory state of things. This claim to protect the public health is rather an arrogant one. The plumber is only a link in the chain, and, if registration is necessary for him, it is equally so for other tradesmen. The mason and the Irish labourer who lay the drains are in every respect as important as the plumber as far as health is concerned.

The State cannot protect the public from the incompetent tradesman unless it controls both parties to the contract, that is to say, the work and the price to be paid for it. To attempt to do this would, of course, be an absurdity. I have looked over the Plumbers' Registration Bill, and all I can see in it is an arrangement for the appointment of secretaries, treasurers and auditors, and the collection of fees, but nothing whatever that will add to the protection of the public and insure a higher standard of work, and for this very good reason, which knocks the bottom out of the whole thing, that no provision can be made for insuring payment for good work. But the State can do, and is doing much that is already bearing good fruit in improving everything that concerns public health and structures of all kinds, by the appointment of public health officers, the passing of Public Health and Police Acts, and by the powers conferred on health officers, burgh engineers and sanitary inspectors. The enforcement by law of these Acts alike against the public, the plumber and the architect is the true and only way of bringing about a better state of things.

While I am entirely opposed to all artificial distinctions of hall-marking of a man because he has undergone an examination on subjects which are admittedly not those that test the real qualifications that fit a man for his calling, I am all in favour of education. Give every young man a fair opportunity of equipping himself for his life's work, then let him swim or sink on his own merits or want of them. The young man who has good stuff in him will educate himself up to the standard of his time, because he knows that to do so is the only passport to success. But you must provide the means of his doing this, and as far as art work is concerned, that is the reason for establishing our applied art school. Every young man cannot get into a workshop or office where good and artistic work is done. He may, and often does, drift into a place where he learns little or nothing, but that can be to a large extent rectified by attending this school, and if there is earnestness as well as ability in him he will get every help and encouragement. This week three students are leaving having been awarded travelling bursaries, and I have such confidence in them that I feel sure they will submit for inspection an amount of work which, both for quantity and quality, will show that the committee have selected the right men. Two of these students are architect's assistants, and one a furniture designer, and it cannot be too widely known that our system of education makes no distinction between the different occupations of the students; the rewards and prizes at this school can be held by any art worker. Merit is the sole title that we recognise.

Now that I have said something about the student, I have something to say about the public. Our Association, gentlemen, does something to educate the public. We do not exist like other Associations for the benefit of the architect only, our strong point is that we exist chiefly for the benefit of architecture and its allied arts. The association of a large number of non-professional members in our midst is a feature that I hope will never be surrendered. The more we can interest the public in art the better for us and for art, and if all other institutes and associations will do as we do, the architect and his work would be better understood and appreciated.

The Saturday afternoon excursions, which are largely taken advantage of by our non-professional members, are most enjoyable and are always interesting and instructive. The unflinching courtesy with which we are always received shows that the noblemen and gentlemen who throw open their places to us know that we do not come out of idle curiosity, but from a desire to learn from and to appreciate all we see. This year our special thanks are due to the Earl of Hopetoun, Lord Torphichen, Mr. McKelvie of Hatton, Messrs. Scott, Bruce & Glover, W.S., and Mr. W. W. Robertson of H.M. Board of Works. We have still two excursions before the season closes, and on each occasion I can promise all who come a very pleasant and interesting afternoon. This is an eventful year in the history of our country; it marks a long period of progress, prosperity and comparative peace under the beneficent reign of our gracious Sovereign Queen Victoria, and in all those benefits we have shared. A great advance in architecture and, indeed, in all the arts, has taken place during Her Majesty's reign, and much of the improvement may be attributed to the direct influence and fostering care of the late Prince Consort. This Association is, therefore, in common with all the subjects of the British Empire, greatly interested in the question of the day as to the most fitting expression to be given to this thanksgiving and jubilee for the long and prosperous reign of her most gracious Majesty. I am aware that the suggestion which commends itself most highly at this time is the equipment or

endowment of institutions for the relief of the sick and suffering. But apart from the fact that infirmaries, hospitals and kindred institutions command at all times national sympathy and support irrespective of any special occasion like the present, I would like to point out that this is to a certain extent beginning at the wrong end.

There is a well-known proverb which says that prevention is better than cure. Applying it to this case I say do something to keep the people healthy and happy in mind and body, and there will be less need for infirmaries, nursing associations, &c. I would, therefore, like in a word or two to repeat what I dwelt on at greater length in a former address regarding the provision of a suitable place for amusement and relaxation for the masses of people whose means do not admit of their procuring such for themselves.

In my opinion nothing could better mark this year of jubilee or be more in accordance with the expressed wish of Her Majesty and the touching letter of the Princess of Wales, in which she pleads that when schools, hospitals and other institutions have been properly provided for, the poor should not be overlooked, than the inauguration of a movement to bring into the lives of those whose means are only sufficient for the bare necessities some of that brightness and pleasure which are the outcome of comfortable and cheerful surroundings and innocent recreation. I think that the institution of a great free place of recreation for the people would be found to have the most potent influence not only in preserving them from many habits which lead to loss of health, but in refining and educating them and in promoting that cheerfulness and contentment of mind which is the enemy to all social disturbances, and I do not think that the municipality could in this year of jubilee enter on any scheme which would have more far-reaching or more beneficent effects.

We hear much at present about the encouragement of music in our midst, but I submit that this can best be done by making music a part of the daily life of the people, and that can only be accomplished by having some vast place to which crowds of men, women and children can resort, and have their little social parties and listen to music without any charge for it. The municipality ought to maintain a first-class orchestra for this purpose. The establishment of such a place of recreation for the people is, in a climate such as ours, a distinct and crying want in every city; and the revenue derived from the sale of refreshments, from bazaars, military tournaments, flower shows, &c., would be sufficient to cover current expenses.

This evening terminates my occupancy of this chair, and, in saying good-bye to you, I have to introduce to you our chosen successor, Mr. Ross. Mr. Ross has long been a loyal and active member of this Association, and is well known not only to all of you, but to a very wide circle outside. His *magnum opus* which he prepared in conjunction with Mr. McGibbon, another valued friend and member of this Association, will long remain a monument of industry and research. It is now having, and will continue to have, an important influence on Scottish architecture. When Mr. Billing's work on "The Baronial and Ecclesiastical Antiquities of Scotland" was published, it disclosed the existence in Scotland of a class of buildings unlike any that had hitherto been illustrated. The publication of this work coincided with a period of great agricultural prosperity and high rents, as a result of which many old houses were enlarged and new ones were built, and all were more or less in imitation of the buildings illustrated in Mr. Billing's work. It cannot, however, be said that this work led to the erection of buildings which mark the recovery of a lost art, or that the buildings erected at this time were in any way expressive of the social or political state of the time, because all the buildings illustrated by Mr. Billing belonged to a time when a house was more or less a castle, a building to keep people out, not one to invite you into, and they were, therefore, not fitting types for buildings erected in a time of peace and prosperity. A great opportunity for a revival of art was thus lost. The great merit of the work on Scottish architecture, by Messrs. McGibbon & Ross, is that it illustrates a large number of buildings not noticed in Billing's work, buildings eminently Scottish, and at the same time eminently domestic in their character. These are the buildings that ought to be studied with a view to their application to present-day work, and if we in Scotland are to develop a domestic art having a distinctly local colour—and we ought to do so—it will be largely owing to the publication of this valuable work.

Gentlemen, I have to thank you for the courtesy and consideration you have at all times extended to me. To the permanent officials, our honorary secretary and treasurer, I and we owe a great debt of gratitude. Their continuance in office, with their long experience and knowledge of our affairs, is of great importance to us. I have now to introduce to you my successor in this chair.

A hearty vote of thanks was awarded to Dr. Rowand Anderson on the conclusion of the address.



## PYRAMIDS AND THEIR RELATION TO MONUMENTAL AND SACRED ARCHITECTURE.\*

(Concluded from last week.)

WE will now turn our attention to the second division of our subject—the relation of pyramids to sacred architecture.

The most striking adaptation of pyramids or structures of pyramidal form to the purpose of sacred architecture is to be found in Mexico and Central America. The conquest of Mexico by the Spaniards under Cortez in 1521 discovered to the Europeans a civilised people possessing considerable knowledge of the arts and sciences, having an architecture of their own, dwelling in cities protected by fortifications, and possessing a monarchical form of government with well-drilled armies, a system of religion with temples, priests and places of sacrifice, codes of morality and laws that would put to shame some of the civilised nations of the present time. The question as to the origin of this wonderful people has, I think, never been satisfactorily settled, nor is it a question for us to attempt to settle. A people commonly called Toltecs is said to have occupied between the fourth and sixth centuries of our era the valley of Mexico. The Mexicans do not pretend to any very remote antiquity or divine descent. There are no heroes who lived thousands or tens of thousands of years, nor any of the extravagances that usually mark the dawn of history in the Old World. On the contrary, their history modestly begins with the arrival of the Toltecs in Anahuac, and with them the beneficent teaching of a stranger who lived among them, taught them architecture and the arts of agriculture, instructed them in their religious duties, and then left them by sea promising to return. For three or four hundred years the Toltecs lived in peace, covering the tableland with their monuments. But evil times came. Famine, war and disaster drove them from their peaceful homes, and they migrated, it is said, southward toward Yucatan, where, it is usually assumed, they erected the architectural monuments whose ruins are now found in that country. From the departure of the Toltecs until the arrival of the Aztecs in the twelfth century nothing is known politically of the annals of Anahuac. The Aztecs were in peaceable occupation of the country at the time of its discovery and conquest by the Spaniards.

The principal monuments that these people have left behind them are the teocallis, literally "Houses of God," the temples of the people. These are pyramids in terraces with flat tops, and always surmounted by a chamber or cell, which is, in fact, the temple itself. They seem to be of all ages, for, if one may trust traditions, that of Cholula is as old as the early Toltecs, whereas the great teocalli of Mexico was only finished five years before the discovery of America by Columbus, and the Spaniards met with many persons who had assisted in its erection. It has, however, with all the native buildings of the city been swept away by the ruthless bigotry of the conquerors. Of these teocallis, the largest and probably the oldest is that of Cholula. Its dimensions are, so far as they can be ascertained in its present ruinous state, 1,440 feet square and 177 feet high, divided into four storeys, the fifth being formed by the cell or temple, which has now been replaced by a chapel dedicated to the Virgin Mary. There are two pyramids at Teotihuacan, the largest of which is a square of 645 feet, with a height of 171 feet, and there are others at Tezcucio of about the same size, and, like them, divided into five or seven storeys; but the most interesting of those brought to light is that of Xochicolo. It is situated on the top of what appears to be a natural elevation, but which has been fashioned into terraces by art. The pyramid itself is in five storeys. The stone facing of the three upper storeys has been removed to repair a sugar mill in quite recent time, but the two lower storeys still retain their sculptures and architectural ornaments. Besides the large many-storeyed pyramids there are numerous examples in many parts of the country of one storey only. Like all others in Mexico it is only a device to raise a temple to such a height as should give it dignity and enable the ceremonies performed on its upper platform to be seen by all the people. It is indispensably necessary to bear this distinction in mind in speaking of these monuments, as careless writers connecting the word pyramid with Egypt are too apt to confound two classes of monuments entirely distinct and dissimilar. The Egyptian pyramid is always a tomb. The principal object of its erection is the sepulchral chamber in its centre. It always terminates upwards to a point. In no instance are there external steps leading to a cell or chamber at the apex. In fact they were always tombs, never temples. The Assyrian pyramids, on the contrary, have much affinity with the building of which we are now speaking. They were always in terraces. The upper platform was always crowned with a chamber or cell, and there were external steps leading to this, which was the principal object of its erection. If we hesitate to admit that there was

any connection between the builders of the pyramids of Assyria and those of Mexico, we must at least allow that the likeness is startling and difficult to account for on the theory of mere accidental coincidence. It is quite probable that primitive man as he slowly emerged from the environments of ignorance with which his mental powers had been enshrouded, became convinced of an unseen and overruling power—a hidden mystery worthy of admiration. If such were the case the most natural objects of worship would be the objects by which he was surrounded. The sun being the most brilliant as well as the most potent object that met his gaze, would be one of the first to command his adoration. The moon and stars would in turn command his respect, and finally fire, as a representative of the sun, would become an object of worship. The same elements in nature, acting on minds in a similar condition, would produce similar results. The ancient Assyrian erected a pyramid, and on its flat top offered sacrifices to his god in the presence of the entire people. The more modern Mexican having by a similar process of mind reached a similar conclusion to that of the ancient Assyrian, proceeds in like manner to erect his pyramid, and upon its broad top to offer his sacrifices in the presence of the assembled multitude. We are informed that the Aztecs were most sincere in the practice of religious rites. They believed in a Supreme Creator, invisible yet omnipresent, but requiring numerous assistants to perform his will, each of whom presided over some special natural phenomenon or phase of human existence. They had thirteen principal and several hundred inferior deities. Their god of war was a patron divinity of the race, and myriads of human victims were sacrificed to him yearly. In each principal city there was the great pyramid, besides several smaller ones, and it is estimated that there were upwards of 40,000 of these places of worship in the empire.

The Toltec race, whose occupancy of the valley of Mexico preceded that of the Aztecs, is said to have emigrated southward and to have occupied what is now known as the peninsula of Yucatan. As in Mexico, the principal monument of Yucatan is the teocalli, but in this case their design is somewhat different from those in Mexico and they were probably erected for a different purpose. They are not generally in terraces like those of Mexico, but rise at about an angle of 45 deg., the platform on which the temple rests being reached by a broad flight of steps. The pyramid of Palenque, which is one of the most interesting ruins of Yucatan, may have been erected as a palace. The pyramid on which the superstructure is built is 310 feet long, 260 feet wide and about 40 feet high. The pyramid is divided into three parts by sill ribbons. The superstructure is reached by broad stairs on its west side. The buildings erected on the pyramid are one storey of 25 feet with flat roofs. Around three courts of different extent are grouped the corridors, halls and rooms. From the one of the five larger entries which extends the most outward, we reach by downward stairs of eleven steps the principal courtyard. Most remarkable are the ceilings of the rooms, formed by stone blocks joined one to another and the symmetrical square tower ending after many gradations in a steeple.

Stone sills bound by the perpendicular ribbons, which had friezes with pictorial work between them, divide the different storeys. All the masonry had an inward and outward covering of polished stucco ornamented with strange fantastical pictures. The floors are of stone, joined by cement and covered also with polished stucco. The other temples found in Yucatan differ but little from this one, except in size, and, architecturally speaking, they are less interesting than the palaces, the splendour of the temple consisting in the size of its pyramid, to which the superstructure is only the crowning member. In the palace, on the other hand, the pyramid is entirely subordinate to the building it supports, forming merely an appropriate and convenient pedestal, just sufficient to give it a proper degree of architectural effect.

Mexico, Central America and Peru each possess wonderful monuments of architectural skill. By whom they were wrought will probably never be known, as the nations who wrought them left behind no literature by which their identity or connection with the Old World can be established.

The final subdivision of my subject, "The Pyramidal Shaped Temples of India," will not occupy us for a great length of time. The earliest monuments of India are the rock-cut temples, which are of themselves so interesting that they will form the subject of a future paper. The structure of the earliest Indian temples was extremely simple. Pyramidal and of large dimensions they had no light except that which the door afforded. And indeed the gloom of the cavern seems to have led them to consider the solemn darkness of such a mansion sacred. There are ruins of this sort at Deogur and at a spot near Tanjore.

In proportion to the progress of the country in opulence and refinement their sacred buildings became highly ornamented, and must be considered as monuments exhibiting a high degree of civilisation of the people by whom they were erected.

Very highly-finished pagodas of great antiquity are found

\* A paper by Mr. Cyrus K. Porter in *Stone*.



in different parts of Hindostan, particularly in the southern part, where they were not subjected to the destructive fury of Mohammedan zeal. One of the most imposing structures of this kind is the pagoda of Chillamboram, near Porto Novo on the Coromandel coast. On account of its antiquity it is held in very great veneration. This monument should perhaps be more properly described as a cluster of pagodas enclosed in a space 1,332 feet in length and 936 feet in width, whose walls are 30 feet high and 7 feet thick, each side being provided with a highly-decorated frustum of a pyramid over the entrance gateway. The pyramids or pagodas which stand over the outer enclosures rise from rectangular bases and consist of several floors. The passage through them is level with the ground. One of the largest temples known is that on the small island of Seringham, on the Coromandel coast. It is situated about a mile from the western end of the island, and is thus described by Sonnerat:—"It is composed of seven square enclosures, one within the other. Each has four large gates with a high tower (pagoda), which are placed one in the middle of each side of the enclosure and opposite to the four cardinal points."

The outward wall is near four miles in circumference, and its gateway on the south is ornamented with pillars, several of which are simple stones 33 feet long and nearly 5 feet in diameter. Those which form the roof are still larger. In the innermost enclosures are the chapels. The extreme veneration in which Seringham is held arises from the belief that it contains the identical image of the god Vishnu which used to be worshipped by Brahma. The pagoda forms a very prominent feature in the architecture of Burmah. The one at Pegu is octagonal in plan, with a diameter at the base of 395 feet and a height of 361 feet. One on the Irrawaddy river opposite Ava is 944 feet in circumference and 160 feet high. The Burmese pagodas are usually square edifices of great extent, the base comprising porticoes and central chambers, and terminating upwards in octagonal or polygonal straight-lined pyramids. The pagoda also forms an important feature in the architecture of China. They are of brick covered with marble, or most generally with glazed tile, and are built in storeys one over the other from three, four or five to as many as nine in number. Each storey is reduced in width and has a gallery around it. The Chinese temples were frequently raised on a square pyramidal-shaped platform, and in this respect were similar to the temple or palace of Palenque in Yucatan.

Ever since the destruction of the world by the Flood there seems to have been a disposition among men of all nations to protect themselves from a similar occurrence by the erection of pyramidal towers, the first notable example of which was the Tower of Babel. The object for which this notable tower was erected having been by Divine Providence frustrated, mankind sought out new objects to which they could turn their attention.

The old kings of Egypt, wishing to hand down to posterity some evidence of their power and glory, erected immense tombs which have in all ages been the wonder of the world, in the centre of which they constructed a chamber insignificant in size when compared with the whole mass, in which a single sarcophagus was deposited, containing all that was left of their mortal remains. The ancient Assyrian and the more modern Toltec and his successor, the Aztec, inspired by religious zeal, erect for themselves immense pyramids with the tops truncated into a platform, upon which they can offer a sacrifice in adoration of the majesty of God as they understood him, or to appease his wrath when misfortune assailed them. The Hindoo, the Burmese and the Pagan Chinese beautified and adorned their temples with massive pagodas beneath whose shadows they offered their prayer, their offerings and their sacrifices to Brahma, to Vishnu, or to Siva.

Even the Christian Church has not been altogether exempt from this disposition to worship a Divine Being in places erected and dedicated to his service and ornamented by imposing towers and spires. As the Pagan Hindoo of old entered his temple through the ponderous pagoda that adorned its front, so do we of to-day enter our sanctuaries through towers beautifully designed, proportioned and ornamented, to chant hymns of praise and to worship the God of our salvation.

### THE PARTHENON IN 1830.

IN 1830 M. Raoul Rochette was sent by the French Government on an archaeological mission to Greece. The following report by him on the condition of the Parthenon and other buildings of the Acropolis is not without interest at a time when the restoration of the building is receiving attention:—

I must now speak of Athens, at least as far as I have seen, but here again the matter is so rich and so abundant that though I have only been at work for a fortnight I should have almost a volume to write. You are aware that the Acropolis was the sanctuary of ancient art as well as of the Athenian religion, and that it is there, notwithstanding all the revolutions and disasters which have afflicted and destroyed Athens, the

most beautiful monuments probably ever executed by mortal hand are still to be found. By a chance, which one can hardly admire enough, these monuments had scarcely suffered at all during the last war, in which the Acropolis served as the field of battle between the Greeks, who were in possession of it, and the Turks, whose batteries were erected in the neighbouring hills of the Museum and Pnyx. But since Athens has become the capital of Greece, the Acropolis has been made, in its turn, the particular object of the care of a Government which cannot be ignorant that the monuments and recollections of ancient Greece are among the first objects of interest which learned Europe associates with the destinies of the modern country. Their labours commenced with the removal of all the barbarous obstructions that encumbered the avenues of the Acropolis. The three Turkish batteries erected at different heights on the steps, and in the very bosom of the Propylæa, have been demolished; the walls which surrounded the columns of the façades of the Propylæa have been destroyed; in fact, it may be said that the ancient soil has everywhere triumphed over the barbarism which had possessed it, and now one may traverse without obstacle, and study without difficulty in all its details, the magnificent vestibule of the Acropolis, which ancient orators, in the utter want of words to express their admiration, could only compare to the Parthenon, and which they were pleased to associate with it with as much enthusiasm as if they had both been conceived by the same brain. But not only are the Propylæa at present free and without any foreign construction; still more has been achieved. In order to restore them as soon as possible to their primitive state much of the rubbish of the architectural elements of the Propylæa has been removed which had been employed as materials in the Turkish fortifications. Some of these elements have been already restored to their places; others which will be are lying on the ground, where they will be measured with greater facility and studied very closely, so that it is to be hoped that ere long the Propylæa will be reclaimed from that state to which they have been so long reduced. Among the most interesting appearances which have very recently resulted from this double work of demolishing and restoring, I must particularly notice the little Temple of Victory without wings, which had so long been a problem to antiquaries, as much as the Propylæa themselves, buried in Turkish buildings, had remained a mystery. This little temple is now found entire, with its four columns on both its façades, and with the walls of its cella on three of its sides. Each block of marble marked with the imprint of the time of Pericles has been brought from the middle of a mass of masonry and restored to its ancient place. The sculptures of the frieze have likewise been found; these had very happily escaped the hand of Lord Elgin, as they were hidden, like unhewn stones, in a modern wall—the only service the Turks could render to antiquity.

The Temple of Victory without wings will thus soon be re-established in all its integrity; all that is wanting are the four fragments of the frieze which are now in London; and England, which has reaped the fruits of Lord Elgin's operations, will certainly not refuse to restore to the Greeks the plaster in her possession, which would allow of the entire frieze being recomposed. I have had a drawing made with the greatest care of this precious monument of the time of Pericles, unexpectedly restored in our own. I have tried to do more, by asking from the king, for our museum, a model of the plasters of the basso-relievo recently found. His Majesty was pleased to inform me that it was his intention to offer a collection of them to the French Government; but architecture not being included in the projected mission, I have procured the Ionic capital, with its base; and it is a present which will, I am sure, be received with gratitude by our School of the Fine Arts, in which these precious remains of a Greek and Ionic Order so pure and elegant will so justly take their place in our gallery of architecture. I will likewise procure models of the capital and base of the Ionic Order of the interior portico of the Propylæa, which are in all respects most interesting remains of the history of ancient art, restored almost intact by the last excavations. In fact, in order to complete this series of examples, all of the highest class, imprinted on the finest monuments of Grecian antiquity, it is also my intention to get models of two of the Ionic capitals of the Erechtheion, a double temple with a double portico, a veritable wonder of ancient art, in the composition of which there are three different Ionic Orders, of which I believe we only possess one specimen in our architectural gallery.

In the state in which the Propylæa are at present, with the Temple of Victory without wings in front of the left wing, and the Pinacothèque, which forms the right wing, and only wants the ceiling, and of which the four admirably fitted walls have been found intact, I have been able to show as a whole and in details this superb vestibule of the Acropolis in a manner which I have no hesitation in saying will surpass all the works from the time of Stuart to our own.

As soon as we have completed our labours on the Propylæa



M. Morey and myself intend to undertake an examination of the Erechtheion, which is now almost wholly freed, and, consequently, in a state in which it could not have been seen by any of the antiquaries and architects who have preceded us. But by means of what has been already restored to its place, and what is lying on the ground, a more correct and complete architectural study of the Erechtheion may be now made than has ever yet been effected; and this result of my voyage, were it the only one, executed with all the care and talent M. Morey could and has bestowed on it, will certainly be of great interest to science.

The Parthenon has also, of late years, occupied the cares of the Greek Government, but unhappily without its being in the power of this Government, or any one in the world, to repair the frightful losses this monument has suffered, and of which you, as well as the whole of Europe, are aware; the most cruel, and still the most sensible, are not those which it owes to the cannons of the Venetian or the barbarity of the Turks. The mosque erected in a part of the *cella* of the Parthenon will soon disappear, but the sculptures removed from the pediment and frieze by Lord Elgin will never come back; and here is a frightful void, which is everywhere felt, and more so at Athens than elsewhere.

In order to repair as much as possible the losses sustained in this manner, excavations are being made in the masses of rubbish which still cover the soil and avenues of the Parthenon, and four fragments of the frieze, probably the most beautiful in existence, have happily been found, and, though long buried in the ruins of the edifice, they have not suffered from attacks of age or barbarism. These fragments are really *chefs-d'œuvre*, all four being of different subject and character. I have made careful drawings of them, and have obtained King Otho's promise that plasters of these admirable basso-relievos should be offered to the French Government, and sent to Paris at the same time as those of the frieze of the Temple of Victory. Paris will thus soon have fresh means of appreciating the art and taste of Phidias from some of the most beautiful fragments of his chisel; and if this lesson is not lost, like many others, it ought to profit France as much as it will honour Greece. I should not forget to state that in an excavation opened last year at the south-east angle of the principle façade of the Parthenon, numerous fragments of the ancient Temple of Minerva, burnt by the Persians, have been found at a depth of about 12 feet; they were undoubtedly buried by the Greeks themselves, as materials of no value, when they constructed the Parthenon under the administration of Pericles. But these fragments, nothing to ancient Greece, are at the present time precious remains of the history of art; they consist of tiles, called *antefixa*, of fragments of cornice and frieze, of burnt-coloured earth, which are authentic monuments of a taste for polychrome architecture; an archaeological question of the greatest interest to artists and antiquaries. I have made drawings of all these fragments, with their colours exactly marked; and it is the first fruit of my researches in Greece that I expect on my return to publish remarks, as those which will most directly benefit science, on one of the questions which is most before the archaeological public.

#### THE TOUR DE L'ÎLE, GENEVA.

THE following communication from Mr. Lawrence Harvey, architect, appears in the *Geneva Telegraph*:—

On the island which divides the Rhone into two channels there is a very old tower. It is a very ugly tower which few of the visitors to Geneva even notice. On account of its plainness there is some likelihood of its being pulled down, to the grief of lovers of antiquity who are agitating for its being left standing.

This tower is the remnant of an old castle built in 1219 by a bishop of Geneva in order to protect himself against neighbouring feudal chiefs, called the Counts of Genevois. From that time this venerable relic has been the witness and often the centre of every memorable event that has happened in Geneva.

The power of the Counts of Genevois waned and was replaced by that of the House of Savoy, the same which now rules over Italy. The island castle, defended by two of the canons of the cathedral and a few Geneva citizens, was besieged and taken by the Counts of Savoy. From the stronghold of liberty under the good bishops of Geneva, it became the stronghold of tyranny. The bishops became the mere tools of the family of Savoy, the noblest sons of Geneva suffered martyrdom within the walls of the very tower which still remains, and at last the excess of evil brought on the Reformation, that great religious and likewise political revolution which has changed the course of the world.

It is not unlikely that if the last bishop of Geneva had been faithful to his trust as sovereign and guardian of the Geneva State there would have been no religious change in Geneva, no Calvin, no Knox, no Bishop Miles Coverdale, and consequently

no Oliver Cromwell and no Jean Jacques Rousseau. Neither would there have been a free Holland, nor a learned Scotland, nor a go-ahead Massachusetts and afterwards United States of America, for all these were leavened by the spirit of John Calvin. Nor would there have been a French revolution to realise the contract social which Jean Jacques Rousseau had discovered from the example of his native city.

But this is not all. The old tower stands close to the spot where Julius Cæsar, the greatest man of antiquity, started to discover Gaul and Great Britain fifty-eight years before the Christian era, a fact equal in importance to the discovery of America by Christopher Columbus. Yet this tower, hallowed by such world moving memories, bears not a single inscription to record the fact, and it is now contemplated by the Geneva authorities to remove the tower altogether. At all events, not the slightest effort has been made to keep the tower. A huge building is being erected close up by which the tower will be dwarfed and made more unsightly than it was; and yet it would have been so easy to have erected a building equally useful for practical purposes which would have included the tower in its design. To obtain this result it would have sufficed to bind the buyer of the land to the condition of erecting a building in which the tower would have been included to the satisfaction of the Town Council. Nothing was done, and we may conclude that nothing was wished to be done.

Such want of appreciation of old landmarks of history can only be explained by the fact that the Genevese people have practically disappeared to make room, as an American city, for a floating population come from all parts of the earth. It is a fact over which Englishmen, the old and staunch friends of Geneva, may mourn but cannot help. *Sic transit gloria mundi*.

#### TESSERÆ.

##### Philibert Delorme on Compliant Architects.

NOTHING strikes us as worse and more ridiculous than to wish, as happens only too frequently nowadays, to impose on architects something else than programmes; nothing gives a more gloomy idea of the state of the arts and those who profess them than to see artists accept all the extravagancies imposed by persons ignorant of practice under the pretext that they pay the bills. Tailors have on this score more moral courage than many architects, for a good tailor will say, if one orders a ridiculous coat, "I cannot make you a garment which will disgrace my house, and which will make a laughing-stock of you." This evil dates sufficiently far back, for Philibert Delorme wrote about 1575:—"I desire to inform you that for thirty-five years gone and more I have observed in diverse places that the major part of those who have made or desire to make edifices have begun them even so hastily as they have lightly considered of them; thereby has resulted most often repentance and derision which always follows those ill-advised in such wise that they who think to understand truly that which they would do have required the contrary of that which was possible and ought indeed to be done. And if by good chance they sought from someone advice touching their resolve and undertaking, it was a master-mason or master-carpenter, as one is wont to do, or perhaps some painter, some notary, or others who hold themselves for well informed, and for the generality have hardly better judgment and counsel than those who ask it from them. Oftentimes likewise I have seen great personages who have decided themselves, for as much as the most part of those who are about them, never wishing to gainsay them or desiring to please them, or, indeed, because they themselves lack understanding answer straightway with the words, 'It is well said, my lord; it is a fine invention; it is very well imagined, and shows truly that you have an excellent understanding; never will such another work be seen in the world.' But the flatterers think quite otherwise, and talk of it behind his back, or perhaps elsewhere. In this wise many seigneurs cheat themselves, and are satisfied with their achievements."

##### St. Mary's Abbey, York.

The early history of this abbey appears to be lost in obscurity; it is, however, almost certain that there was a monastery on the site during the time of the Saxons. Coming down to the Norman era, we have a very clear and precise account by Stephen, called the first abbot. He can only have been the first abbot of the new monastery which was built by him, as Roger de Hoveden (Howden) says, "In the year 1056 Leward, the brave earl of the Northumbrians, died, and was buried in the cloister of the monastery of St. Mary without the walls." The first stone of a new and much larger establishment, over which Stephen ruled, was laid by William Rufus when he visited York, soon after his father's death. Stephen died in 1112. Stow mentions that during the time of Savaracus, the fourth abbot, the monastery was burnt in a dreadful conflagration; but it must only have been partial, for there is



no record of rebuilding from the time of Stephen until that of Simon de Warwick, elected abbot in 1258, who appears to have raised the state of the monastery to one of great splendour and security. From the time of Simon until the dissolution the records are lost, and we have only the mere names of the eight remaining abbots. The remains, however, bespeak an almost entire rebuilding about the year 1450, when William Wells was abbot, he having been elected in 1423, and resigned in 1456, being appointed to the see of Rochester. Taking the epochs of the rebuilding of the different parts of the monastery from the remains, they divide themselves into five distinct periods:—First, the Saxon, of which the only remains are the rough foundations of the east end of the church; second, the Norman, when the monastery was entirely rebuilt by Stephen, under the auspices of William Rufus, about 1100—the remains are the great gateway from Marygate, the vestibule to the chapter-house (exceedingly beautiful as to plan and details), the misericord, the cellarer's office, the school of the monks, and the rough foundations of the north-east part of the east end of the church; third, the Early English, when the church and chapter-house were entirely rebuilt by Simon de Warwick, from 1250 to 1290, of which there are extensive remains; as also of the fourth, the enriched Gothic, about 1450; fifth, the works that appear to have been going on during the time of the dissolution. The walls of a chamber of this period over the gateway are lined with brick; there is no appearance of this material being used before. From the comparative value of the northern abbeys and priories, as given in Dugdale's "Monasticon" by Stephens, the abbey of St. Mary's, York, was considerably the richest.

#### Classification of Crystals.

The primary forms of crystals are arranged in systems, each system containing those forms which have an equality in the number, size and direction of the axes. Six systems are admitted, namely, the cubic or tessular system, having three perpendicular equal axes; the right square prismatic system having three perpendicular axes, two only of which are equal; the rhombohedral system having four axes, three equal and inclined to each other at an angle of 60 deg., the fourth unequal and perpendicular to the other three; the right rhombic prismatic system, with three perpendicular unequal axes; the oblique rhombic prismatic system having three unequal axes, one oblique on the second but perpendicular to the third, the second and third being mutually perpendicular; lastly, the doubly oblique prismatic system having three unequal axes, all mutually oblique. Now, it is remarkable that certain optical and other properties are connected with these systems. Thus, the crystals of the cubic system possess the power of simple refraction only, and when heated expand equally in all directions. The crystals of all the other systems enjoy the property of double refraction and expand unequally in certain directions when heated, but in all doubly refracting crystals there is one or more directions in which no double refraction takes place: these are called the axes of double refraction. The crystals of the right prismatic and rhombohedral systems have only one axis of double refraction, while those of the right rhombic prismatic, oblique rhombic prismatic and doubly oblique prismatic system have two axes of double refraction. In some doubly refracting crystals the extraordinary ray is refracted from the axis; in others, towards the axis. The first are called negative or repulsive, the second positive or attractive. Now, it is remarkable that those crystals which have a negative or repulsive axis expand, when heated, most in the direction of their axis; while those with a positive or attractive axis expand the least in that direction. These facts show that while the elasticity of crystals of the cubic or tessular system is equal in three rectangular directions, it varies in different directions in all other crystals. In those of the right prismatic system it is equal in two perpendicular directions; in those of the rhombohedral system it is equal in three directions, which are mutually inclined at an angle of 60 deg. In the three remaining systems it is unequal in three different directions. As the properties of crystals are considered to be those of their constituent molecules, it follows that the forces which act in the crystal must act in the constituent parts.

#### Sir Joshua Reynolds.

Reynolds was really a great artist; gorgeous in tone and colour, unimpeachable in composition, deep in light and shadow, beautiful in character, and the purest painter of children and women that ever lived in the art, Greek or Italian. His ignorance belonged to the period, his beauties were entirely his own; and, though he overrated Michel Angelo, and has done injury to taste by his sincere conviction that he was right, yet, had he lived to see the Theseus or Ilyssus, he would have been equally candid in saying he was in error. Lord Heathfield is a portrait that need not fear any work of Titian's for men, and Mrs. Parker, a tender, sweet picture of a woman, was never equalled in sentiment or delicacy by any work of the Venetian and Roman schools. Where were children ever so completely

hit as in the *Infant Academy*? Who surpassed the propriety of his backgrounds as well as their splendour? His eye, or rather his organ for colour, was exquisite, nor is there in the whole of his works a heated and offensive tint. He did not combine essential detail and breadth so beautifully as Titian; but place one of his finest portraits by the side of any picture of Titian's, see them at the proper distance, and Reynolds would keep his station. Here, however, the praise must stop. Reynolds could have no more painted *Pietro Martire* than he could have revived the martyr after he was dead. He was not so great a man as Titian, because he did not, like him, remedy his ignorance when he found it out at a much earlier age. He was always talking of what he would do if he began the world again. Sir Joshua loved society; he was the deity of his coterie; he liked a glass of wine and a game at whist; and he never lost his temper—because he was successful in the world, but the first time he was thwarted he got in a passion. Reynolds was a great genius in painting, but not a great man. He raised English art from the dust, and gave English artists an *aplomb* in society which they never had before, and he first reduced the art to something like system by his discourses; but not having moral courage to resist the formation of an academy, which he could have done by his influence and his genius, he compromised the art and was indirectly the means of throwing it off its balance.

#### The Nimbus in Christian Art.

The nimbus was originally given in Christian art to sovereigns and allegoric personages generally as the symbol of power or distinction, but with this difference, that round the heads of saintly and orthodox kings or emperors it is luminous or gilded, round those of Gentile potentates it is coloured red, green, or blue. About the middle of the third century it begins to appear, and at first as a special attribute of Christ, later on appearing round heads of angels, evangelists and apostles. Finally, it was assigned to the Blessed Virgin and all saints, but not as their invariable attribute before the seventh century.

#### GENERAL.

**The Duke of Norfolk**, Mayor of Sheffield, has given a plot of ground of 20 acres in the Brightside division for use as a public park, in commemoration of the Diamond Jubilee and the Queen's visit to Sheffield.

**The Comtesse de Castellane**, née Gould, has given 1,000,000 francs for the purchase of a plot of ground and the construction thereon of a safe, durable and commodious building for the annual charity *fêtes* in Paris. The Cardinal Archbishop of Paris intends to purchase, if possible, the land in the Rue Jean-Goujon in order to found some charitable work.

**The French Government** have presented to the Académie the painting by M. André Brouillet which represents the reception of the Emperor and Empress of Russia by the Academicians on October 7, 1896.

**The Slade Professor of Fine Art**, Mr. H. E. Wooldridge, M.A., will give his first three lectures upon the "Sphere of Paduan Influence" on Monday, Tuesday and Wednesday, May 24, 25 and 26, at the University Galleries, Oxford, at 4 P.M.

**The Awards** to British artists at the Dresden exhibition are as follows:—*Large Gold Medal*—Mr. Strang. *Small Gold Medals*—Mr. Watson, Mr. La Thangue, Mr. Roche, Mr. Cameron, Mr. Pegram and Mr. Frampton.

**The New Garrison Church** at Strassburg, which was commenced in April 1892, has cost 1,400,000 marks. The architect is Herr Louis Müller, of Frankfort. The style adopted is local Gothic, and the building will accommodate 3,000 worshippers.

**Messrs. Layton**, the insurance publishers, have arranged with Mr. Edwin O. Sachs for the immediate publication of a treatise entitled "Fires and Public Entertainments," which will include exhaustive particulars of over 1,200 fires which have occurred at theatres, music-halls, assembly-rooms and temporary buildings, involving over 20,000 fatalities. Mr. Sachs's collection, with its analysis, has been in preparation some considerable time; and he aims at strengthening the hands of those anxious to insure the safety of the public when attending places of amusement.

**Mr. Dodgshun**, of Leeds, is preparing plans showing new receiving wards and new tramp wards in order to extend the Hunslet Workhouse so as to give more room for the old men, and to provide a larger kitchen and new bath-rooms, school building, hospital with accommodation for nurses, &c.

**The New Swing Bridge** over the Dee at Queensferry, Hawarden, is rapidly approaching completion, and it is expected that it will be ready for opening by Mr. Gladstone on Whit-Monday.



# The Architect.

## THE WEEK.

THE award of the medals in the Architectural Section of the Salon gave rise on Friday last to some commotion. For the Médaille d'Honneur M. PONTREMOLI obtained 37 votes, M. MARCEL 32, M. CHANCEL 9, MM. MARCEL and BLANC 2, M. BLANC 1. As by the regulations at least 42 votes were required, it was necessary to make a second attempt, when M. MARCEL gained 43, M. PONTREMOLI 39, MM. MARCEL and BLANC 3. This attempt also was fruitless, for 44 votes were necessary. M. GINAIN, who served as president, accordingly declared that the Médaille d'Honneur would not be awarded. But the electors protested, declaring that as M. MARCEL had obtained 43 votes on his account, and with his partner shared in 3 votes, he had complied with the regulations. M. GINAIN was not to be moved, and accordingly the voters sent a demand to the committee for another trial. The other medals were awarded as follows:—1st class medal: M. PONTREMOLI. 2nd class: MM. EUSTACHE, MORIN-GOUSTIAUX, BLANC, MAISTRASSE and BERGER. 3rd class: MM. TONY GARNIER, WOOG, PAILHES, GUILLAUME, CHAUSSEPIED, HÉBERARD, LE GRAND and DEMIERRE. Honourable Mention: MM. BOURBIER, CARRÉ, CHESNAY, DEMUR, EICHMULLER, GUYOT & POTTIER, HERVEY-PICARD, JASSON, LEGRESLE, MESNAGER, OLIVIER, ROME. For painting, M. HARPIGNIES, the landscapist, has obtained the Médaille d'Honneur; in sculpture, M. MATHURIN MOREAU has been successful; and in engraving and lithography, the Médaille d'Honneur was awarded to M. SIROUY, whose masterpieces, *Athalie* and *Arcadia*, were reproduced in *The Architect*.

DURING several years Mr. C. J. PHIPPS, who died suddenly on Tuesday morning in his sixty-second year, could claim a monopoly in the erection of theatres. So strong was his hold on managers, it was one of the legends among theatrical people that whenever an announcement appeared of the burning or condemnation of a theatre a bottle of champagne was at once opened in Mr. PHIPPS's office, to drink prosperity to the new building. He could safely assume the commission for it was to come to him without delay. That the style he employed was generally commonplace was an advantage in the eyes of lessees, for in a speculation of the kind economy was to be studied. It was well known that playgoers cared little about the exterior of a theatre, and colour and gilding could compensate for defects of form in the interior. Mr. PHIPPS was supposed to make sacrifices of his art in the interests of his clients, and he could not have a better recommendation. At length there was a change, and he was forced to see the designs of younger men accepted in preference to his own, and buildings raised which were in keeping with the times, although capacious and economical. While he enjoyed favour Mr. PHIPPS was the architect for about seventy theatres, a number exceeding all experience of one man's work. Moreover, he was the patentee for seats and other appliances, so that a new theatre brought him profit in more ways than one. But numerous as are his buildings, his fame will hardly be more enduring than that of the men and women who performed on his stages. His latest metropolitan theatre is the new Her Majesty's in the Haymarket, which shows a departure from his customary type, which he first created in Bath. It is supposed that Mr. PHIPPS caught a chill while returning on Saturday from a building at Dover, and as he had been lately in delicate health, he succumbed with an ease which was not anticipated. His practice will be continued at 26 Mecklenburgh Square, W.C., by Mr. ARTHUR BLOMFIELD JACKSON, who was associated with Mr. PHIPPS as partner in his more recent works.

We have often pointed out the necessity for a commission to apportion catchment basins for water-supply, in order to prevent "grabbing" by one town at the expense of another. No less important would be arrangements con-

cerning underground water. According to Mr. BALFOUR BROWNE, Q.C., "the law of underground water as it now stands is simply silly." At the Engineering Conference on Tuesday, Mr. JAMES MANSENGH referred to the recent contest between the Corporations of Newark and Nottingham on the subject. Both had obtained their water-supply from wells sunk into the pebble beds of the new red sandstone. The Nottingham Corporation recently attempted to extend their district with the intention of sinking wells. The Newark Corporation, in self-defence, proposed a Bill to secure a protective zone of four miles radius. Mr. MANSENGH considered that in the case of surface streams the law was clear, righteous and intelligible—that a man must allow the water flowing over his land to pass on to his neighbour, having only a fair and reasonable use of it in its passage through his land. Having glanced at the geological question as to the outlet into the sea from the pebble bed, and at the question of the amount of percolation into the pebble beds in terms of the rainfall, Mr. MANSENGH urged that something ought to be done to simplify and put on a sensible basis the allocation of underground water-bearing areas. The difficulty will be to convince a parliamentary committee that sufficient knowledge is attainable to allow of justice to all sides in parcelling out underground water-beds.

It is satisfactory to find that no deaths occurred during the execution of the Blackwall Tunnel. But as caissons are adopted in America for laying the foundations of buildings and may also be introduced in England, it is well to know there is a special compressed air illness or caisson disease which often ends fatally. That the men who toiled beneath the Thames did not succumb must be attributed to the precautions taken by the contractors in order to minimise the danger of the system. Dr. SNELL, the resident medical officer at the tunnel, and who was always at his post, has notes of 200 cases of illness arising from compressed air, and he believes many more were not brought under his notice. Several men were so severely affected they declined to continue on the works. Even robust men writhed with the excruciating pains for weeks or months. The impurities in the air are one source of danger. How much depends on care was exemplified at the bridge over the Mississippi at St. Louis. During the sinking of the first pier twelve lives were sacrificed, but at the second pier under similar conditions only one man died. It is astonishing how easily the air can become dangerous. Charges of tonite which were fired to ease one of the compartments of the shield at Blackwall increased the quantity of carbonic acid above the safe limit; at another time the increase was owing to the works being then under what had been the Isle of Dogs sewer, and it is also supposed the lime used for grouting in the tunnel making lime-water was a cause. When the carbonic acid exceeded 1-1000 additional air was pumped in, but in such a place that air could not always be considered as absolutely pure.

It is unusual for a parliamentary committee to issue a sort of emergency report, but in the case of the South Kensington Museum that course is praiseworthy. Already several artists have approached Sir JOHN GORST recommending the immediate completion of the buildings, but the Paris catastrophe having given an overwhelming proof of the expedition with which temporary buildings can be consumed, we now have Sir JOHN GORST and his committee as eager as any artists or visitors for the commencement of the works. We print the report on another page, and the array of dangers described is enough to scare any fireman. Old lath-and-plaster buildings, varnished matchboarding, wood lanterns, skylights, open sidelights, canvas lining to walls, tarred felt, wood partitions, flimsy construction are among the sources of danger. In the "residences" are eighty-one open fire-places, and a domestic accident might at any moment be the beginning of a conflagration. When it is remembered that the collections which have been so long imperilled are of more importance than those in any other museum, the urgency of an immediate starting of the indispensable works cannot be denied.



### SIR WALTER SCOTT AS AN ARCHÆOLOGIST.

THE fixing of a bust of Sir WALTER SCOTT in Westminster Abbey, which was unveiled on Saturday last, was one of those events, like the hall-marking of gold or the presentation at Court, which are supposed to determine for ever the character of the subject. To the world in general SCOTT will not be any higher than he was last year, but a certain class of people will feel that they can consider him henceforth as more deserving of their approbation. We may therefore be allowed to use the occasion as an opportunity to consider some aspects of his genius to which the majority of his readers are indifferent.

There may have been greater writers of romances and greater novelists, but in his power to produce both classes of blessings to mankind SCOTT was unique. He knew the limits of each. Romance, according to him, was "a fictitious narrative in prose or verse, the interest of which turns upon marvellous and uncommon incidents," and generally relating to an age which has passed, while the novel was "a fictitious narrative differing from the romance because the events are accommodated to the ordinary train of human events and the modern state of society." SCOTT was a shrewd observer, and among his contemporaries there was not one who was better acquainted with life in Edinburgh, and in the region which is associated with him in Selkirk and Roxburgh. But he gained his power by raids into the past. Starting with "sixty years since," he entered periods more remote, and he appeared to exercise as much power over the beings of the eleventh century as over the Highlanders who had made a final struggle to restore the STUARTS. Whether it was due to second sight, imagination, scholarship, or a combination of the three is not easily decided, but the power was a gift which professed historians vainly coveted. AUGUSTIN THIERRY declared there was more real history in SCOTT's novels than in the philosophical but false compilations betitled histories, for "everything peculiar to the time and place, the exterior of men, the aspect of the country and of the habitations, costumes and manners are described with the most minute truthfulness, and yet the immense erudition which has furnished so many details is nowhere perceived." CARLYLE also insisted on the minute truthfulness with which the vanished races were restored to life:—"There they were, the rugged old fighting men, in their doughty simplicity and strength, with their heartiness, their healthiness, their stout self-help, in their iron basnets, leather jerkins, jack-boots, in their quaintness of manner and costume; there as they looked and lived; it was like a new discovered continent in literature." The truthfulness of SCOTT in describing habitations, costumes, manners, &c., was not so wonderful as is commonly supposed. His books are not manuals of archæology, although they have done more to resuscitate the past than all the manuals which have appeared in all languages. SCOTT was too versed in business to be ignorant of the fact that readers of romances will only take archæology in homœopathic doses, and, however small, they must be disguised, or the book will be set aside. The advice he once offered to authors reveals his own method:—

He that would please the modern world, yet present the exact impression of a tale of the Middle Ages, will repeatedly find that he will be obliged, in despite of his utmost exertions, to sacrifice the last to the first object, and eternally expose himself to the just censure of the rigid antiquary, because he must, to interest the readers of the present time, invest his characters with language and sentiments unknown to the period assigned to his story; and thus his utmost efforts only attain a sort of composition between the true and the fictitious—just as the dress of Lear, as performed on the stage, is neither that of a modern sovereign nor the cerulean painting and bearhide with which the Britons, at the time when that monarch is supposed to have lived, tattooed their persons and sheltered themselves from cold. All this inconsistency is avoided by adopting the style of our grandfathers and great-grandfathers, sufficiently antiquated to accord with the antiquated character of the narrative, yet copious enough to express all that is necessary to its interest, and to supply that deficiency of colouring which the more ancient times do not afford.

The recipe may appear easy, but SCOTT did not find it so. CARLYLE considered he was only an improviser, but the preparation for the feat involved enormous labour. When SCOTT was recommended in his last days to allow his wearied brain some repose, he said it was like the servant bidding the kettle on the fire not to boil. He could

not help thinking, and for a great part of his life his thinking was about remote times. SCOTT was lame, and on that account might be supposed to divide his life between his office and his library. But he loved action, for it enabled him to give more reality to his peculiar thoughts, which were rarely far removed from "feats of broil and battle," or manly exercises which were a fitting preparation for a soldier's life. There is a story related by HOGG, the Ettrick Shepherd, which enables us to see the difference between WALTER SCOTT and most of the poet archæologists, for he never cared to see his face in a looking-glass "sicklied o'er with the pale cast of thought":—

I remember his riding upon a terribly high-spirited horse, which had the perilous fancy of leaping every drain, rivulet and ditch that came in our way; the consequence was that he was everlastingly bogging himself, while sometimes the rider kept his seat despite of the animal's plunging, and at other times he was obliged to extricate himself the best way he could. In coming through a place called the Milsey Bog I said to him, "Mr. Scott, that's the maddest de'il of a beast I ever saw. Can ye no gar him tak a wee mair time? He's just out o' ae lair intil another wi' ye." "Ay," said he, "he and I have been very often, these two days past, like the Pechs; we could stand straight up and tie our shoe-lachets." I did not understand the joke, nor do I yet; but I think these were his words. We visited the old castles of Thirlestane and Tushilaw, and dined and spent the afternoon and the night with Mr. Brydon of Crosslee. Sir Walter was all the while in the highest good-humour, and seemed to enjoy the range of mountain solitude which we traversed exceedingly. Indeed, I never saw him otherwise in the fields. On the rugged mountains, or even toiling in the Tweed to the waist, I have seen his glee not only surpass his own, but that of all other men. His memory, or perhaps I should say his recollection, surpasses that of all men whom I ever knew. I saw a pleasant instance of it recorded lately regarding Campbell's "Pleasures of Hope"; but I think I can relate a more extraordinary one. He and Skene of Rubislaw and I were out one night, about midnight, leistering kippers in Tweed, and, on going to kindle a light at the Elibank March, we found, to our inexpressible grief, that our coal had gone out. To think of giving up our sport was out of the question; so we had no other shift save to send Rob Fletcher home, all the way through the darkness, the distance of two miles, for another fiery peat. While Fletcher was absent we three sat down on a piece of beautiful greensward on the brink of the river, and Scott desired me to sing him my ballad of "Gilmanscleuch." Now, be it remembered that this ballad had never been either printed or penned. I had merely composed it by rote; and, on finishing it three years before, I had sung it once over to Sir Walter. I began it at his request, but at the eighth or ninth verse I stuck in it, and could not get on with another line; on which he began it a second time, and recited it every word from beginning to end. It being a very long ballad, consisting of eighty-eight stanzas, I testified my astonishment. He said that he had lately been out on a pleasure party on the Forth, and that to amuse the company he had recited both that ballad and one of Southey's ("The Abbot of Aberbrothock"), both of which ballads he had only heard once from their respective authors; and he believed he had recited them both without misplacing a word. Rob Fletcher came at last, and old Laidlaw, of the Peel, with him, and into the foaming river we plunged, in our frail bark, with a fine blazing light. In a few minutes we came into Gliddy's Weal, the deepest pool in Tweed, when we perceived that our boat gave evident symptoms of sinking. When Scott saw the terror that Peel was in he laughed till the tears blinded his eyes. Always the more mischief the better sport for him. "For God's sake push her to the side!" roared Peel. "Oh, she goes fine!" said Scott; "an' gin the boat were bottomless, an' seven miles to row;" and by the time he had well got out the words, down she went to the bottom, plunging us all into Tweed over head and ears. It was no sport to me at all, but that was a glorious night to Sir Walter—and the next day was no worse.

In this picture we see SCOTT projecting himself, as it were, into the past and leading the life of one of his moss-trooping ancestors. But he does not forget to visit old castles as if he were on a special archæological excursion, and the period of accidental repose is turned to account in the recitation of heroic ballads, just as the borderers would have done after a successful foray before the Last Minstrel had appeared at Newark's stately tower. What better preparation could be found for a man who wished to describe ancient life in Scotland? About his manner of studying buildings SCOTT furnishes some delightful lines:—

Crichton! though now thy miry court  
But pens the lazy steer and sheep,  
Thy turrets rude, and totter'd keep,  
Have been the minstrel's loved resort.  
Oft have I traced within thy fort  
Of mouldering shields the mystic sense,  
'Scutcheons of honour, or pretence  
Quarter'd in old armorial sort,  
Remains of rude magnificence.

The extent of SCOTT's erudition is evident from the number of books which he refers to in his writing. He was not perhaps a dry-as-dust student, for his nature compelled



him to enter heartily into whatever he undertook ; but he was able to seize the character of all the volumes to which he referred and he employs them for his own purposes like a true scholar. It is no wonder then that when describing buildings, and especially what might be called baronial residences, SCOTT uses words which excite the imagination, but which afterwards cause some disappointment to strangers when they see some of the dwellings of Scottish chiefs for the first time. His glowing fancy and his patriotism made ancient buildings appear sublime, and he compelled not only the English people, but those in all countries who were reached by translations of his works, to consider Scotland as a sort of architectural paradise, and Northern Gothic as a style which surpassed the Grecian. SCOTT, we may be sure, was able to take an exact view of the peculiarities which belonged to Gothic. With him it was the mason rather than the cut stone which absorbed his attention. It seemed absurd to him that a man like HORACE WALPOLE should suppose it was possible to create a Gothic mansion because the chimneypieces, ceilings, windows and balustrades were made out of fragments collected from cathedrals and monuments, although SCOTT himself, under the pressure of a desire to see Abbotsford quickly completed, abstracted many carvings from Melrose. He wished to have evidence of individuality in buildings. On that account he preferred to see a castle uninhabitable, although the walls were entire, rather than have a restoration which would destroy its character as a memorial of antiquity. With him restoration signified timely and reverential attention, by which not only actual destruction but the slow progress of decay was arrested.

The conflict in SCOTT's mind between the archaeologist and the modern citizen was curiously exemplified in what he said about Edinburgh houses. He was like PLEYDELL in "Guy Mannering," and considered there was no view equal to what could be seen from an upper window in an old-fashioned house. But his love of the picturesque, however, could not make him close his eyes to the deficiencies of the flats in his own romantic town. Sickness, he said, had in them no nook of quiet, affliction no retreat for solitary indulgence, many of the rooms were dark even at noon-day, or borrowed but a gleam from some dark alley. On the other hand, he could say on behalf of them that in an Edinburgh *land* a sort of general interest united the whole of the inhabitants from the top to the bottom of these lofty tenements.

SCOTT, it should be remembered, was a born aristocrat, and although as an author, printer and publisher—for he combined the three callings in the hope of making more money—he wished to make all classes fascinated with romance, if he had the power he would have restricted the use of buildings that recalled feudal manners to nobles or to gentlemen like himself. If need be let plebeians suffer in preference in the lofty and dark mansions of the Old Town. Writing in 1821, when his poems and the series of novels from "Waverley" to "Ivanhoe" had produced their effect in compelling many people to surround themselves with imitations of Mediævalism, SCOTT said, with more of contempt than of pity :—"The Gothic order of architecture is now so generally and, indeed, indiscriminately used, that we are rather surprised if the country-house of a tradesman retired from business does not exhibit lanceolated windows, divided by stone shafts and garnished by painted glass, a cupboard in the form of a cathedral stall, and a pig-house with a front borrowed from the façade of an ancient chapel." The mock Gothic of that time was defective ; indeed some critics consider that the most perfect imitation of Gothic must be an anachronism in the nineteenth century, but the last man to deride it should have been WALTER SCOTT.

Strange as it may appear, SCOTT's aversion to Gothic houses was, we believe, not so much on account of the style as the comfort which was at the disposal of people who could make no claim to be considered gentry. That at least is the conclusion we draw from what he said about the New Town of Edinburgh. In the old days, when people lived in flats and from want of space were obliged to meet in the assembly-rooms on festive occasions, then it happened, says SCOTT, that "all persons of rank and fashion entitling them to frequent such places met upon easy and upon equal terms, and without any intrusion on the part of others," and "the pretensions of everyone were known and

judged by their birth and manners, and not by assumed airs of extravagance or a lavish display of wealth." FERGUS MACIVOR could hardly assume a more lofty tone if he had to speak of the modern race of citizens. The upstarts who possessed all qualities but birth were, however, moral in their conduct, or at least they were not found out. SCOTT is forced to admit that fact, although they had abandoned flats which their fathers contentedly occupied, and descended from their "common stairs" to claim the dignity of a front door. "In the present condition of Edinburgh," he says, "the men have gained much on the score of sobriety, while the women have, *as yet*, lost none of that high character for conjugal, filial and maternal affection for which they have been long distinguished. An 'arrangement,' so common in the London circles, is a word unknown ; and since scandal is silent we may safely conclude that little cause exists for calumny." Could love for the past go further? SCOTT admired his countrymen and countrywomen, but because they found it was more advantageous to live in dwellings which were not crowded like rabbit warrens, he became apprehensive that the more healthful living must cause them to succumb to temptation. Modern sanitarians cannot derive much support from SCOTT's authority. After what he says against the buildings in the New Town we need not wonder when we read that at the close of his life, when he was in Rome, he preferred to visit an old Mediæval castle at Bracciano, and to examine every part with the greatest attention, and to make pilgrimages to Frascoli, where Cardinal YORK, the last representative of the STUARTS, lived, rather than to look at the works of MICHEL ANGELO and RAPHAEL at the Vatican. For the castle and the village bore some relation to Mediæval Scotland, to rank and birth, while the painters' works would recall the drawings or the prints on the walls of the detestable and dangerous if comfortable houses which, like an exhalation, were constantly arising outside the old city, which was more than ever in his thoughts.

### THE TRANSMISSION OF POWER IN FACTORIES BY ELECTRICITY.

BY F. J. WARDEN-STEVENS, A.M.I.E.E.

A PAPER dealing with the above subject was read by Mr. S. V. CLIREHUGH, before the Northern Society of Electrical Engineers, on Monday, May 17.

The paper referred more particularly to the textile trades, but the results are applicable in a great measure to timber and other mills, and for wood-working factories, and are therefore of interest to those connected with the building trades.

Mr. CLIREHUGH commenced by stating that he wished it to be distinctly understood that he did not think that electricity would in any great measure supersede mechanical transmission of power in factories used for textile work, as some people had supposed. Cotton mills, in particular, had such a good and steady load that only about 20 per cent. of the brake horse-power is wasted in transmission, and the coal bill is only 2 lbs. per horse-power hour. Even if the loss is 50 per cent., when such economical engines are used the saving is hardly sufficient to make it worth while to adopt electricity.

There are, however, other trades in which this is not the case, where the margin of loss in the distribution of power is so enormous as to effect a large saving even if the loss is only reduced by 20 per cent. The dyeing, bleaching and printing trades, in the author's opinion, use more coal per brake horse-power than any other trades in the world. The machines used for these purposes are driven by isolated engines of small size. The reason for this is that the speeds required are so varied that no reasonable form of speed gearing is known which would accomplish this variation of speed required. He also says it is necessary for the attendant to have the apparatus under his immediate control.

The losses in these small engines are so great that no more inefficient arrangement can be devised, and the adoption of electricity *must* save something.

We entirely agree with Mr. CLIREHUGH when he says that the unwisdom of the British manufacturer is in saying that he cannot afford to carry out improvements because



"trade is bad and profits low," while in Germany it is just at that time that improvements are introduced, and the trade improved and profits increased owing to the lower possible price of production. He also speaks of the suspiciousness of the British manufacturers, and says it is probably due to the great number of times they have been deceived by the travellers in oil, patent firebars, &c., which will, it is claimed, save half their coal bill.

Mr. CLIREHUGH then goes on to give his ideas on the particular form of plant suitable. He declares for direct coupled plant, medium speed, the dynamo being, in the larger sizes, multipolar. He also recommends shaft governors and ejector condensers. The engine should be of the inverted vertical enclosed type, with piston valve for high-pressure cylinder and a balanced slide valve for low pressure, and the lubrication should be under pressure. The dynamo recommended for 200 brake horse-power should be of the six-pole type with a slot-wound armature. We think it a rather extraordinary proceeding to lay down hard-and-fast lines in this manner, and one which is obviously unwise. For instance, the type of engine chosen is not the only one which would give very good results, as there are many other types which would give as good or better for this class of work. We think that due consideration should be given to the special circumstances and conditions of the case.

With his remarks insisting on the importance of sparkless collection of current from the dynamo, and with the result he expects, viz. 30 lbs. of steam per kilowatt, or  $2\frac{1}{2}$  lbs. of coal per indicated horse-power hour, we agree. He also insists upon the need of generating plant which will run continuously without heating or breaking down.

The important part of the paper now follows, and this refers to the size of a motor for any particular machine.

He speaks of the difficulty of obtaining information from the machine makers; they do not know, but have an idea that an engine of a certain size works with the machine. He points out that the indicator diagram is of no use, owing to the leaky glands, and the fact that the engines usually run with the drain cocks open because of wet steam. The diagrams show no signs of cut-off or expansion. The maximum normal power is a very difficult thing to arrive at, and is the most important point. The increased power required at starting, or exceptionally for a few seconds, is not of much importance. A motor will give almost unlimited power for a few moments, but the power over, say, five minutes is of great importance. The heating effect then rapidly comes into play and limits the power safely obtainable. He says that the best way is to measure the power taken by a motor driving the machine temporarily for a considerable time, several hours at least; the longer the time and the more nearly the work approaches to the usual the better. He further goes on to recommend the Royce time-fuse, and says that it will protect any motor which is at all suitable for hard work. It may be adjusted so that the motor can exert, say, 50 per cent. more than its normal load for any time up to three or five minutes without the fuse blowing, and this is the condition met with in practice. These time-fuses enable a check to be kept on the condition of the machine and the way it is used, and any great increase in the power required, due to the machine being dirty or improperly used.

Mr. CLIREHUGH also expresses the opinion that much power might be saved if machines were designed for running with electric motors, as wasteful gearing could be dispensed with.

The part of the paper which relates to gearing of motors to machines is of great interest. Three methods are mentioned as available when a motor running at 1,000 revolutions per minute has to be connected to a machine running at 50 revolutions per minute:—(1) Worm-gearing; (2) double reduction-spur; (3) single reduction-spur and belt. "It is undeniable that each of these methods may be satisfactory under certain conditions, but as it is always desirable to keep the speed of the motor up to that mentioned, it will be found that the peripheral speed of spur-gearing is too great." He mentions that the highest peripheral speed at which the best cut spur-wheels will run silently without wear is about 1,800 feet per minute. Belts are objected to owing to damp and space occupied, and he states that the worm-gearing is the most satisfactory, when made in the

best manner, for such a large reduction in speed. The results of a test are given, which show that the worm-gearing is practically as efficient as a belt drive. We think this result cannot be accepted entirely, as there are several points of difference in the conditions, but it shows at least that the worm-gearing is fairly good and that, taking into consideration the small space occupied, it is very suitable where large reductions in speed are required.

The use of enclosed motors is recommended in most works, and in some of the wet positions the motors should be water-tight as well.

Carbon brushes are condemned with low voltage motors, but a wholesale condemnation such as this we cannot agree with. If a motor is exceptionally well designed and expensive, there is no doubt that they are unnecessary, but it is a fact proved by theory and experience that carbon brushes will make it possible to run cheap motors without attention, which could not otherwise be used at all. Referring to the means of varying the speed of the motors within wide limits, the use of water resistances to reduce the speed for any time is condemned, owing to the trouble caused by evolution of gas, &c.

Again, in connection with the wiring of buildings, one system is broadly recommended, viz. that of fixing insulated wire on insulators. These broad statements are useless, as the kind of system must depend upon local conditions.

Referring to the cost per motor installed, the power of the motors varying from three to twenty, he finds that for enclosed motors it works out to be about 235%, and for open motors 217%. He then goes carefully into the losses and gains with electric transmission when compared with the use of small engines. A few of the statements may be of interest.

The capital cost of an electrical transmission is about double that of small steam-engines. From Mr. BRYAN DONKIN's tests small steam-engines use about 150 lbs. steam per horse-power hour. The engine to be used for electric transmission uses 20 lbs. of steam per brake horse-power hour. The losses from engine-shaft to motor—dynamo 5 per cent., transmission (cables) 2 per cent., motor losses 5 per cent., gearing losses 8 per cent.; total, 20 per cent. We think these losses rather too low, especially as the engine and motor will seldom run at their full load. He states further that if you use half the coal you only require half the stokers and half the boilers. The maintenance costs with electricity have been certified by several owners on the north-east coast to be only 20 per cent. of that with steam.

In conclusion, although the figures given and some of the arbitrary recommendations are not wholly acceptable, the paper is a valuable contribution to this subject, and is well worth reading by those interested in the reduction of the cost of power in workshops and factories.

## THE ARCHITECTURAL ASSOCIATION.

A MEETING of the Architectural Association was held on Friday evening last, Mr. Beresford Pite, president, in the chair.

The following officers were elected for the ensuing year:—President, Hampden W. Pratt; vice-presidents, Banister F. Fletcher and A. H. Hart; committee, A. Beresford Pite, G. H. F. Prynne, R. S. Balfour, F. G. F. Hooper, F. T. W. Goldsmith, W. H. Seth-Smith, H. B. Cresswell, C. De Gruchy, T. W. Aldwinckle and W. D. Caröe; hon. treasurer, H. W. Pratt; hon. librarian, C. H. Freeman; hon. secretaries, E. Howley Sim and G. B. Carvill.

The Architectural Association Travelling Studentship, 1897, was awarded to Mr. E. H. Evans by the unanimous vote of the prizes sub-committee. Mr. H. F. Waring's drawings were considered next in merit.

An exhaustive paper on "Plumbing and Sanitary Work" was read by Mr. S. S. Hellyer, a part of which will be found in the present number.

A vote of thanks was proposed to Mr. Hellyer by Mr. F. G. F. Hooper, who spoke upon the necessity of a more careful attention to sanitary arrangements in all houses.

Mr. G. H. Fellowes Prynne, in seconding the vote of thanks, spoke of the shortcomings of the present system of sanitary administration, and especially in the case of suburban villas.

Mr. W. E. Bland said that Mr. Hellyer was one of the pioneers of sanitation. Although he had long taken an interest in the subject, some points had never appeared to him in their true light until he heard the lecture just delivered.



The Chairman said genius had been defined as an infinite capacity for taking trouble. Lectures like Mr. Hellyer's were far more important than the ordinary lecture, and sanitation was made to appear more simple in its principles than they had imagined.

The vote of thanks was carried by acclamation.

Mr. Hellyer expressed his gratification at the attention given to him. He believed it to be the duty of the architect to make the house healthy, and it was not properly finished unless in that condition.

### CONFERENCE OF CIVIL ENGINEERS.

THE conference of the members of the Institution of Civil Engineers was opened on Tuesday morning at the Westminster Town Hall. Mr. J. Wolfe Barry, C.B., F.R.S., president, in a brief opening address congratulated the members who had taken part in the designing and construction of the Blackwall Tunnel upon the successful completion of that work. He then gave an outline of the career of the Institution, which dates from 1818. From the small beginning of 1818—which had not attained to a growth of 200 members of all classes in 1828, who, from difficulties of intercommunication between different parts of these islands, must have been mainly, if not exclusively, Londoners—there now number 6,200 members, associate members and associates, and 900 students, making a total roll of 7,100. It is not too much to say that in this past sixty years a new and most important profession has arisen, second to none in its responsibilities and in its value to humanity at large. A little more than 5,000 members are in the United Kingdom and 2,000 are abroad; and as almost all the students and most of the associates are to be found at home, therefore of the corporate members from one-half to one-third are in the colonies or dependencies or in foreign countries. Of the 5,000 members, associate members, associates and students in the United Kingdom, 1,950 of all classes are living or practising in the Metropolis. Though largely cosmopolitan as a society, the great value of the metropolitan headquarters or central home of the whole body was admitted. Experience amply proved how often absent brethren turned to it for advice, for reference, or for the support of their views and interests. Without this mutual interdependence the Institution would be but a poor representative of the profession. It was with the view of further strengthening the bonds of union that the Congress of this year had been instituted. It was a new departure, and much was to be learned with regard to conducting it to the best advantage, both for the important objects in view and for the convenience of the members who attend it. About 800 members expressed a wish to be present at the meetings, and of these a very large part are country members. The idea which we have had in view, said the President, is to encourage by all means the conversational interchange of ideas and knowledge rather than any set debates. I think that we engineers as a body are always ready to give our brethren the benefit of any experience or knowledge which we may have happened to gain. I do not think that ours is an acrimonious profession; we may have our contests before tribunals of various kinds, but I think we are free of mean jealousies and of what I may almost call the crime of importing personal animosities into our professional struggles. Dr. Johnson says, "Knowledge is of two kinds; we know a subject ourselves or we know where we can find information upon it." I think this Congress will be useful in the direction of both these descriptions of knowledge, and that nothing can be better for those who are facing new problems than being able to meet and discuss their progress or their difficulties. Again, we have thought that a Congress would be very beneficial as bringing about an acquaintance with the personality, as well as with the work, of so many who up to now have not had the advantage of meeting each other. I should like it to be distinctly understood that any repetitions of this Congress, so far as my views and the views of the present Council are concerned, will be like this, namely, a metropolitan Congress. It is not intended to be a peripatetic Congress, meeting this year in London and another year elsewhere. The object which we have had before us is to bring those who live out of London into London, not to take Londoners and others elsewhere. I think any other object would be undesirable. London is so large that it is naturally the centre to which all local associations can occasionally turn with advantage to themselves and with manifest benefit to Londoners. Further, it contains what I have justly termed the home of the Institution, associated not only with so much of present interest, but still more with the important memories of the past—with Telford, Walker, Rennie, the two Stephensons, Brunel, Locke, Vignoles and others who have gone before us, and with so many of the fathers of the profession who, happily, still adorn our Society. The home, further, contains our unrivalled library and a fund of engineering information. Lastly, by arranging the Congress

at the usual time for our annual conversazione, we are able to meet socially and to show some hospitality to our brethren. All these considerations point, in my opinion, unmistakably to London as our rallying-point, and I see no reason for any other arrangement.

In section I., railways, Sir Benjamin Baker took the chair, and the subject of rails and permanent way was introduced by Mr. H. Copperthwaite, who restricted himself to the proper material for sleepers and the weight of steel rails. Timber creosoted sleepers, in his experience, are the best. Steel and iron sleepers have been tried, but the results generally have been disappointing. Jarrah and Kauri, two hard Australian woods, are about to be tried, and it is anticipated that they will prove a success. The weight of rail is a difficult point to settle, but a steel rail of about 80 lbs. per yard appears to be about what is now wanted. The subject of permanent way was introduced by Mr. F. W. Webb, of the London and North-Western Railway, who, in improving the permanent way on a portion of that system some years since, introduced a bull-head section of rail in place of the double-head section, and a deep fish-plate for the joints. Other details were also improved, and the system had worked satisfactorily down to the present time.

Section II. dealt with harbours, docks and canals. Mr. Harrison Haytor took the chair, and Mr. John Kyle introduced the subject of concrete in relation to marine work. He treated the subject under three heads, namely, the treatment of concrete in the yard; the treatment of mass-work under water, and the treatment of block-work under water. Having had over forty years of practice, during which time he had handled over 1½ million cubic yards of concrete at home and abroad, Mr. Kyle was enabled to bring a number of interesting and useful facts before the section. Mr. A. E. Carey was equally interesting in his communication on the same subject, treated from the standpoint of his experience. Mr. H. F. Donaldson covered a wide field in his communication treating of the arrangement of docks, with special reference to the formation and maintenance of their approaches.

In sections III. and VII. Mr. W. H. Preece spoke on the transmission of power by electricity. In this communication he broadly discussed the relative efficiency of three effective modes of transmitting power, namely, electricity, water and air. Naturally Mr. Preece has a predilection for electricity, and he gave some satisfactory examples of its application, showing its many and marked advantages. He instanced some cases in which it would have been impossible to transmit power otherwise than by electricity, which power for long distances carries off the palm. Mr. E. B. Ellington followed with a communication on the transmission of power by water, in which all the advantages of that method were pointed out and its special applications described. For intermittent work it was shown to be well suited, but its cost is altogether too high to displace private steam plants, except in special cases. Dr. John Hopkinson then introduced the general subject of the transmission of power by ordinary gearing and shafting, by ropes, by compressed air and by steam, comparing them with electricity and water and pointing out that each had its own field. This in fact was the conclusion deducible from the long and animated discussion upon the three communications. There was a general admission that every system had its own merits, but that for long distances electricity was the best.

Mining and metallurgy were discussed in section IV., with Mr. T. Forster Brown as chairman. Mr. J. B. Simpson greatly interested the meeting in the information he imparted in the matter of dealing with water in pits during sinking and in permanent work, giving some useful examples of his practice in these respects. Mr. Henry Davy dealt with the cognate question of water in deep shafts, explaining the oldest method of dealing with the matter, which is the Cornish, and proceeded to describe the more modern systems in general use. Mr. Bennett H. Brough introduced the subject of deep levels in mining practice in the United Kingdom. In Great Britain the deepest colliery is at Pendleton, near Manchester, the deepest workings being 3,474 feet below the surface. The deepest metal mine is Dolcoath, Cornwall, which has reached 2,582 feet. These enormous depths have, however, been largely exceeded in other countries, notably in the Lake Superior copper region, where the Red Jacket Shaft of the Calumet and Hecla Mine has now attained the record depth of 4,900 feet. The prospects of deep mining in Cornwall were considered by Mr. William Thomas. Comprehensive schemes for placing the equipment of the leading Cornish mines on a more satisfactory footing are being carried out, and the prospects of deep mining are proportionately improving.

Section V. (shipbuilding) was presided over by Sir William White, and Mr. Archibald Denny introduced to notice the practical application of model experiments to merchant-ship design. He described the Leven Shipyard experimental tank and apparatus and the manner in which the experiments were practically applied in ship-designing.

In Section VI. questions relating to waterworks, sewerage



and gasworks were dealt with. The chair was occupied by Mr. James Mansergh, who introduced the subject of the law and allocation of underground water. The subject proved of great interest to waterworks engineers, as the principle involved has been a matter of discussion before a Commons committee within the last few weeks. He showed that the law relating to underground water was confessedly so difficult to interpret and so likely to operate unjustly that it required some amendment.

The afternoon was devoted to visits to electric-lighting stations, gasworks, waterworks and hydraulic-power works in and around the Metropolis.

### PREHISTORIC MAN IN ENGLAND.

IN his last report on the Geological Survey of the United Kingdom, Sir Archibald Geikie, the director-general, writes:—

Excavations and borings undertaken last year by Mr. Reid at Hoxne, with the aid of the British Association and the Royal Society, have thrown a good deal of light on the question of the relation of man to the Glacial epoch. He has now proved that the Palæolithic period is certainly newer than the period of intense glaciation represented by the chalky boulder-clay. He has also found that between the two came a mild epoch, when a temperate flora flourished in Suffolk, followed by a cold epoch, when only dwarf Arctic plants could endure. The evidence agrees closely with that obtained during the geological survey in Sussex and Hampshire, where also Palæolithic gravels are separated from the period of maximum glaciation, represented by the "Selsey erratics," by fluviatile deposits containing remains of animals and plants indicative of temperate climate. The whole of these recent researches tend to show that the earliest satisfactory evidence of man's appearance in this country indicates a date considerably later than has often been supposed.

At the close of the season Mr. Reid paid a brief visit with Mr. B. Harrison to the part of the North Downs where that gentleman had obtained the extremely rude and doubtful "implements" about which a good deal has lately been written. The pits that had been opened were, unfortunately, too much obscured by the falling-in of the sides to allow of proper examination; but the evidence for the supposed extreme antiquity of the deposit seemed to rest more on the geology of the surrounding area than on the character of the sections.

An examination of the plateau shows that the dip-slope which extends from the chalk escarpment to the Thames has been greatly modified by the excavation of numerous "coombes," which fall towards the north. As these coombes, like those of the South Downs, nearly all commence close to the continuous ridge of the escarpment, without cutting through it, they appear, like those of Sussex formerly described by Mr. Reid, to have originated since the escarpment was in its present position. It is clear, also, that if the dry chalk-valleys of the South Downs were excavated by floods caused by the impervious nature of the frozen soil at a period when the climate was colder, the same reasoning must apply to the North Downs. The gently-sloping plain and slight hollow near Parsonage Farm is, in Mr. Reid's view, exactly one of those places where gravel formed from the reconstruction of the clay with flints, Eocene and Pliocene strata, might be expected to have been deposited in late Pleistocene times. Elevation above the sea-level, or above adjoining valleys, under such Arctic conditions, would be no test of the antiquity of the gravels. These might obviously have been deposited at any level and over rocks that are now pervious and no longer liable to floods if the winter climate were severe, the slope gentle and the area dominated by land somewhat higher.

Mr. Reid would therefore correlate these plateau-gravels of the North Downs with the implement-bearing gravels of Sussex and the Thames Valley, and would suggest that the rude character of most of the implements—if implements they be—may be due to the weathered surface, the flints from which they were made having been toughened by weathering, so that they could only be battered, not flaked. It is well known to every road-surveyor that flints picked off a field are much tougher than those dug directly out of the chalk, for not only have they gone through an annealing process, but they are survivors after the weather has destroyed those that contain flaws. The surprising point is not that implements should occur in these gravels, but that good implements should be so extremely rare.

The occurrence in the plateau-gravels of fragments of Ightham stone points to their transportation across the area now occupied by a deep east and west valley. The date of that transportation is not yet known; but the discovery of much Greensand and Purbeck chert in the Bagshot sands of the Hampshire Basin suggests that in the North Downs also it may date back to Eocene times. In the older Pliocene period, also, a plane of marine denudation seems to have connected the

Greensand and chalk areas. Thus during two periods at least Greensand chert may have been transported to the North Downs. Its final deposition in the gravels near Parsonage Farm is probably only the last of many removals to which the fragments have been subjected.

Whether any part of the existing sheet of clay with flints remained undisturbed in the Glacial period is very doubtful, and this deposit certainly overlaps and contains material from both Eocene and Pliocene strata. The discovery even of undoubted Palæolithic implements at a considerable depth in clay with flints would be insufficient to carry back the antiquity of man beyond the last period when the soil was frozen and the higher downs were subject to torrential action.

### THE SILCHESTER EXCAVATIONS.

IN 1890 the excavations on the site of the Romano-British Calleva Atrebatum of the Antonine Itineraries were commenced, and the results are regularly shown at the rooms of the Society of Antiquaries. The site has been divided into squares, and Numbers XV. and XVI. were the fields of the operations for last year's work. Number XV. appears, like several of the others, to have been given up to the dyeing industry, of which traces were found in 1894 and 1895. It contained two houses, one of large size, and four other blocks of buildings, as well as the remains of several hearths and furnaces, and it is conjectured that a large area towards the north was used as a bleaching-ground. One valuable discovery was that of two wells, one with a wooden framing at the bottom, and the other with a large wooden tub. The latter is in very tolerable condition, and will be added to the Silchester Loan Collection in the Reading Museum. The well was sunk in the native soil to the depth required to reach the water supply. A square curb, formed of 6-inch square oak baulks about 4 feet long, dovetailed together, was laid on the bottom. Upon it rested a round tub or barrel 3 feet in diameter, made of fir staves 3 feet 9 inches long by 5 inches wide, the whole hooped with birch hoops. A second tub was stood on the top of the first, and the interspace between the tubs and the sides of the well was filled by pugged clay well rammed in. Above this the well was steened with flints.

Although the past year's work has not exhumed any such extraordinarily magnificent edifices as those found previously in Insula XIV., the examination of Insula XVI. has produced a large and important house of the courtyard type and two other houses of the corridor type, as well as an isolated square building, and traces were found of what were probably structures of wood. The collections of glass, pottery, bone and metal articles, coins, &c., are not less numerous and interesting than usual. Roman wood relics are always rare by reason of the perishable nature of that material, and therefore the leg of a domestic stool in turned hardwood, although broken, is a cherished rarity. Many slabs and smaller portions of Purbeck marble, and of a purple, green and white Pyrenean marble used in architectural constructions, have been obtained. Some of the former are from the tribunes of the basilica or law courts. A small fragment of Egyptian porphyry, probably from a broken vase or other ornament in one of the temples, was found near the east gate. One fragment of glass with green and yellow eye-spots in a deep brown ground is particularly beautiful, and a perfect white-ware bottle-necked vase is of very elegant shape. In one pit were found a large number of sheep's bladebones, the perforations in which showed that they had been used for rings and counters; and among the minor objects were a small Doric capital, a handle of a bowl of millefiore glass, two bronze bells, the bronze covering of a casket and four gilt brooches.

The most striking discovery, however, was of a cutting about 6½ feet deep, outside the city and leading to the wall. Towards the east end were found remains of iron collars, at regular intervals, which showed that a wooden pipe had been laid in the cutting. These collars were used to join the several parts of the piping together, and the joint was probably made watertight by some kind of cement. Nothing of the kind has been found elsewhere in this country, but a precisely similar discovery was made in France in 1872 on the site of a Roman town at Chatelet, between St. Dizier and Joinville, in Champagne, of which an account was given by M. Grignon, who carried out extensive excavations there by order of the king. The tracing of the pipe led to the discovery of a hitherto unknown gate in the city wall, which bears a striking resemblance to one discovered near Aldersgate Street when the new Post Office buildings were erected. The gate had a single opening 12 feet wide, which had been reduced to 7 feet by blocking it with masonry. There was a ditch outside, traversed by a wooden bridge, supported midway on wooden pillars resting on a gravel bank. The part of the bridge adjacent to the gate was probably either a drawbridge or one which could easily be destroyed, so as to render an attack impossible. The piping below led to Insula III., where there is an unexplored building which will be examined next season, and where it is conjectured



that the principal or most used baths of the city were situated. The gateway is a very durable structure of rubble and large flat stones.

The explorations to be next taken in hand are those of the Insulae XVI. and XVII., and the site of the buried building in Insula III., into which the water conduit from the postern ditch was carried. The executive committee of the Silchester Excavation Fund, therefore, have a more than usually expensive task before them by reason of the greater depths to which the excavations will extend.

The balance-sheet shows an expenditure of about 500*l.*, of which 333*l.* went for wages and 61*l.* for carpenters, &c., and a balance in hand of 13*l.* 15*s.* 8*d.* Subscriptions are invited, which may be paid either to the hon. treasurer, Mr. F. G. Hilton Price, 17 Collingham Gardens, or to Mr. W. H. St. John Hope, the hon. secretary, at Burlington House.

### SOUTH KENSINGTON MUSEUM.

THE select committee appointed to inquire into and report upon the administration and cost of the museums of the Science and Art Department have presented the following first report on the protection of the South Kensington Museum from fire:—

1. Your committee are making progress in the inquiry entrusted to them. But they consider it to be their duty to make an immediate report to the House of Commons on the peril of destruction by fire to which the priceless collections at South Kensington Museum are exposed.

2. There are a number of old buildings, built of wood and lath-and-plaster, and in some instances covered with tarred felt, in close proximity to the modern permanent buildings which contain the bulk of these collections; and the danger has been aggravated by the erection of large temporary buildings constructed of fir framing, covered, it is true, on the outside with iron, but lined internally with varnished match-boarding.

3. Attention has repeatedly been called both in and out of Parliament to the risk to which these collections are thus exposed, but the state of things above described goes on from year to year.

4. The roofs of the galleries in which the Sheepshanks and Jones collections, the Chantrey bequest, the Water-Colour Gallery and the Dyce and Forster collections are housed are constructed mainly of unsuitable timber, and are especially open to fire damage, from the fact of having wood-lanterns, skylights and open sidelights. The walls are boarded and canvased, with a space behind. The sparks from a conflagration of the old or from the temporary buildings might occasion irreparable damage to these collections from fire or water used to extinguish it.

5. Opposite the Raphael Cartoon Gallery there is a staircase with a wooden roof and wooden stairs and partitions. In one of the eastern picture galleries there is a door which opens into a wooden staircase leading to the roof, with a large amount of wood partitioning. These would, in the event of fire in other parts of the premises, be sources of imminent danger to the collections.

6. The Art Schools, which adjoin these galleries, are from their construction and from their necessary use specially liable to the risk of fire.

7. The private residences of the officers of the Department in the immediate vicinity of the galleries are a further source of danger. The whole of the floors are of wood; the partitions running up and dividing the upper storeys are of wood, the staircases are of wood, and the roofs are also of wood. The party walls dividing the residences have not been carried through the roof. There are eighty-one open fireplaces. These premises cannot be watched day and night by the police and attendants, as the other buildings are, and a domestic accident, such as might happen in any London house, might at any moment be the beginning of a conflagration.

8. The entrance to the southern galleries on the west side of the Exhibition Road is a highly dangerous structure. It is timber-framed and weather-boarded and covered with tarred felt.

9. The southern galleries themselves would fall an easy prey to fire. They are of slight construction, are open from end to end, one side is almost entirely window openings, and wood is entirely used in the fabric for floors, roofs, divisions and staircases. Should fire seize a portion, the great probability is that the whole would become a heap of ruins in a very short space of time.

10. Dangerous as these galleries are in themselves, they are exposed to still greater risk from the flimsy temporary buildings which adjoin them.

11. That the buildings in which the collections at South Kensington are placed have enjoyed so long a comparative immunity from fire is due to the care and vigilance of the police, the skill and care of the various attendants and mechanics employed about the premises, and the unremitting

watchfulness of the officials. The erection and continuance of such buildings as are about the site have almost courted disaster.

12. That the principal structural alterations necessary for the protection of the collections from fire have not been made appears to be due to the fact that the completion of the permanent buildings of the South Kensington Museum has always been in the contemplation of successive Governments, as the true remedy for the danger of destruction from fire which hangs over the collections so long as they have to be partly housed in the present temporary structures.

13. This necessity of providing buildings suitable for the exhibition of the objects of art and science collected at South Kensington has been long under the consideration of successive Governments. Your committee regard it as their immediate duty to lay before the House of Commons by means of an interim report their very strong opinion that permanent buildings for the adequate accommodation of the collections at the South Kensington Museum should be proceeded with without delay. They are of opinion that it will be a source of grave discredit to the country if the settlement of this matter, which has been the subject of consideration by Government for many years, and of endless correspondence between the departments concerned, is any longer delayed.

### EDINBURGH ARCHITECTURAL ASSOCIATION:

THE Edinburgh Architectural Association visited on Saturday last The Binns and Midhope, Linlithgowshire, by permission of Mr. J. Cornwall Dalryell and the Earl of Hopetoun. Mr. Thomas Ross, F.S.A.Scot., in describing The Binns, said that it occupied a charming situation on the summit of a low ridge of hills to the south of Blackness Castle. On plan it formed three sides of a square, the east wing being the oldest part, and probably dating from the sixteenth century, and the north and west wings from the seventeenth century. One, at any rate, of the fine plaster ceilings seemed to be by the same hand that executed those at Moray House, Edinburgh. The Dalryells of The Binns were descended from the Dalryells of Dalryell, and they acquired The Binns towards the end of the sixteenth century. General Dalryell took a most prominent part in the events of the seventeenth century, dying a very old man in 1685 in spite of a large reward being offered for him, dead or alive. Mr. Ross, in his description of Midhope, said it was a lofty mansion-house situated in a picturesque dell, and quite hidden from view till one was almost within call of it. Oblong on plan, it was erected at three distinct periods. The whole basement was vaulted, and a small newel stair in the older part and a fine oak stair in the latter gave access to the upper floors. Alexander Drummond, second son of Alexander Drummond of Earnock, was the first laird of Midhope, and in the beginning of the seventeenth century the property passed into the hands of the Livingstone family, who probably built the eastern parts.

On the motion of Dr. Rowand Anderson, a vote of thanks was passed to Mr. Dalryell, the Earl of Hopetoun and the leader of the visits, Mr. Thomas Ross.

### THE SHEFFIELD TOWN HALL.

THE Sheffield Town Hall was on Friday last formally opened by the Queen. On Her Majesty's arrival an address was presented in which the Corporation expressed their grateful rejoicing that the dedication of the home of the municipal government in the city would for ever link Her Majesty's name with the history of Sheffield, and through far-off years would strengthen the bonds with which a grateful and ever-growing loyalty shall bind the subjects to the throne. The address was presented in a gold casket by the Duke of Norfolk, the mayor.

Her Majesty gave the following written reply to his Grace:— I have great pleasure in receiving your loyal and dutiful address, and in being able to be here to open this spacious and beautiful Town Hall, which is a worthy monument of the vast growth and importance of your city. I am glad to associate myself with an event of such moment to Sheffield as the dedication of this fine building to municipal uses; and I trust that the progress and the prosperity of the city and the welfare of its inhabitants may be great and uninterrupted. I fully share in your appreciation of the manifold blessings of peace and prosperity which have during the last sixty years been vouchsafed to my Throne and Family and to all classes of my subjects, and I am deeply touched by the numerous manifestations which reach me of the wish to associate these blessings with my reign. With profound reverence and thankfulness, I join in your praise and gratitude to the Almighty, who has sustained and blessed this kingdom and Empire during the long period for which the responsibilities of the sovereignty have lain upon me.

The architect was presented to the Queen. The ceremony lasted twenty minutes.



## NOTES AND COMMENTS.

THE name of ROBERT THOROTON, M.D.; of Car Colston, who died in 1678, is associated with the history of Nottinghamshire. When it was decided to found a society for the study of the history and antiquities of the county of Nottingham a more appropriate name could hardly be found than "The Thoroton Society." The first meeting is to be held in the Shire Hall, Nottingham, on June 1, with the Duke of ST. ALBANS, Lord Lieutenant, as chairman and first president. The funds obtained by the subscriptions of members (10s. 6d. annually) are to be devoted to promoting the objects of the Society and printing historical matter. The vice-presidents nominated are the Duke of PORTLAND, the Duke of NEWCASTLE, the Earl MANVERS, the Bishop of SOUTHWELL, Lord BELPER, the Mayor of NOTTINGHAM, the Dean of ST. PAUL'S, Mr. J. E. ELLIS, M.P., Mr. JOHN G. B. THOROTON-HILDYARD. The honorary secretaries are the Rev. JOHN STANDISH and Mr. W. P. W. PHILLIMORE, and Lord HAWKESBURY will be Chairman of Council. The new Society is deserving of support, and is likely to render yeoman's service to local archæology.

ALTHOUGH railways have been in use in this country for three-quarters of a century, it is still uncertain what kind of timber should be specified for sleepers. Fir is almost universally employed, and generally creosoted. When creosoted sleepers last from twelve to fifteen years, and so long as rails only last about the same time there is no need for better material; but, with the adoption of steel rails, there is need of sleepers of greater endurance, and cast-iron, wrought-iron and steel have all been tried. But they have caused disappointment, the greater first cost not producing any proportionate added life. The Australian woods, Jarrah and Kauri, have been suggested, and a trial is to be made of them. The remarkable endurance shown by these woods when employed for street paving encourages the hope that they will be equally efficient in railways. A great many sections of rails have been rolled, but only two, the vignoies, or flat-footed, and the bullheaded, are in use, and the vignoies section is rarely seen in this country. Mr. COPPERTHWAIT, of the North-Eastern Railway, is of opinion that if a life of about twenty years were adopted for steel rails on ordinary railways, it would be a waste of material to use a section weighing more than 80 lbs. per yard lineal. Mr. F. W. WEBB, of the London and North-Western Railway, introduced on that system the bullhead section of rail, a deep fish-plate, and screened the ballast so as to keep the road-bed as dry as possible. As a heavier rail is about to be introduced, he has suggested a joint in which the defects of the ordinary fish-plate joint seem to have been overcome, and the usual fish-plate holes through the rails are rendered unnecessary.

At the last meeting of the Wandsworth Board of Guardians the special committee on the Nurses' Home reported that they had requested Mr. ALDWINCKLE to give his aid in the selection of the sixteen designs submitted in competition, his fee being twenty guineas. It was decided that the design marked "Nightingale," by Messrs. LONSDALE & HARRISON, was entitled to the first premium of fifty guineas; that the design marked "Florence Nightingale," by Mr. F. J. W. GOLDSMITH, was entitled to the second premium of twenty guineas, and the design marked "Victoria," by Messrs. GOLDWILLS & BULMAN, to the third premium of ten guineas. It was further recommended that Messrs. LONSDALE & HARRISON'S design should be carried out, subject to such alterations as Mr. ALDWINCKLE had suggested. The Board of Guardians adopted the recommendations of the committee.

THE object of the Conference of the Institution of Civil Engineers is to make members more or less acquainted with the latest development of practical science. The paper which was read by Mr. ROGERS FIELD on "House Sanitation" at the meeting on Wednesday suggests that civil engineers are as yet in the elementary stage; and it

will be long before they are competent to undertake the charge of domestic sanitation. The author said the subject was well worth attention. There should be an ample supply of pure water to the house, and appliances for distribution should be so arranged that it could not be contaminated before it was used. In drainage the two chief guiding principles were:—(1) That all foul matter directly it was produced must be rapidly and completely removed from the house; and (2) that there must never be any passage of air from the drains or waste pipe into the house. The drainage must be self-cleansing and readily accessible. He found it advantageous to use heavy cast-iron pipes instead of stone-ware pipes. Gas pipes and fittings were as a rule leaky, and allowed a constant escape in the house, which might cause serious outbreaks of sore throats. The pipes and fittings should always be tested by pumping air into them and watching the result on the pressure gauge. Who would have expected that it was necessary to explain to the foremost body of engineers in Europe a few facts with which it was supposed every child in a Board school was acquainted? Mr. ROGERS FIELD'S experience would have enabled him to say much more about sanitation, and that he started at so low a level does not say much for his estimate of the knowledge of his fellow-members.

WHEN MOORE, the poet, said that two thousand years had passed without any improvement in the cabins of the Irish he was not exaggerating. Unfortunately the dwellings of the agricultural labourers in many parts of England appear to be no less unfitted to shelter human beings. According to what was stated at a conference of the Land Law Reform Association on Tuesday, an inquiry into the condition of sixty-seven villages had demonstrated that among 270 cottages one-fifth were bad or extremely bad; 61 per cent. of the bedrooms had no fireplaces, consequently no proper ventilation; one-sixth of the cottages had bad and dangerous water-supply, and in some cases were without any supply. In another direction 247 villages were examined. In one-half of these villages were bad cottages, one-fifth had insufficient cottage accommodation, in many there was gross overcrowding, and in one-sixth there was totally inadequate or dangerous water-supply. With so many impressive facts before them, the Conference could hardly decline agreement with the following resolution:—"That this Conference is of opinion that the condition of the housing of the working-class population in a large proportion of the villages of England and Wales constitutes an evil of serious public importance. It considers that measures are needed which shall provide effective remedies for the unsatisfactory sanitary state, the bad repair and the insufficient accommodation of many of the existing cottages; which shall make it possible to replace the dilapidated buildings that are still inhabited by new and convenient houses; and which shall assure to the labourer some degree of security in the tenure of his home." The remedies are costly, and the difficulty is to discover where the money is to be found. Land is not everywhere profitable, and the additional taxes imposed by county and parish councils do not diminish the burthens on it. All the Conference could devise was to recommend that authority should be given to those councils to raise loans for acquiring land on long lease on which to build cottages with gardens attached, and to delegate the management to the councils or to committees. That would signify that where landlords are indifferent other people would be mulcted to house the landlord's labourers. If cottages are provided at the public expense why not also add food and clothing?

## ILLUSTRATIONS.

SHEFFIELD MUNICIPAL BUILDINGS.—TOWER AND MAIN ENTRANCE FROM GROUND LEVEL.—WEST FRONT AND MAIN ENTRANCE.—DOORWAY AND COLUMNS IN DINING HALL.

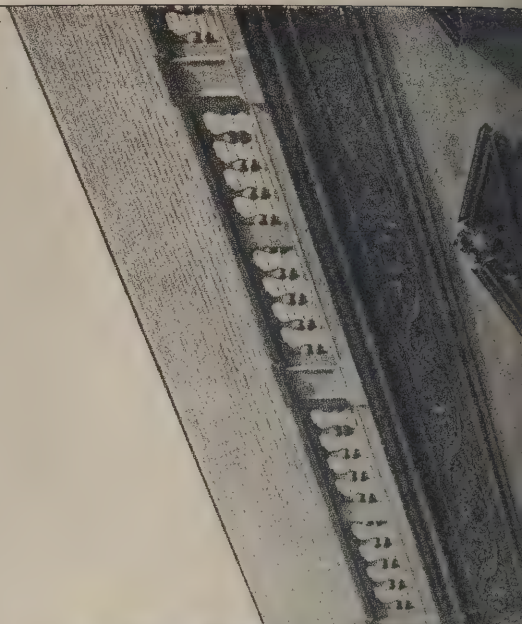
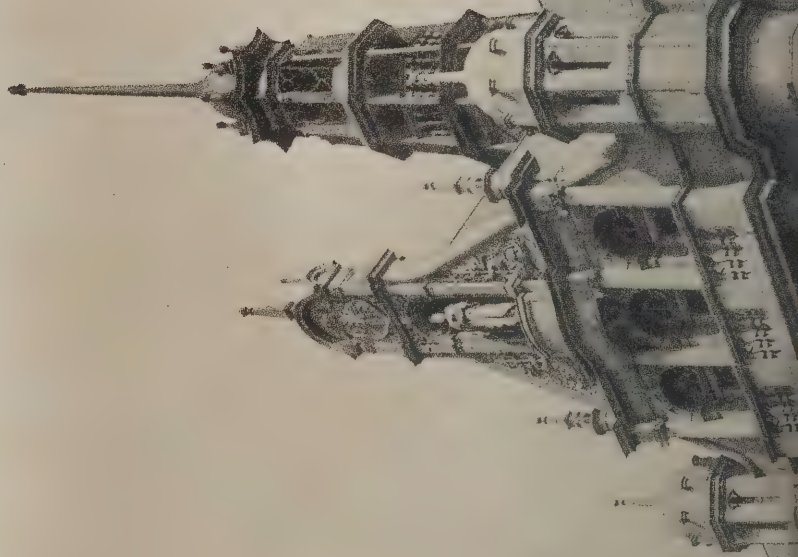
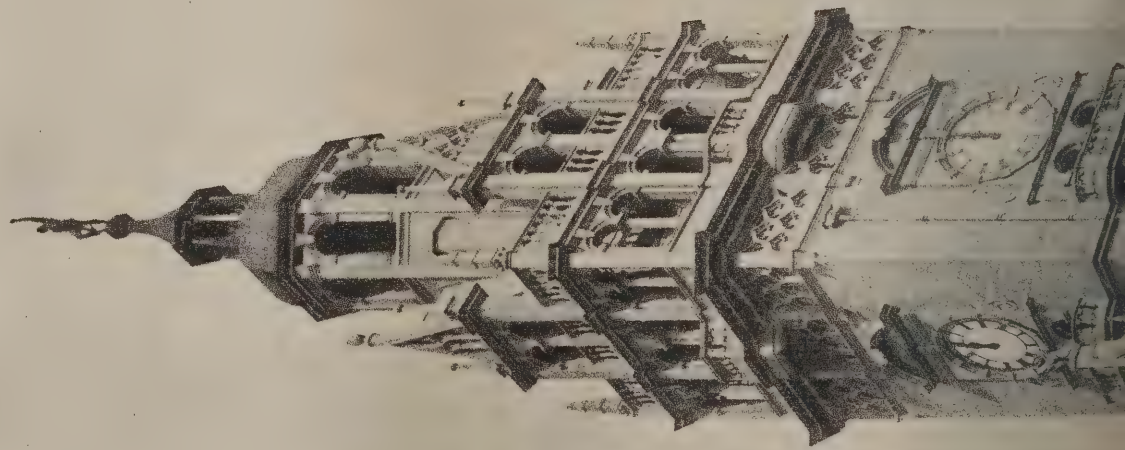
CATHEDRAL SERIES.—NORWICH: EXTERIOR, SHOWING APSIDAL CHAPEL.—EXTERIOR, SHOWING BUTTRESSES, ETC.







The Architect, May 28<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO

INK-PHOTO. SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

**SHEFFIELD MUNICIPAL BUILDINGS: TOWER AND MAIN ENTRANCE FROM GROUND LEVEL.**  
E. W. MOUNTFORD, Architect.

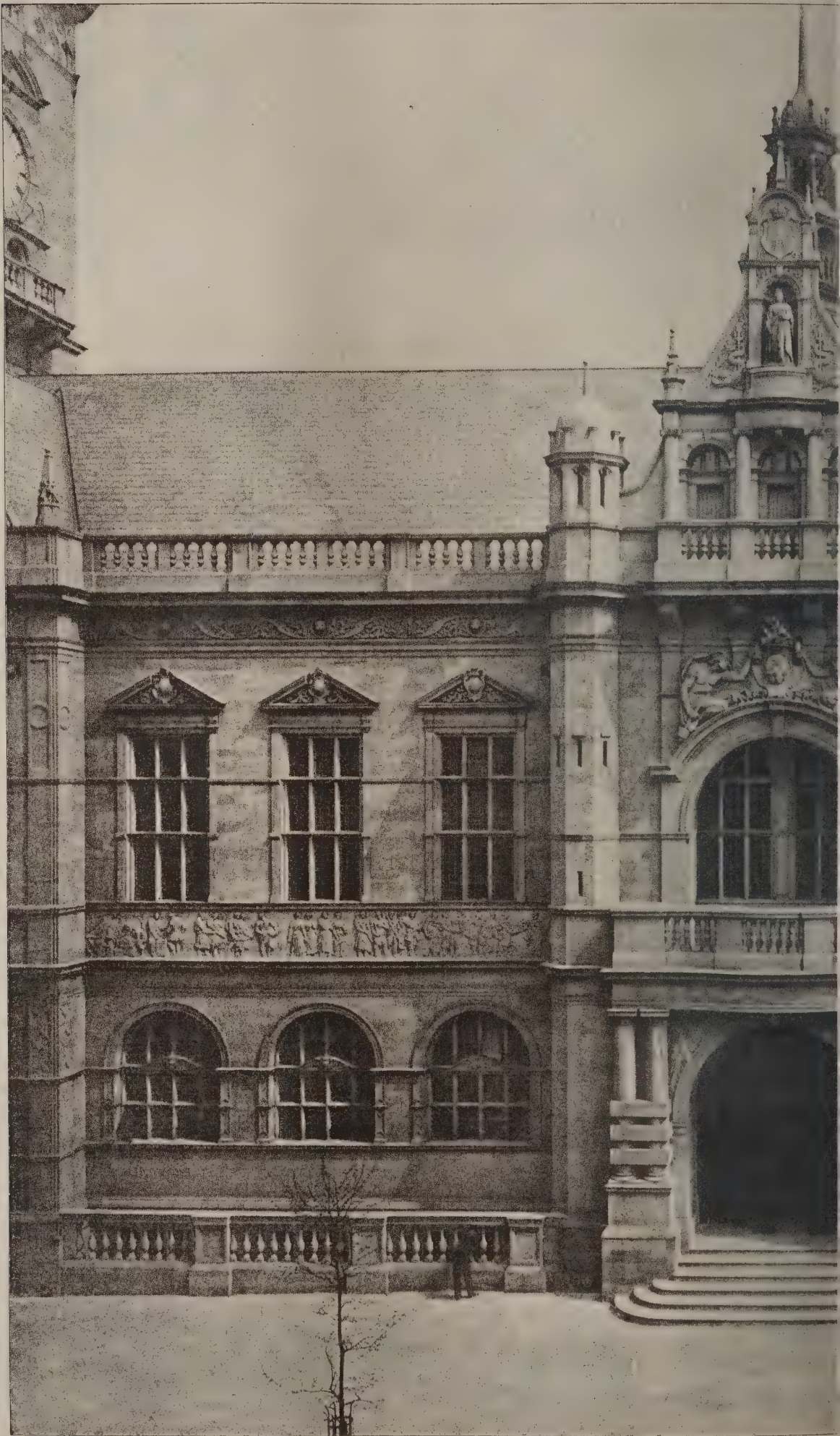












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Aug 28<sup>th</sup> 1897



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FRONT AND MAIN ENTRANCE.

Architect.



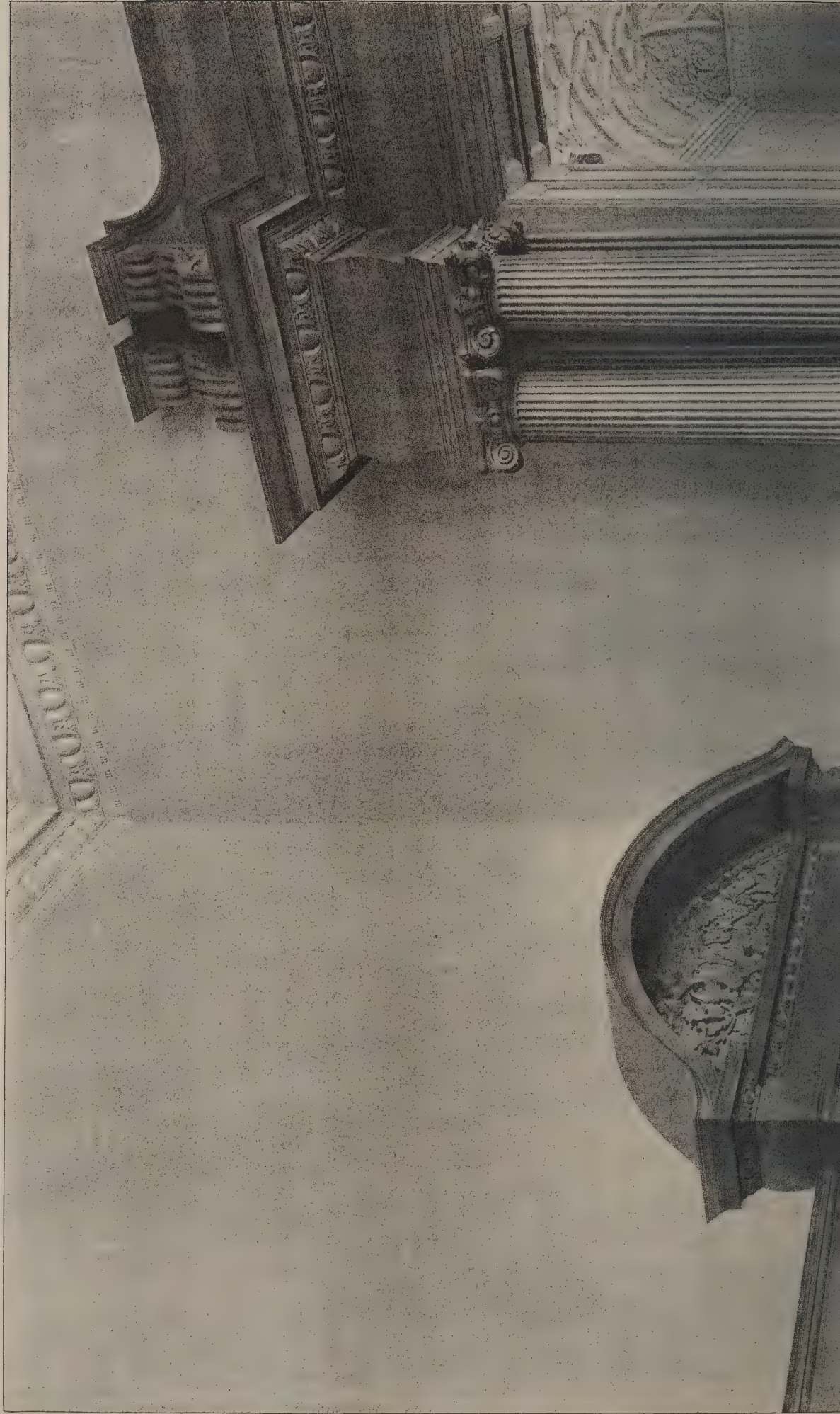




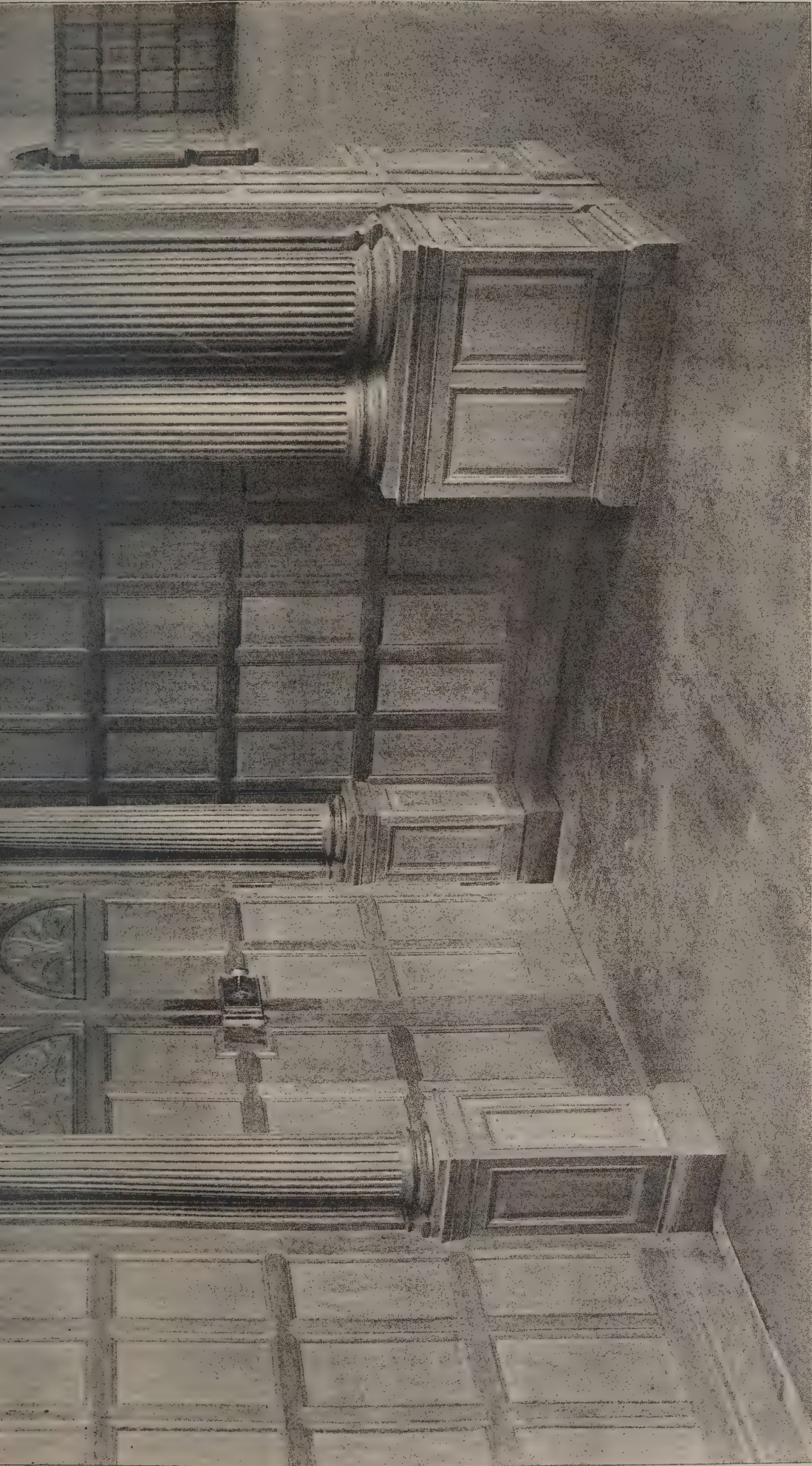




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**SHEFFIELD MUNICIPAL BUILDINGS: DOORWAY AND COLUMNS IN DINING HALL.**  
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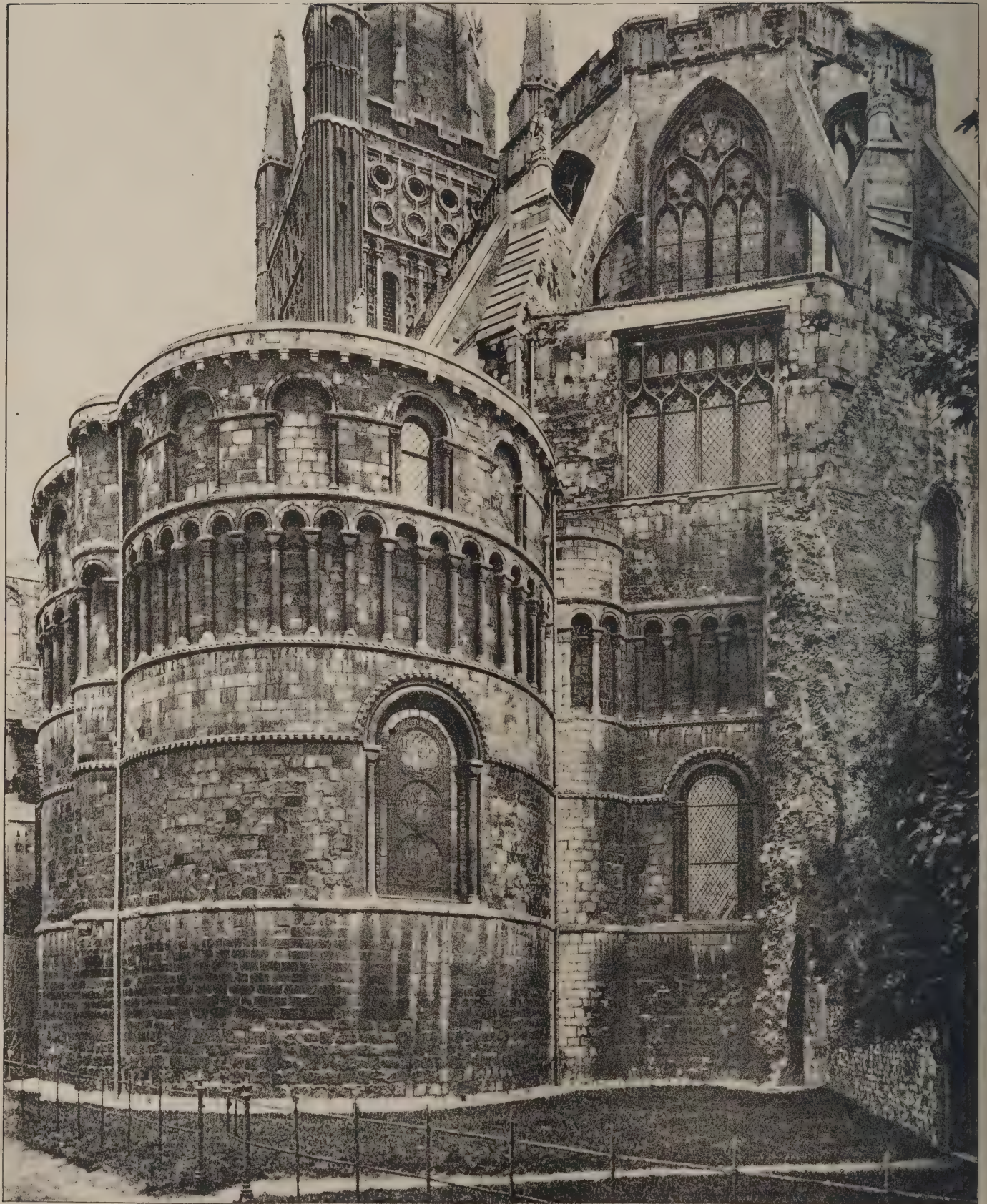












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INK-PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 36.—NORWICH: EXTERIOR, SHEWING APSIDAL CHAPEL.





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CATHEDRAL SERIES, No. 37.—NORWICH: EXTERIOR SHEWING BUTTRESSES, &c.







## SIR A. W. FRANKS.

THE president of the Society of Antiquaries, Sir Augustus Wollaston Franks, K.C.B., died in London on Friday after some weeks' illness in his seventy-second year. According to the *Times*, he was the elder son of Captain Frederick Franks, R.N., and Frederica, daughter of Sir John Sebright. He was born in 1826 at Geneva, where, and at Rome, his parents lived during his boyhood, and was educated at Eton and at Trinity College, Cambridge. Even in his college days he developed the taste for Mediæval archæology upon which in later life he became the leading authority, and he published in 1849 a volume of "Ornamental Glazing Quarries," containing many drawings by his own hand. At the same time he began his extensive collection of rubbings of monumental brasses which was eventually presented to the Society of Antiquaries. He acted as secretary of the exhibition of Mediæval Art held at the Society of Arts in 1850, the first of many similar displays, and it was probably the knowledge of the subject he then showed that led Mr. Hawkins, the keeper of the Department of Antiquities at the British Museum, to propose that he should enter the Museum as an assistant, which he did in the year 1851. The department was then a mere collection of odds and ends; when Sir A. W. Franks retired it occupied more than one-half of the upper floor of the building. The post of principal librarian of the Museum was offered him, but he declined it, feeling that his proper vocation lay in his own department. He was a man capable of warm friendships, which was in itself a benefit to the Museum, and it may safely be said that it is to his friendship with Mr. Henry Christy, Mr. Felix Slade, Mr. John Henderson and Mr. William Burges, and to the advice and help that he gave them in forming their various collections, that the Museum owes their valuable bequests. To him was due the comparatively recent purchase of the Royal English gold cup; he actually bought it himself from Messrs. Wertheimer, and it was only the consideration that his purchasing powers would be curtailed for some time that decided him to appeal to others for help in keeping it for the nation. Other sections besides his own bear witness to his catholic taste and great liberality, and he was not infrequently requested by Government to give his judgment on proposed purchases. As soon as his retirement from the Museum became inevitable under the Order in Council he was placed on the standing committee, and took up to the time of his death an active part in the business of the Museum. He was for some time director of the Society of Antiquaries, a post involving the editorship of the Society's publications, and in 1891 he was nominated President for the usual period of seven years. The Society as well as the Museum was familiar with his liberality, and quite recently he presented to the Society some hundred volumes from his antiquarian library. Many struggling antiquaries and others can testify to his generosity, both with his varied knowledge and his purse.

His chief collections are of Chinese and Japanese porcelain and English pottery and porcelain (both presented to the British Museum); drinking vessels of all materials, and Japanese works of art (both on loan at the British Museum); continental porcelain (now exhibited at the Bethnal Green Museum); rings and gold ornaments—the rings forming undoubtedly the finest collection in existence; and bookplates. The latter collection was the amusement of his later years, and is due to his intimacy with the late Lord de Tabley, who was the first to take up the subject. It is probably the largest and best in England. At the Fountaine sale Sir A. W. Franks joined the syndicate of gentlemen who secured for the nation the objects now in the South Kensington and British Museum. In order to give the Trustees of the British Museum a lever to use with the Government he offered to give objects equivalent in value to the special grant asked for. The works of art he then presented were worth about 3,000*l*. His friendship with the late Lady Charlotte Schreiber led him to help her in her great work on "Playing Cards," and when Lady Charlotte's sight failed he undertook the completion of the book, the last volume of which appeared shortly after her death. His principal discovery in archæology was to separate the work of the age which produced what he called "Late Celtic" antiquities—perhaps the most artistic productions of any people who have inhabited this country—from that of the age which preceded and followed it. His persistency as a collector, moreover, managed to secure for the nation the best collection that exists of the remains of this period—a period which lies on the borderland between the prehistoric and historic periods in Britain, and about which antiquarian relics are our only means of knowledge. He had in hand at the time of his death a catalogue of the enamels in the British Museum—one of his favourite subjects. It is to be regretted that it was not finished, as a work on the subject is much wanted. Among his published archæological works may be mentioned the valuable catalogue called "Medallic Illustrations of British History," which he edited with Mr. Grueber in 1885, an edition made in conjunction with Dr. Latham of Mr.

J. M. Kemble's "*Horæ Ferales*," a volume which his additions converted into a standard archæological work, and a treatise on glass and enamel, which, though brief, is, with regard to the enamel, the most trustworthy treatise in English on the subject.

A HALF-CENTURY OF LINE ENGRAVING,  
1780-1830.\*

I WISH first to warn you that the breadth of the subject of my paper as indicated by its title will be found considerably narrowed in its delivery by reason of the limitation of time, and more so by the limitation which I have placed on myself, my object being briefly to call attention more particularly to one application of the art of engraving in England, which had its rise and decline within a period of half a century, a period, however, which produced in great quantity work which I believe to be worthy of careful study and of being carefully preserved.

Many of you probably are familiar, but I trust not with that familiarity which breeds contempt, with the little duodecimos, generally in shabby browns and often denuded of all the charm of gold-tooling and lettering, which once gave exterior beauty to the dainty little books, which enshrined the poets, essayists and novelists of the later years of the last century, and with the like-sized books in the brighter clothing of reds and greens and purples covering the collections of prose and poetry which, under the various names of *Bijou*, *Souvenir*, *Amulet* or *Annual*, gave the motive for the production of some of the most charming of the engraved work of the fifty years between 1780 and 1830.

It is of the illustration of these little books I am about to speak. Before, however, I do so, you will pardon me if I assume that possibly there may be present a few to whom the art of engraving, as it must be understood in this application of its several methods, may not be entirely familiar, and I will very shortly indicate the methods which at the moment most interest us.

Some of you have probably seen in the Museum of Antiquities in the Louvre that wonderful specimen of engraving upon which is recorded in Phœnician characters the account of some of the conquests of a king of Moab 3,000 years ago, and all of us are familiar with the small pieces of copper on which fashion prescribes that our names shall be inscribed by the engraver to be used in the production of the visiting-card of to-day.

Now it is a very wide step between the Moabite stone and a visiting-card, but there is yet a broad identity between them as to the method by which their markings are produced, for both are incised, the rough chisel on the basaltic stone of Moab finding its exact counterpart in the more delicate graver of the card-plate. Both, then, are incised, that is, the level surface is cut by incision, and both are in intaglio. I will return to the familiar card-plate, and let it serve me in illustration. You see in such a plate that the character, in imitation of writing or of some variety of type, has been sunk below the surface. If a suitably prepared stiff ink is rubbed over the surface in such a way that the sunken hollows of the plate become charged with it, and then that surface is cleaned or cleared of the ink upon it, the hollows alone remain filled with the ink; the plate thus charged being placed under the rollers of the copperplate press with the sheet of paper or card which it is desired to print in immediate contact with it, the ink in the hollows of the plate is given off to the paper, and we have then what is technically called a "print." The process is precisely the same whether the plate be a common card-plate or an etching by Rembrandt.

I have spoken so far of the incised work as produced by the graver, which is, in effect, a finely-pointed chisel; there is, however, another method by which the incised work is produced on the plate, namely, by the erosion of the metal surface, be it copper or steel, by aquafortis. In this case the plate is coated with a thin film of varnish, upon that film the engraver draws the design with a fine needle, the needle cutting through the film and laying bare the metal beneath; the plate is then subjected to the action of aquafortis, which in all the exposed lines bites into the metal, and in this way plays the part which, in the other case, is taken by the graver. This is crudely put, but I hope it is sufficient to convey to you a general idea of the operations.

On the screen you will now see an example of the result of each of these methods. The first is "*The Young Novice*," engraved by Greatbatch after a picture by Northcote, and the work is entirely that of the graver; and the second is after Turner's "*Greenwich Hospital*," engraved by William Finden; with the exception of a few lines on the boat and the figure in the foreground, this is all etched, that is, the lines are formed by the action of aquafortis alone. This is, of course, an impres-

\* A paper by Mr. George Chulow, read before the Applied Art Section of the Society of Arts on May 11.



sion from the first state, as it is called, of the plate, pulled for the purpose of the engraver, and in its completed state, as you now see it, is worked upon by the graver. I shall have occasion to refer to both of these again.

It seems to me that of all the arts which have sprung from that of design, there is none except architecture and painting which has given pleasure to so many or has been of so much benefit in shaping correct ideas as to form and of educating the eye and the intellect as that of engraving, whether on metal or on wood, though with the latter we have nothing to do to-night. By means of the burin of the engraver we have had brought within the immediate reach of nearly everyone the best work of the artists of all countries and periods, and it has served in many cases to preserve to us priceless designs which would have been otherwise lost. Very much of the work of the great artists of three centuries ago exists only now by the copies made contemporaneously by the engraver. Engraving, moreover, has proved to literature and the right understanding of it an aid which entitles it to take rank with literature itself. John Evelyn most happily speaks of a picture, and he had in his mind an engraved picture, as a kind of universal language, for he says that "although it has no tongue it can yet speak and convey instruction"; how true this is we know by our everyday experience.

Although I claim for England the possession of a distinct school of engravers, worthy in their way to be called "little masters" as much as the "little masters" of Germany of an earlier period, I admit that we cannot be said to have had a school of engraving before the middle of the last century. We had, however, a hundred years earlier a few able and distinguished men who as engravers have left a broad mark for themselves; I need only mention Elstracke, Delaram, Faithorne and Hollar, and later the names of Hogarth, Woollett, Strange and Sharpe occur naturally to us. Of the brilliant cluster of engravers in mezzotint of the last century we have no concern at the moment, tempting as it is to speak of them; what the fame of Sir Joshua Reynolds, for example, owes to such engravers as McArdell, Houston, Fisher, Grozer, Valentine Green, Pether and others is known to us all.

But I am being tempted into the broad fields and out of the path upon which I have set out, for it is with the illustration of books by the "little masters" of whom I have spoken that I have to deal. Prior to the last quarter of the eighteenth century the illustration of books had been confined for the most part to the delineation, with more or less accuracy—generally considerably less, I apprehend—of the features of historical personages, or the subjects of biography and archaic representations of historical events, but there had been little attempt to create the actual circumstance and incident of the novelist, poet or historian in a realistic way. The books which are in my mind as marking a distinct epoch in the art of illustration by engraved plates appeared in 1780 as the *Novelist's Magazine*, which seemed to suddenly focus within its pages a new school of artists and engravers in line, the name which stands out the most prominently among the artists of that period being that of Stothard, and those of James Heath, Sharpe, Goodall and Finden among the engravers. A fashion was set, and a pretty fashion it was, and able and accomplished craftsmen were found to give it ample expression; such men as the Heaths, the Findens, Neagle, Noble, Fittler, Freeman, Ridley and Bartolozzi gave us things of beauty in constant succession. I do not attempt to give a catalogue of names of all the clever engravers who were occupied upon the book illustration of that period, but I know that I am finding for you a wide source of enjoyment in indicating so much as will induce you to seek further for yourselves. I have selected Stothard as an artist to serve as a kind of text, because he was perhaps the designer most in demand by the publisher, and whose work passed into the hands of the largest number of engravers for reproduction. I want to be, nevertheless, understood as not selecting Stothard because his work was uniformly better than his *confrères*, because there were others, and notably Westall, who, less prolific, attained a high average of artistic excellence, but there is an almost constant charm about all that Stothard did, and we linger admiringly over the exquisite grace and proportion of most of his compositions, the tenderness of his invention, the charm of his line and the propriety of his accessories. Nothing in English art excels his children and young girls, and he is alike a master in depicting an English cottager child and the *belle dame* of society. Let us stay for a moment and look at the examples which I have selected in illustration of this.

As was Sir Joshua Reynolds with the mezzotint engravers so was Stothard fortunate in finding men to engrave his designs who were in fine artistic touch and feeling with him, men, indeed, who would seem to have found their gravers inspired by the grace and beauty of his design. It is almost invidious to discriminate among such names as Allen, Fox, Humphreys, Goodall, Goodyear, the Heaths and the Brothers Finden, all of them so excellent. On the screen you will see examples of their work, among others, and I may safely leave you to form a competent opinion of their relative merits. I want you, how-

ever, to bear in mind that the examples I have selected for you appeal to me as representative of the highest attainment of this art of engraving "in little," which is to me so impressive and interesting, but do not forget that outside of them are hundreds of examples full of beauty and as good in interest artistically and technically.

I would also have you keep in mind that as you see these engravings on the screen they are enlarged to from forty to sixty times the height of the originals, and that some of them only an inch high are seen on the screen enlarged to 6 feet, because it is on this point of scale that I desire you to share with me the admiration of the consummate draughtsmanship of the engravers, who, without contemplating the severe ordeal which their works thus undergoes, prove the claim good, which I make for them, as being very much more than mechanical reproductions of the original work of the designer. The artist worked, of course, to the scale of the intended reproduction—it was long before the days of photography and its resultant and often abominable processes—and one is frequently impressed by the fact that the engraver has seen and has had the ability to correct the small shortcomings of the artist. I do not intend by this to disparage the very beautiful work in miniature, for such it is, which was created by such men as Stothard, Lawrence, Burney, Westall and others; it would be rank heresy, perhaps, to suggest that Turner could have been improved by his engraver, but I will venture to say that even he had no reason to complain of the interpretation which his compositions received at the hands of the artist-engraver. I wish that it had been possible to have placed side by side the original and its engraving, but I can only now put before you the examples which are selected in illustration of what I have said.

The screen has now on it one of the illustrations to Rogers's "Poems" by Stothard, engraved by William Finden. It is an early working proof and it shows the early stages of the etched and also of the engraved line, and well indicates how the landscape portions are laid in with the etching needle and the figures by the graver. It is followed by a finished proof of the same subject and shows how the lines are deepened, crossed and interlined to produce varying degrees of the shadow and of tone, variations in intensity, which give what is described as "colour." In the next we see the use of stipple. Here let me remark that I do not exclude the dot or stipple as an adjunct to the line, for with it we have an aid to modelling and colour.

"Children on the Seashore," engraved by J. H. Robinson, after Stothard, which I take as an example of extreme freedom in laying in the line and figures—nothing laboured, but every line telling and giving its proper value in colour and tone—it is beautiful in its expression; note the expectant eagerness of the child in arms and the kneeling child.

An example of Charles Heath, after Corbould, excellent in the simple treatment of the engraved line, as seen in the wavelets in the immediate foreground.

Bust of Homer, from the Du Roveray edition of Pope's "Homer" published in 1805. Designed by Burney and engraved by Schiavonetti; the bust and figures in the frieze are all done with the graver, the rest is etched.

Here is a charming illustration after Sir Thomas Lawrence, by Thompson, lovely in pose and modelling, and suggesting the inspiration of the engraver by the exquisite drawing of the original.

"The Embarkation," a subject treated after the manner of Turner, by Whichelo, and engraved by Robert Brandard, who was painter as well as engraver. This is one of his earliest plates. The slide is from a not very good impression, but it serves to show how well the abundance of small detail bears enlargement. In this plate the lines have been laid in by etching, as in the Greenwich plate after Turner, and afterwards re-entered with the graver and the shadows and the darker tones re-bitten.

"Cleopatra Embarking," after Danby by Goodall. I have selected this as similar in subject to the last, and as showing a different handling, but similar mastery of small detail; the method is much the same, but it is not seen at its best owing to the impression not being a good one.

The Medici Vase and a Bacchanalian Vase, both are from Rogers's "Poems," designed by Stothard and engraved by Allen. You will observe the even quality of line on both, a compound of etching, crossed and intersected with fine graver cuts; the careful exactness of work should be noted, the height of the figures in the Bacchanalian Vase being only a quarter of an inch.

Here again is Stothard in one of the illustrations to Walton's "Angler," engraved by Finden. It is a good specimen of mixed etched and graver work, the landscape, grass and foliage being all bitten, and the figures all graver—the grass in the foreground is interlined with fine graver cuts to give harmony and quiet tone; the size of the original is under 2 inches, and the tallest figure less than an inch. Note the head of the elder woman, which is full of expression, though in the original only an eighth of an inch in size.



"Pilgrim and Group of Young Girls" now on the screen is another of the Stothard illustrations to Rogers's "Poems," and is a fine example of William Finden's smaller work. The whole of the figures are in pure line, the grass is etched, the shadows in the grass being deepened with the graver; in the original the figure of the pilgrim is a little more than an inch high, the faces are less than an eighth of an inch.

"The Travelling Musicians" is another of William Finden's plates, the whole of the figures being graver work; the features have extremely fine dots to give small shadows. Can anything be more exquisite in expression than the face of the musician and the upturned face to the left?

"Cora"—a group of amoretti surrounding the figure of the young girl—is another of William Finden's plates after Stothard. The whole height of this is but  $1\frac{3}{4}$  inches.

Here is another of the smaller plates after Stothard, but engraved by Goodall, "The Waterfall," in mixed etching and graver line. Notice the extreme delicacy of the background; as a piece of miniature engraving it would be difficult to surpass. We have here another engraver after Stothard—Shenton—less prolific than most of his contemporaries, but with wonderful vigour and force in his line. In this example—which, without being quite sure of it, I will call an illustration to the "Babes in the Wood"—the horses and figures are fine graver work, intelligent and with a keen perception of colour; the landscape and sky are etched—probably a little overdone if brilliancy is sought—but the whole composition is harmonious and very pleasing.

On the next two slides we have two other engravers after Stothard, both displaying the same delicacy in handling of small subjects and minute figure-work.

The "Death of Raphael," by J. H. Robinson, who was Associate engraver of the Royal Academy. Notice the beautiful liquid flow of the graver lines on the figures throughout; all the figures are very small, the whole composition being less than  $2\frac{1}{2}$  inches high.

"Taking the Veil," by Humphreys. Here the figures are all graver, the rest etched; the line in some parts of the draperies is a little harsh and metallic, but as a whole it is a fine print.

"The Young Novice," engraved by Greatbatch, after Northcote, now on the screen and which we have seen before, is all graver. The open book with the fine lines of writing is but three-quarters of an inch high, and is a *tour de force* of manipulative skill with the graver. The value of gradated line is very effectively seen all through this plate.

"The Fairy of the Lake," after Richter, by Edward Finden. In this plate great brilliancy is given to the figure by the extreme closeness of line in the landscape; the graver work, especially in the hair, is very fine.

"The Vintage," after Stothard, engraved by Goodyear. In this plate brilliancy is obtained by closeness of background in contrast with the high lights in the figures; there is remarkable quality in the engraving of the head of central figure.

"Capture of the Wild Boar." We have here a similar effect gained by fine stippling over the figures, drapery and cloud; the effect is delicate and has great charm, but does not compare well with the results obtained by direct line.

"Girl with Basket." We have here another example of brilliant effect gained by contrast, though in this instance at the expense of some truth, the etched background being throughout too massive and dark.

This example engraved by Chevalier, the figures being all graver and the landscape etched, avoids the fault of the preceding plate, while it is not less brilliant and is altogether more harmonious.

Here is a plate engraved by mixed methods—etching, graver line and stipple—portions of the figures and background being by the latter method; it is shown as an illustration of styles, but is the least good of the series.

"Mary Queen of Scots," by Fox, nearly all graver, the darker parts bitten and afterwards gone over with the graver.

This is a plate by Davenport, which is shown as worthy of a place with the work of the better-known engravers with which it is in company. It is combined etching and graving, and has a pleasing and harmonious effect.

I now return to examples from Stothard—the temptation has been not to leave him—and here we have his conception of "The Poet," engraved by Charles Heath. The figure and drapery are all done by the graver, while the background and accessories are etched, crossed with fine graver lines. For so small a subject there is wonderful strength all through, and on the screen it has the effect of an engraving originally of large size.

"The Dance," engraved by Fox. This is the smallest in size of the examples which you have seen to-night, and despite some trifling exaggeration of details, it is the one which marks, to my mind very emphatically, the claim of these "engravers in little" to a cleverly trained and skilled draughtsmanship. The original is exactly an inch high; the figures are all by the graver, the rest etched.

Next we have two subjects engraved by William Finden. Note the great simplicity and freedom in arrangement of lines, and in this single figure the accurate drawing and sense of motion which it conveys.

We have now four landscape studies, all engraved by Finden, after Turner. To me they seem marvellous in their subtle expression of colour and of size, although the originals are none of them more than 2 inches high.

A pretty composition—a domestic group—again by Stothard, and engraved by William Finden. The graver and etched work are together here in most happy and effective conjunction.

With the four friezes after Stothard, also engraved by William Finden, the illustrations end. Of their claims as compositions I need not, I feel, speak; of their beauty and grace you are able to decide, and as examples of the masterly union of the etching needle and the graver, it is not, I conceive, possible to find finer examples among the group of artist engravers which I have so imperfectly reviewed, or, indeed, among the engravers of any time or country. I hope that I may, however, have, to some at least, directed attention to a branch of the beautiful art of engraving which has not been fully explored, and which has in it a source of great artistic gratification.

What the outlook for the engraver is nowadays I cannot say. It would seem as if it was a case, not of there being no longer men able to produce such work, but rather that they have been starved out of existence. We can only look regretfully at the fact that an art so charming has all but died out with us, and hope that some turn of the tide of demand may again bring it into vigorous life.

## PLUMBING AND SANITARY WORK.\*

ON one of the dog-days in July of last year, when everything was in a state of dissolution, I received a letter from the honorary secretaries of this Association asking me to read a paper on "Sanitary Plumbers' Work and Sanitation," and being in a melting mood, and it being "the second time of asking," I flowed out naturally enough into so pleasant a channel, and accepted the honour. And if since then I have had many qualms about so fluidal a condition, they have arisen chiefly from the fear of being unable to interest so important a body of gentlemen as the Architectural Association, and so to-night, in a more apprehensive state of mind, I crave your indulgence.

The subject is too large and the time too short to admit of any adornment, even if I had the power, but in this I am not troubled, knowing well enough how learned you all are in the art of embellishment, and that any deficiency of mine in this respect will readily enough be made good by you.

Holding the strings of his client's purse, money naturally becomes an important factor with the architect. He ever wants to accomplish so much for so little, and somehow money does not increase in value as the years go by—the wages world makes a shrinkage in it. I should like, therefore, to comfort your minds at the outset by saying—speaking obviously apart from the increase in plumbers' wages, which applies to all the other building trades—that the sanitary plumbers' work of to-day costs but little more relatively than did the insanitary work of two or three decades ago.

The additional cost for better treatment and arrangement for better ventilation of the soil-pipes and waste-pipes is largely met by the adoption of more simple methods, by the use of cheaper traps, smaller waste-pipes and soil-pipes; also by the use of fewer cisterns and cisterns of smaller size and of a less expensive character; and, further, by the difference in the market price of materials, lead especially being much cheaper now than it was a quarter of a century ago. I will give you an instance by throwing upon the screen illustrations showing the insanitary method of treating a valve-closet thirty to forty years ago, and the sanitary method as generally practised to-day by those proficient in the craft of plumbers' work. The excess of work is so marked in the old method that I need not go into figures to show its greater cost.

No doubt the many improvements which have been made in the best kinds of valve-closets have increased their cost, but this is met by the simplification of certain parts, and by the use of plainer basins, a simple white satisfying for most places now; for we no longer require to study colours in our water-closets—we have our art schools for that—nor do we now seek for closet-basins with looking-glass bottoms.

I think I ought to say that there are older methods of treating the valve-closet than the one just shown, that being considered (half a century ago) an improvement upon the treatment it first received in the latter part of the last century and the earlier part of this. For instance, in the illustration just

\* A paper read before the Architectural Association by Mr. S. S. Hellyer on May 21.



shown the waste-pipe from the safe is trapped independently of the closet-trap, a weeping-pipe from the closet service is turned into it for charging the trap with water every time the closet is used; whereas in the earlier method the waste-pipe from the safe was connected with the closet-trap, as in fact was also the waste-pipe from the cistern. In the earliest method of all these two latter dangers were non-existent: the closets having no safes under them no waste-pipes were required; and as the water was generally pumped up into the closet cisterns where situated above the basements there was no such need for cistern wastes, especially as the water instead of overflowing the cistern could run away through the pipe of the service-box into the closet basin, and through the overflow-pipe of the latter into the closet-trap and out into the soil-pipe. In an illustration later on we shall see how this was done. But I am departing from my subject.

In the old method the Bramah-closet was supplied by means of a spring-valve, a spoon or shoe-valve, or a round drop-valve soldered to a lead service-box, the latter kind being the one just shown; but such details do not in any way upset our conclusions as to the greater amount of labour involved in the old method than in the new.

That carries us a long way, for it mattered not whether a valve-closet or a pan-closet were adopted; the plumber's work was just the same in both, the service box only being a little larger in the former case than in the latter. For good houses the best plumbers used to consider the Bramah-closet the proper kind for the principal water-closets, and the pan-closet for more common use and for servants' use indoors, and sometimes also for the upper servants' use in the yard or area, though the water-closet in the latter places was generally fitted with the well-known long hopper-closet. I will say nothing about the cost of the latter, excepting to remind you that it was cheap and advertising; but I do not hesitate to say that the insanitary pan-closet, with its D-trap and other belongings, cost more than the sanitary pedestal wash-down closets of to-day.

In this reference to the relative cost of the modern method of plumbers' work with that of the old, I am not, of course, taking into consideration the additional comforts and luxuries, if I may so call them—elaborate baths and luxurious lavatories. If people want sitz, spray and shower-baths they must expect to pay for them, as they do for their motor-cars and bicycles. However, I should be sorry to convey the impression that because the prices of certain materials have been reduced, and the work to certain water-closets simplified, that plumbers' work now costs next to nothing; for there is a very important factor yet to be considered, viz. the labour, the crux which generally baffles the best of estimators. Plumbers' wages in London are at the rate of about one-fifth more than they were a quarter of a century ago, and I should think four-fifths more than when the Queen began to reign. The men do not receive this amount of increase in their weekly wage, for they do not work so many hours now. I am saying nothing against this advance in wages. Intelligent, industrious labour should be properly paid for.

The first great requisite in a house is its water-supply, for, in my opinion, as I said twenty years ago, no house can be considered safe to live in which is supplied with unwholesome water. If it were possible to get at the actual facts, it would often be found that many a case of illness and death arose from bad water rather than from bad drains, from water supplied in an impure state, or which had been allowed to become contaminated in its storage. Therefore, when water has to be stored great care should be taken to see that it cannot be rendered impure by its surroundings, cannot be contaminated by the effluvia from water-closets, the emanations from ventilating-pipes, soil-pipes and drains, or from the vitiated air of bedrooms and living-rooms. One hardly expected to have required any further restrictions, but our accountant actually saw two hobbledehois bathing in a cistern the other day. The illustration before you faithfully represents what (I fancied from his face when he told me) amused him as much as astonished him. A proper cistern-room should be provided with lights and openings to and from the external air, and the cisterns should be so arranged that they may be readily and periodically cleansed. For this latter purpose—in addition to any overflowing pipe required by the water company—a cleansing waste-pipe should be so fixed that the cistern, or cisterns, may not only be emptied, but rinsed out with clean water from the ball-valve. To prevent the possibility of such pipes becoming conductors of bad air to the cisterns, great care should be taken to see that their discharging ends are kept well away from open traps, sinks, gullies and places where foul air could enter them. It ought to be superfluous to say this after so much has been written on the matter, but only very recently I came upon an error of the kind we are now considering in a nobleman's mansion, the work having been done but a year or two ago. I will show it upon the screen. The cistern-waste is taken into the head of a long length of 3-inch cast-iron pipe, which, at the time I saw it, was in a very foul state, receiving, as it did, the discharges from

a general sink. That the waste-pipe from the sink would become fouled was pretty well understood by the authorities, for it was trapped rightly enough, though it was not ventilated; but neither the cistern-waste nor the overflow-pipe from the bath had any trap in them, although they delivered into the same head as the sink-waste. Of course trapping these pipes would be of no value, for there would be no water passing through them to keep the traps charged. I could add to such examples and give others of a more serious kind. We shall see some instances of how the cistern water can be contaminated later on in connection with other matters; but I must pass on to consider the important method of supplying cisterns with water.

Apart from the great saving in cost by having a constant supply instead of an intermittent, enabling, as it does, the use of smaller rising mains and cisterns of a smaller size and fewer in number, there is the great advantage of keeping the communication-pipes from the companies' mains always charged with water, and thus preventing them from becoming communication-pipes in another sense—from becoming, in fact, air tubes or passages for communicating disease germs.

In the case of an intermittent supply under favourable circumstances, directly the water is turned off from the main in the street the lower cisterns on the system would be supplied as they were drawn from by the water left in the mains, and it requires no great effort of one's imagination to conceive of streets sufficiently sloping for such pipes to be quickly emptied, and to remain so daily for perhaps twenty hours out of the twenty-four. In such cases—the rising mains in large houses being often of 1½-inch bore, and even larger—the air, infected or otherwise, would pass at times even through such restricted passages from one part of a house to another, and also from one house to another under favourable circumstances.

As the water subsided in the communication-pipes air would enter them through the open ball-valves, nature abhorring a vacuum. And the air which would be thus sucked into the pipes would come, of course, from the air which surrounded the cisterns, and where such cisterns were in open contact with the air from bedrooms and water-closets, as shown on the screen, which represents a suburban house, of which there are perhaps hundreds like it, it could hardly be pure and might be dangerous. The upper cistern is practically quite open to the bedroom, for a badly-fitted door would be no barrier and the lower cistern is not only exposed to the air of the scullery but also to the water-closet which opens into the scullery. No doubt any air-currents set up through the empty main in the street and the communication-pipes to the houses would be induced by the difference in the temperature of the different houses, one house being often much warmer than another.

Fortunately there is a redeeming point in most things, and notwithstanding that specifications direct that rising-mains shall be laid in a manner to empty themselves, they are not often so treated; circumstances intervene and "the best laid schemes o' mice and men gang aft agley;" the street main, for instance, stands higher than the point of ascension of the rising-main. But in cases where houses stand on much higher levels than the street main no doubt such communication-pipes would empty back into the main in the street or road, and in streets or roads with a steep fall, as shown, the main with the water turned off would soon become empty.

With a constant supply the main and the communication-pipes would practically remain always charged with water, and no such risk as we have been considering would be likely to take place.

Cisterns with a constant supply can be of much smaller size than when the supply is intermittent; and generally one cistern in such cases suffices for a house with a fair-sized family. The size, of course, must depend upon circumstances. It should be equal to the keeping of all the services from it going at one time, or the service-pipe to it must be of a bore sufficiently large to supply the water at about the same speed that it can be drawn from the cistern.

Where there is only one cistern in a house, and it is also made to supply the hot-water circulation, the cold-water services from it for all other purposes should be so connected that a body of water is always retained in the cistern to keep the hot-water system going in case the water should be turned off from the main for a little while; especially should this be the case when the hot-water circulation is on the tank system.

Also with a constant supply there is the further advantage of being able so to draw directly from the company's main, and the water supplied to the table in this way will be found to be much cooler and nicer in every way, provided that the water in the company's main is pure and wholesome. For this purpose ½-inch lead pipe will be found to be quite large enough. When the water is soft, and would be likely to act on lead, block-tin, or tin-lined lead pipe should be used, or tin-lined wrought-iron pipe if the water company will allow it.

Where the water would act on lead it would also act on galvanised iron; therefore the storage cisterns in such cases should be of cast-iron or wrought-iron limewhited inside, and



the cisterns for storing water for dietetic purposes would be nicer in earthenware, white enamelled inside.

Great care is required in selecting the course for the service-pipe—the communication-pipe from the company's main. The pipe should never be laid under or near a soil drain, or in any trench in which bad or surface water could collect, for even though there may never be any restriction in the pipe to allow water surrounding it to be sucked into it, in case of any hole or defect in the pipe such water may find its way into it when the water is turned off from the main and be forced up into the cisterns when the water is turned on again.

Where such pipes cannot be kept at least 2 feet under ground, then, in positions where they would be liable to very severe frost, they should be laid in a trough or box made of creosoted wood filled up to the top edges of the sides with hot pitch, with which might be mixed a little Stockholm tar and some sharp sand. No lead or iron pipe should be allowed to come in contact with lime, and when such pipes pass through clay soil they should be well tarred over or be embedded in ashes or cocoanut fibre, which will also be helpful in protecting them from frost.

If plumbers' work inside our houses ended here we should not have much to fear from noxious gases in our homes, but civilisation calls for certain conveniences to be placed indoors, and I must confess that it is most comforting to one's mind, if feeling a little "out of sorts" on going to bed, to know that if taken ill one will not have to light a lantern as in the olden times and go out into the night air.

Now I know of no reason beyond that of incapacity why a water-closet should not be fixed inside a house with absolute safety, safer and sweeter, in fact, than in a night stool in one's bedroom, the use of which, when all the servants are in bed, would leave its presence painfully present for the rest of the night. But it is not so much a question of a night-stool versus a water-closet, or a privy or water-closet situated out of doors versus a water-closet indoors; for the outside convenience, by bad arrangement, may render it and the air surrounding the house more unhealthy than even an insanitary water-closet indoors. The important question is, Can a water-closet be so fitted up that it can be used with absolute safety in any position or place it may reasonably be required, either outside or inside a house? Well, gentlemen, if I could not answer that question in the affirmative, I should not be here to-night.

Living on an island, we naturally believe in isolation. We isolate all clean water pipes such as safe-wastes, cistern-wastes and overflow pipes by making them discharge into the open air. We also isolate all dirty water waste-pipes, such as bath wastes, sink wastes and lavatory wastes, by exposing their discharging ends to the air outside the house, and in this matter we stand ahead of all other nations, not excepting even America. In some cases we also isolate soil-pipes by "disconnecting" them from old and filthy soil drains, safeguarding them from the air in the drain, and giving to each soil-pipe a separate inlet and outlet for continuous ventilation.

We go further than this, for we not only isolate the drain of one house from that of another, by disconnecting both from the common sewer, but in some cases we disconnect one section or wing of a building from that of another, excluding any infected air which may be in one section from another, and providing independent ventilation to each section, taking care, however, that no length of drain shall remain unventilated.

And we not only isolate the main carriers, the sanitary wings are now isolated from the general building. And the water-closet apartments are not only isolated, but the water-closets. The "Corbel" and the "Bracket" closets have been specially introduced to isolate them from the floor as well as from the walls, an illustration of which is now before you.

But isolation is not everything; our ships of war still count for something. A water-closet may be as isolated as a sentry-box and yet be dangerous, for in this sanitary age no water-closet can be pronounced sanitary in the highest degree which cannot be used and left in itself and in all its parts as clean and wholesome as it was before usage.

To compare various points and features of the great variety of water-closets and flushing-cisterns which now exist would require several evenings, and to attempt this to-night would only tend to the confusion of our minds on a subject simple enough in itself, but which, owing to the multifarious patterns of the many manufacturers, has become a little complicated.

In passing over many water-closets which have been introduced during the last ten or twenty years we shall not miss much, for the majority of them are as noisy and as unsightly as some of the new motor-cars, and to the olfactory nerves are just as objectionable as the pan-closet they were meant to supersede. I propose, therefore, to confine my remarks to a few kinds, viz. the valve-closet, the "Syphonic," the "Wash-down," and the "Wash-out," but before doing so let me mention the several points which I consider essential to a good water-closet.

1. It should hold a body of water large enough and deep enough to quite submerge the fæces.

2. It should have no parts or places in it where fæcal matters could cling to or accumulate upon.

3. It should have a water-seal of at least 1½-inch for trapping off the soil-pipe.

4. It should be so constructed that the whole of its contents may be changed by a flush of two gallons of water, and its interior parts well washed.

5. And in the case of earthenware closets having their basin and trap in one piece, its connection with the soil-pipe or drains should be readily seen.

Now if we examine the general kind of "wash-out" closets, we shall see that they all more or less fail in some one or more of these important points. In the majority of such closets, if not in all of them, it will be found that the water held in the bottom of the basin is too shallow to cover the fæces, the consequence being that the portion which is not submerged throws off a vapour—its temperature being generally greatly higher than the air of the apartment—which soon fills the place with an odour, objectionable to the then occupier, and most repulsive to the next comer immediately following. So pronounced is this, that on making an examination it is rarely necessary for a sanitarian to do more than put his head into an apartment where this kind of closet is fixed to know that it is a "wash-out."

Then in this kind of closet the flush of water is made to break up the fæces in the best possible way for throwing their odours into the apartment, and instead of spending its full force upon the sides of the basin and upon the trap, it is chiefly spent in clearing the bottom of the basin. There is also the evil of a large exposed surface between the weir of the basin and the water-seal of the trap, a part which will generally be found to be in a filthy state.

Having dismissed the "wash-out" kind of closet, let us now see what can be said for its next-of-kin, the pedestal "wash-down" kind. There is a very great variety of them with several points common to them all, and yet they differ so much in certain essential features that, like Jeremiah's figs, "the good are very good indeed, the rest are not fit for pigs." In one particular they all stand at a disadvantage with the "wash-out," viz. that their exposed surface of water is smaller. But the best of their kind may be said to pretty well embody the points required in a good general sanitary water-closet. They are to be had of many a manufacturer, each one claiming some feature or advantage not possessed by others.

In the example before you my assistant will soil over the whole of its interior exposed surface, and will test it with a dozen pieces of paper, using only two gallons of water, and you will see that the closet and trap will be left free of the matters put into them. And as it is more difficult sometimes with such closets to wash out a few pieces of paper of the size of postage stamps, he will try it again and show you that the closet stands both tests equally well.

Several varieties of "syphonic" closets are now in the market, the main object with them all being to provide a larger exposed surface of water than can be given to the "wash-down" kind; but though such closets excel the "wash-down" closets in this particular, they are not so satisfactory in some other points. The majority are not so simple, nor so reliable in their action with only a two-gallon flush of water, and some of them are complicated in their supply and discharge arrangements.

In testing such closets with a pailful of water emptied quickly into them, I have seen them left with a much reduced water-seal even when they have not been attached to a soil-pipe; and how they would withstand the action of syphonage when fixed in about the middle part of a stack of soil-pipe 80 to 100 feet high, I should hardly like to say, but I should be apprehensive of the result.

I know of an instance where a syphonic closet was put into use during the time its soil-pipe was under a smoke test, and the smoke escaped through it into the water-closet apartment. But, perhaps, this is hardly to be wondered at, for under certain conditions the contents of the closet are syphoned out very vigorously, so much so that the water-seal of the trap would often be broken in the action.

The emptying of a pailful of slops into such closets not only syphons out their previous contents, but the added slops as well, leaving the basins practically empty, in which state they would at times be used when the fæces would fall upon dry basins; for, no doubt, the servants would not always remember to pull the flushing handle after emptying the slops, especially as there would be no necessity to do so to get rid of the slops.

Then, unlike a valve-closet, the water held in the basin is in continuous contact with the air in the soil-pipe, but this is the same in "wash-down" closets.

Then I think when the water is limited to 2 gallons it is important that the whole of such a flush should be utilised for washing down the walls of the basin and cleansing the trap; but in the majority of the syphonic closets it will be found that part of the flush is used for starting the syphon in a compartment outside the basin.

Then a close examination of the majority of such closets



when in action will show that their sides are not properly rinsed, and that in consequence particles of matter are left adhering to the surfaces, and that even some of the rinsed water is returned back into the closet when the syphonic action has been broken. But of course a second flush would make this all right. It is better that such closets should have a flush of not less than three gallons.

Before I pass away from the classes of water-closets which may, and which often are, connected to soil-pipes and drains by imperfect joints, I should like to say as strongly as I can that no closet or trap having a breakable outlet, such as earthenware, should be connected to a soil-pipe or drain in a manner that will not admit of a ready inspection.

(To be continued.)

### MEMORIALS OF GREATER LONDON.

THE committee for the survey of the memorials of Greater London, of which the late Lord Leighton was president, and whose members include Lord Meath, Lord Tredegar, Lord Carlingford, the Hon. Lyulph Stanley, Sir Walter Besant, Mr. Hamo Thornycroft, R.A., Mr. Frampton, A.R.A., Mr. E. W. Mountford, Professor J. W. Hales, Mr. F. D. Mocatta, Mr. Humphry Ward and Mr. C. R. Ashbee, has just issued a report of its progress for the last two years. The object of the committee has been "to take up certain areas in London, and in them to register and record with drawings, photographs and other records whatever may be deemed to be of historic or æsthetic interest. The work is not confined to buildings only; any valuable open space, any remnant of an old village green, any beautiful tree, any object of local life or custom that may have a definite external embodiment, or any interesting piece of handicraft, even if it be but a signboard or a wrought-iron gate, comes within the committee's survey. The aim is to draw attention to these things. If they are in private hands, to get the owner's consent towards their registration; if under the guardianship of any representative public or semi-public authority, to encourage their maintenance for public purposes as national trusts." The first publication of the committee was a monograph on the Trinity Hospital in Mile End. Other monographs are in preparation upon the Old Palace of Bromley-by-Bow, Aldgate Church, Hill Hall and the work of John of Padua, Bow Church (Stratford-atte-Bow), the Mile End Road (its external life and character), the Great House at Leyton, Essex House (Bow). Cases are quoted in which the committee have helped to save from destruction notable spots and buildings, and the report says that "perhaps the most successful outcome of the two years' work may be seen in the conference convened last December by the London County Council, and the action resulting from it. . . . How far the identical method of the Council will be subsequently followed by the London County Council, if it should decide to support and continue the work that the committee has set before itself of the registration of the whole of London, it is as yet impossible to say; but acting on the strength of the work already accomplished, the committee invite further support, either by funds or by active assistance, or by gifts of drawings, photographs, or memorials of London as it is." It is mentioned that the next area to be taken up by the committee will be Chelsea. The names of those willing to join the committee either as active or honorary members, or subscriptions to the committee's work, may be sent to the chairman of the committee, or to the secretary, Mr. Ernest Godman, Essex House, Mile End Road, E.

### THE DUBLIN COLLECTION OF ANTIQUITIES.

IN the course of his evidence before the select committee of the House of Commons on museums of the Science and Art Department, Lieutenant-Colonel Plunkett, the director of the Dublin Museum, said that the collection of Irish antiquities was transferred from the Royal Irish Academy to the Dublin Museum about six years ago. He believed one of the conditions was that they should accept the former curator of the collection, Major M'Eniry. He was an old man, and when witness knew him was in bad health, but he did not know him when he was taken over. The collection was unique and one of the finest in the world—finer in some respects than the collections at Stockholm or Copenhagen, or any other archæological collections. He meant more valuable from the antique and artistic points of view, better in every way. Being so valuable and so unique, it was desirable that it should be better exhibited than at present. Of course the gentleman who came over with it being very advanced in years, and for the last year or two in very feeble health, could not have done more than he did in arranging and exhibiting the objects. As regarded publishing the chief objects something had been done, but as regarded the exhibiting and arranging there was an immense deal to do.

An immense number of the objects were stowed away in drawers and out of sight. The post of keeper had been vacant since last November or December, and when they had a keeper and were able to set to work there were two rooms vacant and an immense deal of work for a first-rate skilled archæologist for years to exhibit the collection properly. Sir William Wilde made a catalogue of portions of the collection, and Miss Margaret Stokes had done a great deal towards it. There was no proper catalogue up to date, and nothing was being done in that direction until they got a keeper. The rooms in which the collection was exhibited were among the best in the museum, but the long room, in which alone the public saw it, had deficient light. In the estimates for the current year there was provision for top-lighting it, so he hoped it would be done during this year. He thought they might consider the building fireproof, and of course there were precautions against fire. The safety of the objects against theft was well secured. They proposed to keep the archæological collection apart as one department of the Museum. He thought Major M'Eniry's salary was 257*l.* a year. He was aware that gentlemen in the position of Mr. Skinner and Mr. Weale at South Kensington Museum got a very much larger salary than that, and he thought that unless that salary was materially increased they would find great difficulty in securing a man who would do justice to their wonderful collections. He thought the keepership of the archæological and Irish articles ought to be put on the same footing as the keepership of the art and industrial collection, or the keepership of the natural history collection. The keeper of the art and industrial collection got double the salary of the keeper of the Irish antiquities. Witness was further examined in much detail with a view to the alleged lack of care of gold and other articles in the museum, and as to the charges which had been made of bad arrangement. In witness's opinion Mr. Arthur Evans displayed extraordinary ignorance of art in the letter to the *Times* with regard to the Celtic collections in Dublin. He said it was untrue, as stated in the letter, that "no less than 1,000*l.* of what is nominally an Irish grant was expended in London for the Dublin Museum without any reference to the officials on the Irish side of the water." Nothing was ever purchased without consulting him now, and therefore he was quite sure that nothing was done without consulting his predecessor. When the visitors met to make their annual report they could receive, if they required it, information and advice from witness and from the keepers of the various departments. He had been in his present position one year and five months, previously to which he was secretary of the Royal College of Science. He had the control of everything in the museum. Their staff was very scanty indeed. He had asked for an increase, and he supposed it was the fault of the Treasury that it was not granted. The Treasury objected to making a keepership of the Irish antiquities and giving a salary to a keeper. There were not many men suitable for the position, which required a man who was a comparative archæologist, thoroughly skilled in all modern imitations of archæology, and, also, he must have a very special knowledge of Irish antiquities. He found it very inconvenient to have the keepership of the Irish antiquities vacant, but he would rather have it vacant for twelve months, and then have the right man in, than that an inferior man should be appointed in a hurry. The reason it was vacant so long was that they were trying to get the salary increased by the Treasury. Until it was settled what the salary was to be of course it was impossible to make the post known by advertisement or otherwise. He heard the other day that the Treasury had refused to give what was wanted, but he could not say whether that was absolutely fixed or not.

### TESSERÆ.

#### Llanthony Abbey.

THE remains of the Priory of Llanthony are situated in the Vale of Elwias, surrounded by the Hatterill Hills. The priory owes its origin to one of the followers of Hugh de Laci, who, about the year 1108, being joined by Ervistus, chaplain to Queen Maud, erected a hermitage, which, by valuable endowments, was in a few years raised to the more important establishment of a priory, and Llanthony became the habitation of a fraternity of black canons, who dedicated their church to St. John the Baptist. Circumstances led some of the monks to remove hence to a cell in Gloucestershire, belonging to the priory, as a temporary residence, which, however, proved so agreeable to them that, at a subsequent period, they not only refused to exchange the fertile plains of Gloucestershire for the comparatively barren soil of Elwias, but claimed for their favourite possessions a pre-eminence over the mother church. The few monks left at Llanthony were exposed to oppression and pillage; consequently the establishment declined, and the dilapidation of the buildings commenced. Edward IV. attempted to unite the two establishments by a charter. It is,



however, uncertain whether the projected union took effect, as the two priories were separately valued at the dissolution of the monasteries. Very few views of Llanthony have been published. From its secluded situation it seems to have escaped the notice of the tourist more than any ruin of like importance. The priory church is 208 feet in length inside; the nave, 27 feet wide; the aisles, 9 feet 3 inches, exclusive of the piers; the whole width is 53 feet 6 inches; the length between the north and south extremities of the transepts is 101 feet, and their width the same as the nave. The small passage south of the transept is perfect; its details are of a bold and beautiful character. The chapter-house adjoining is evidently of the same date; the few fragments now remaining are elegant and expressive. The gatehouse to the priory, several hundred yards westward of the church, is a good specimen of the early style, but of later date than many other existing parts of the monastery.

### English Historical Medals.

The first contemporary English medal is of Sir John Kendal in 1480, and of Italian workmanship. We have a gold medal of Henry VIII., date 1545. Evelyn remarks that in this medal Henry appears in his usual bonnet, furred gown and invaluable collar of rubies. The first coronation medal of England is the one of Edward VI.; it is of very indifferent workmanship and in low relief. There are several beautiful medals by Trezzo of Philip and Mary, and many curious ones of Elizabeth on her accession to the crown, and the defeat of the Spanish Armada in 1588. The medals of Elizabeth are generally cast, and have highly raised borders richly embossed; during this reign, too, we have some exquisite medals by the famous Stephens of Holland. It is doubtful whether there are any works superior to them for style in art; the admirable manner in which the flesh is treated in distinction to the hardness of bone in the face could not be sufficiently studied or admired by the medallic artist or amateur; the reverses, however, are not equal to the heads. All the medals by Stephens are exceedingly rare. The history of James I. is tolerably well preserved in medals; they generally, in style, resemble those of Elizabeth; but there is a very good one by Warin, of Sir Thomas Bodley, founder of the Bodleian Library at Oxford. In the early part of the reign of Charles I. we have many counters struck on his marriage. The medals of this monarch are numerous, many of which were engraved during the time of Charles II. by the Roettiers. Cromwell was fortunate in having excellent artists. The two Simons executed all the best medals; Abraham was a modeller, and there still remain in the British Museum many excellent models in wax by him; they were generally cast in silver, and some of the best were left untouched from the casting, but others were admirably chased and repaired by Thomas Simon. The great merit in these works is the characteristic expression of living nature; other artists have been more correct, but often coldly correct, as compared with the Simons. A large oval medal, struck in gold, was presented to Admiral Blake after the engagement with Van Tromp in 1653. Of Charles II. there are several good medals. Many medals occur of James II., both before and after his abdication; and the events of the reign of William III. called forth many interesting medals—the Dutch ones extend even from his infancy. The medals of Queen Anne are not only interesting as works of art, but particularly so as recording the great events with which Marlborough illuminated her reign. About 1730 John Dassier, a native of Geneva, settled in London, and engraved a series of medals of the kings of England. They would be more valuable if the portraits could be relied on. He also executed a set of small medals of the reformers, and commenced a series of our great men. His nephew, James Antony, who on Croker's death was appointed second engraver to the Mint, engraved several others. The character of workmanship of both the Dassiers, notwithstanding their industry and ingenuity, was that of extreme hardness and precision of outline; still there are very clever medals by them, and they evince an advance upon the state of the medallic art of that period.

### The Pointed Arch in Sicily.

The Sicilian Normans employed the Pointed style, and it is supposed they adopted it from the Saracens. How came the Saracens of Sicily by it? Was it invented by them, or for them in Sicily, or did they bring it with them? Sicily at the time of the Saracenic invasion was exclusively occupied, and had for centuries been occupied by the descendants of Greeks and Romans, who, when left to themselves, invariably adhered to as close an imitation of the Roman style as the state of the arts enabled them to accomplish. It was not in Sicily, therefore, that the Pointed arch would be found by the Saracens. Was it invented there? Let us cast a glance over the countries from whence the conquerors came, and see whether in them we shall not find the answer to this question. Sicily was conquered by the Saracens in 832. By that time the Arabs had extended their empire over Persia, Syria, Egypt, Africa proper and Spain, and wherever they went had become great builders. Bagdad,

Fez and Morocco were already splendid cities. Abdalrahman had already built his palace at Cordova, and several hundred mosques had been raised in different parts of the Mohammedan empire. The Arabs, therefore, had already had a considerable practice in architecture, and were likely to have acquired a predilection for some particular forms. Without precise information, as we are, with respect to the style which they habitually employed at that remote period, let us observe what style they did employ at the nearest period to the moment in question of which any monuments exist. The earliest Saracenic buildings of which the date is accurately known, are to be found in Cairo. The Nilometer was rebuilt where it now stands, and as it now appears, by Motawkel, tenth caliph of the Abassides, in 859. The mosque of Teyloun was built in 879, and the mosque of Hakem in 1003. The dates are recorded in Cufic inscriptions still existing in the walls of the buildings, and in all these buildings the Pointed arch appears. In Spain the oldest Saracenic arches, though slightly pointed to the eye, are all on the Pointed principle, that is to say, arches not struck from one centre, like the round arch, but invariably struck from two or more centres. Upon the whole, then, it appears that the Pointed arch came from Africa to Sicily; but how did it find its way, at a later period, into northern France and Germany—the countries of the continent of Europe in which it first made its appearance? We might have expected to have found it first in Normandy, as intercourse was constantly kept up between what may be called the mother country and the Sicilian colony; but the Pointed arch did not appear in Normandy as soon as it appeared in other parts of northern Europe.

### Thomas Stothard.

Stothard, as an inventor in composition, was equal to all, but as a painter was certainly inferior to all. In fact, he could not paint; he had no identity of imitation; he did not, and could not, tell a story by human passions; and his style of design showed great ignorance of the constituent parts of the figure. But there was a beautiful and angelic spirit that breathed on everything he did. He seems in early life to have dreamed of an angel, and to have passed the remainder of his days in trying to endow every figure he designed with something of the sweetness that he had seen in his sleep. It was impossible to be in Stothard's painting-room for ten minutes without being influenced by his angelic mind. He seemed as if he had been born in the wrong planet. He had a son whose etchings from our ancient tombs are an honour to the country. He fell from a great height in pursuing his designs from some tomb in a country church and was killed. This ill-fated artist was in every respect worthy of his father. Never were there four men so essentially different as West, Fuseli, Flaxman and Stothard. Fuseli was, undoubtedly, the man of the largest capacity and the most acquired knowledge; West was an eminent artist in the second rank; Flaxman and Stothard were purer designers than either.

### The Neglect of Greece.

The indifference and ignorance about the actual state of Greece continued to so late a time that, even in the huge quartos of Pinkerton, published at the beginning of this century, the whole country occupies only one page, and Athens is despatched in half a line, from which we learn the important fact that "Atini, the ancient Athens, is of small population." Till the year 1678 Greece was almost as much lost and unknown to Western Europe as Pompeii and Herculaneum. It is true, indeed, that more than two centuries before this time Ciriaco de Pizzicollis, a native of Ancona, had visited the country in search of Greek inscriptions—of which he was such an ardent amateur that, being informed by a fellow-passenger while he was on his voyage homeward of the existence of an ancient marble which had escaped his notice, he immediately left the vessel and went back eighty miles by land to examine it. But the Itinerarium of Ciriaco, containing a brief account of his journeys in Greece and other countries, which he wrote at Florence in the year 1441, remained 300 years in manuscript and was first published at the same city in 1742. We have no account of any travels in Greece during the sixteenth century, and the only document from which we can glean any information concerning the then state of the country is a volume entitled "Turco-Græcia," published at Basil in 1584, and containing a history of the city and church of Constantinople during the fifteenth and sixteenth centuries, written by Greeks residing in that city, with a collection of letters from writers at the same place and of the same nation, addressed to Martin Crusius, a scholar of Melanchthon, and professor of Greek and Latin at Tübingen. One of his correspondents, a native of Nauplia, assures the professor that wisdom, science, arts, learning, valour, wealth and all other good things have departed from Greece, and that the Muses themselves have quitted Helicon and Parnassus and have settled, he supposes, at Tübingen. The same writer reproaches himself for wasting words upon such a wreck as Athens. "Why," says he, "do I



dwell upon the description of this place, which is like the hide of an animal that has been long dead?" From his conversations with another Greek, the professor himself infers that Greece had ceased to exist in Greece and Athens in Athens. These and many other passages of this volume, in which the writers feelingly deplore the degraded and desolate condition of their country, would tend rather to discourage than to invite the curiosity of travellers if the book attracted any notice at the time. But the letters are so dull in style and so barbarous in language that few would be tempted to search for the little information they contain. From 1584 to 1678 we have still only two or three scanty notices of the condition of Greece, and these are so replete with fictions and absurdities that their authors could never have ventured to blunder or to invent with so much boldness if they had not been assured that the ignorance of their contemporaries would secure them from detection.

#### Athenian Houses.

An inherent defect in the construction of houses in Athens occasioned great inconvenience; the stairs were erected in the street, and the upper apartments, projecting over these, disfigured the façades, obstructed the view and prevented a free circulation of air. According to Aristotle all this arose from the avarice of the proprietors, who, by placing galleries over the heads of the passengers, endeavoured as much as possible to gain possession of the very streets. The Areopagites, who had the immediate inspection of all the buildings at Athens, did not, in this point, render their policy severe, and they even pretended to discourage all innovations in domestic architecture. In consequence of this their tribunal had a ceiling of clay only, it was the model proposed for the citizens, and being thus recommended any deviation from it would have been attended with danger. Amongst us, says Euripides, it is a general rule with architects never to adorn the roofs of houses, nor render them at all remarkable. An edifice too highly decorated, or distinguished by a little more than common elevation, must instantly have attracted a crowd of jealous observers; and suggestions would not have been wanting that this ostentation denoted a pride incompatible with republican equality. Those who, from experience, know the spirit of popular or democratic governments, will conceive this without difficulty; but to such as have never had an opportunity of acquiring this knowledge it must appear almost incomprehensible. The Areopagus was a very mysterious tribunal, and conducted by such obscure maxims that its principles could only be unveiled by a perfect acquaintance with all the secrets of the State. This court would never approve the plan of the orator Timarchus, who proposed that the republic should erect a range of buildings along the place called Pnyx, which was allotted for the assemblies of the nation. The Areopagus dreaded to see these new edifices converted into places where the citizens would have been tempted to injure their reason with wine before they came into the public place to discuss affairs of state. Yet this spot was in a state of unexampled desolation and unworthy of the majesty of a people pretending at once to the empire of the sea and the first place on the Continent. Another circumstance tended still further to the deformity of Athens; many spots, according to Xenophon, remained vacant where the habitations had either been destroyed by fire or erased by a decree of the people. No sooner was a citizen accused of high treason or some such crime than immediately his house was demolished, as a vessel is broken which has contained poisonous liquor. Neither was it lawful to rebuild there, for the very ground was supposed to become fatal and execrable from the crimes of its former possessors.

#### Restoring Spanish Paintings.

The greatest care is necessary in cleaning Spanish pictures. A large portion of those now remaining, and which come under the inspection of the purchaser, are dried up and the oil exhausted by exposure to the burning sun, in a climate so favourable to evaporation. It is common to see pictures of which the surface crumbles to dust in the fingers. With those there are two plans to be pursued. The first is to fix the colour, which is done by a species of glue applied to the surface; the picture should then be lined, and the operation of what the Spaniards term giving jugo, sap or juice, be commenced. This consists in applying walnut oil slowly and successively as the picture will absorb it, when it gradually assumes consistency and shows the colours. After this the cleaning may be done, but the picture should if possible be exposed to the air for some time previously. The cleaning is an operation of extreme delicacy. In all the schools, especially in that of Seville, and more particularly in the pictures of Murillo, from some cause, either of the oil, or of the oxidation of the mineral colours of the glazing used to finish, they acquire a dinginess of colour and have often a roughness on the surface from the handling of the master. Both these circumstances try the nerves of picture cleaners and of most of their employers, and a picture is seldom allowed to remain in this

state. Some acid or other method is tried, the patina and the supposed blemish come off together, and the picture is washed, as are nearly all in the galleries. The fine finishing of the master is irretrievably gone and is frequently attempted to be restored by what is called toning. Very few exceptions are seen, either in the works of Velasquez or Murillo, and those of the latter frequently resemble copies, from the faint and cold colours which now form the surface, and which in London is frequently supplied by quantities of varnish, and in Paris by picking away the outline and giving fresh relief or rotundity to the picture, which is thus re-manufactured.



#### Exhibition of Non-Inflammable Decorations.

SIR,—Under the circumstances connected with the recent disastrous fire in Paris, will you permit me to direct attention to the exhibition of fireproof materials made from asbestos to be opened in the large hall of the Society of Architects, St. James's Hall, Piccadilly, at one o'clock on Monday next, the 31st instant?

This exhibition, suggested by the above deplorable event, has been organised in order to demonstrate means of assisting in the prevention of loss of life by the use of non-inflammable decorations in our homes and public buildings.—I am, Sir, your obedient servant,

J. ALFRED FISHER, General Manager.

The United Asbestos Company, Limited,  
Dock House, Billiter Street, London, E.C. :  
May 26, 1897.

#### GENERAL.

**The Prince of Wales** on Wednesday opened the new medical school buildings at Guy's Hospital, which were designed by Mr. J. H. T. Woodd.

**A Commission** has been formed to arrange for the retrospective exhibitions in the great international show at Paris in 1900. It will consist of 200 members, including officials, critics, collectors, &c., with MM. Pol Neveux and Migeon as secretaries.

**Mr. H. Douglas Horsfall** proposes to build and endow a church at Liverpool as a memorial of the Queen's reign.

**The Site** for the new University College Hospital has been secured, and the questions of light and air settled with the adjoining owners. Mr. Alfred Waterhouse has rearranged the plans, so that a much finer entrance is made for the outdoor patients, this being a particular request of Sir Blundell Maple, who is anxious that patients while waiting to see the doctors should be comfortably provided for.

**The Bishop of Capetown** stated on Monday that an energetic attempt is now being made to erect a cathedral for his diocese at a cost of 100,000*l*.

**A Visit** will be paid by the Northern Architectural Association on June 9 to the Leeds Steel Works to view the manufacture of steel, in its various processes, from the ore to the finished girder.

**Plans** have been prepared by Messrs. Cossins, Peacock & Bewlay for the extension of the Deritend branch library, Birmingham.

**The Bill** for the construction of a subway between Greenwich and Blackwall was approved by the Committee of the House of Commons on Wednesday.

**The New Gallery of British Art** at Millbank is rapidly nearing completion, and is expected to be ready for opening in July. Some of the rooms are finished, the walls being hung with tapestry of a deep lake colour, which will form an excellent background for the display of pictures.

**Messrs. Whitelegg & Whittaker**, architects and surveyors of Manchester, notify us that they have removed to larger and more convenient offices at Somerset Buildings, 19 Brazenose Street.

**Mrs. Rutland Barrington** has informed the vestry of St. Mary Abbott's, Kensington, that the sisters of the late Lord Leighton had offered to present to the nation his house and all the treasures in it, provided that suitable arrangements could be made for the acceptance of the gift and the maintenance of the property. The vestry were asked to nominate two or three representatives to attend a conference of authorities interested in the matter. Canon Pennefather (vicar), Major Isaacs and Mr. Fellows-Guy were appointed to attend the conference, the date of which remains to be fixed.



# The Architect.

## THE WEEK.

ONE of the oldest and, as many think, one of the greatest of the French landscape painters died on Friday last in his eighty-second year. FRANÇOIS LOUIS FRANÇAIS was born at Plombières in 1814, and his first experience in Paris was as a bookseller's assistant. From selling books he was inspired to illustrate them, and while still in his teens he obtained a commission from a publisher. He was fortunate in being accepted as a pupil by JEAN GIGOUX. His first picture in the Salon was in the exhibition of 1837. His work was then rather timid in style, but a visit to Italy with COROT worked a revolution with him. One of the effects was the indefinite character which he imparted to the figures in his landscapes. A correspondent of *The Architect*, describing an interview with the painter some years ago, said:—"M. FRANÇAIS expressed his regret that the young school so freely indulged in the reproduction of the costume of the day in its minute details, which, however necessary in a portrait as illustrative of the idiosyncrasy of the sitter, are, in his opinion, out of place in a landscape. 'When a figure enters into a landscape,' said the master, 'the first duty of the painter is to subordinate it to the laws of light, and consequently to treat it as "une valeur de ton, dans l'ensemble." It seems to me,' he continued, 'that the modern school is just now under the influence of Japanese art. The Japanese neither understand the laws of perspective nor gradation of light.'" His *Jardin antique* carried off a third-class medal in 1841; *Sentier dans les blés* won a second-class medal in 1843; while in 1848 his works were deemed worthy of a first-class medal, and consequently of being *hors concours*. M. FRANÇAIS was created Chevalier in 1853, and Officier de la Légion d'Honneur in 1867. In partnership with GERADET, FRANÇAIS undertook the illustration of "La Touraine," one of the most splendid works ever published in Paris. MEISSONIER painted the figures in the *Parc de St. Cloud* (1846). In 1853 FRANÇAIS exhibited *Fin d'Hiver*, purchased by the Government, and which is now at the Luxembourg. Among his most celebrated landscapes, besides those mentioned, are *Vue prise du Bas-Meudon*, purchased by the late Prince JEROME NAPOLEON; *Orphée*, exhibited 1861; *Les Bois*, 1864; *Environs de Rome*, 1866.

MERRY Margate must now be in that happy state when large profits can be anticipated. All the world is coming to London, and, according to the fortunate people who take in visitors, there is no place in England which can so efficiently restore minds and bodies that are tired in the Metropolis as Margate. Are the inhabitants to be blamed if they have golden visions? But the staid members of the School Board are engrossed by cares which would make them indifferent if it were announced that Pactolus was for several months to run into the town and spread its wealth over the sands. They have just erected two schools, and have drawn the final cheque for the architect, Mr. REEVE, but they do not possess his plans of the buildings. The utility to themselves and the ratepayers of two rolls of drawings is not plain, but the want disturbs the members and prevents them from enjoying themselves like the rest of the inhabitants. The cheque was drawn conditionally upon the surrender of the drawings, but the architect still hesitates. There is a clerk, who is a lawyer, and he obeyed the instructions of the Board in informing Mr. REEVE about the condition, but he wisely declines to say whether it is an entirely legal condition or whether the Board have a right to the plans. He was asked whether Mr. REEVE could legally detain the plans or not, and the answer was, "Mr. REEVE has detained them, but if you are going into the legal point of the question, I must ask you to go into committee." When one of the members who was probably a little alarmed about the consequences of the affair subsequently inquired whether the Board could put off the payment of the cheque, the clerk answered:—

"Until somebody has asserted legal rights to obtain it, the Board is perfectly right in withholding it. But a great deal more has been made out of this than was necessary, and it ought to be discussed in private. In no case do I give a legal opinion in public if I can help it." The Lord Chancellor could hardly offer a more prudent remark, and everybody is free to put his own interpretation on it. Our advice would be, Let the Board take no more trouble about the plans, but devote their thoughts to preparations for the coming season and the native, colonial and foreign victims who are to enrich Margate. The plans will not aid in increasing the tributes which will have to be offered, and they would be as useless to the Board teachers and pupils as in the lodging-houses. If the case is to be fought on technicalities of language, we would also recommend Mr. REEVE to put himself in the hands of a lawyer as shrewd as the clerk, if one is to be discovered in Margate. His theory that "author of a plan" means "owner of a plan"—and the use of the phrase by the School Board is evidence of the Board's admission of his right to his plans—is novel, but it would not be wise to rest an action on so ingenious an interpretation. As architects well know, the owner of a plan, although an architect, is not necessarily the author or designer of it, but the owner can hold it and enjoy the rights of authorship in it until it is purchased from him. A lawyer, like the clerk of the Margate School Board, would not advise an assumption of ownership by his clients until all conditions of purchase were fulfilled.

THE works committee of the London School Board have had under consideration the question as to the hours of work of the clerks of works employed by the Board. The existing rule with regard to that section of the clerks of works who are engaged in superintending the erection of schools, enlargements, &c., is that they shall be "in attendance on the works during the whole of the working hours, unless specially relieved from duty or summoned to the office." The committee are of opinion that a similar rule should be passed with regard to the whole of the clerks of works, whether permanent or temporary, who are engaged by the Board. It is therefore proposed that in future the hours of all clerks of works, whether permanent or temporary, employed by the Board be the same as those recognised for workmen in the building trade, it being understood that their attendance will be required at other times, if necessary, while the men are at work.

PRIVATE individuals and companies are not the only sufferers from obstacles to light. Sir A. GEIKIE reports a case which affects the public and government officers, and has led to the waste of public money. After the petrographical and palæontological collections of the survey had with much labour and thought been arranged in the gallery assigned to them in the Dublin Museum of Science and Art, a range of high buildings has been erected opposite the windows, the effect of which is to darken the room to such a degree as to make the proper examination of the specimens by the public impossible. This is all the more to be regretted as a descriptive handbook had been prepared in which an account of the collections was given case by case, while at the same time a compendious statement of Irish geology was afforded. There was every reason to hope that this handbook, taken with the collection it described, might be of great service in promoting the science of geology, and in providing accurate information regarding the geological structure and resources of Ireland. The director of the museum has provided another gallery for the collection. But the new accommodation is not quite satisfactory, and the amount of space is inadequate. A complete change of cases is necessitated. The collections must be entirely rearranged, and the handbook, on which so much labour had been bestowed, becomes practically useless. It is not stated whether the range of high buildings is an official work, but from the neglect to assert the right to ancient lights it may be assumed an ordinary owner was not the culprit.



## TESTING OF BUILDING MATERIALS.\*

WHEN in 1755 JOHN SMEATON proposed to employ cast-iron in "totally new subjects," he found everybody who claimed to possess experience in construction was opposed to him. According to him, "the cry then was, that if the strongest timbers are not able for any great length of time to resist the action of the powers, what must happen from the brittleness of cast-iron?" The knowledge of materials at that time was of the empirical sort. The cast-iron of 1755 was superior in quality to the cast-iron of 1855, but there was no test by which its excellence could be ascertained. Experiments were made in order to impart more precision to what was known of the material, but from the size of the specimens employed and the imperfection of the apparatus the trials appeared to be a sort of game, which, however interesting, could not be considered as having any importance to engineers. It was by guessing that JAMES WATT arrived at a section of a cast-iron beam, and from the thickness of the vertical part it is evident he was afraid to go too far from the example of a timber beam. TREDGOLD attempted more systematic experiments than seemed possible with a man who was so poor. He was followed by FAIRBAIRN and HODGKINSON, who were able to operate on large pieces. But the most that was then desired to be ascertained was simply the breaking weight. The various stages through which a specimen had to pass before it succumbed was not much noticed. FAIRBAIRN does not appear to have employed a microscope in his numerous investigations, and he was describing his own defects as well as those of the iron trade generally when he said:—"Ironfounders, managers and furnace-men appear to work under the impression of the non-importance of attention to the mixture of metals, and hence arise all the anomalous conditions of soft and hard, strong and weak irons, and many other disqualifications which might easily be avoided by closer attention to the quality and due proportion of each particular iron and the quantity of carbon and flux used in its liquefaction." After giving a recipe of his own for an efficient mixture in order to produce a strong cast-iron, FAIRBAIRN falls back on the old practice of trusting to individuals, for he says, "In ordinary cases the mixture may be left to the discretion of those accustomed to the management of the cupola and the furnace." In those most important investigations on the strength of materials which were undertaken by EDWIN CLARK in connection with the proposed Britannia and Conway tubular railway bridges the problem was also what weight was required to break a beam or a trial-piece? The changes which were accomplished in the atomic constituents of the various materials were disregarded. On that account the record of the costly experiments is rarely referred to by modern authors on the strength of materials.

It was creditable to the sagacity of FAIRBAIRN that he was not blinded by national prejudice to the value of experiments so different from his own which were instituted by the United States Government, in order to arrive if possible at some exact formulæ for the preparation of material for ordnance. He describes them as opening out a new field of observation. In those experiments chemical composition was sought. FAIRBAIRN was able to perceive that they were leading to more certain results than were likely to arise from leaving the process to the discretion of men who were accustomed to cupolas and furnaces. Writing of one series of experiments, he remarks:—"It will be observed that while there is a very great disproportion in the quantities of each single ingredient in the hot and cold-blast metal, yet there is nearly the same amount of several combined, such as the slag and allotropic carbon, the amount of silicium and combined carbon, or silicium and total carbon. These numbers are significant, for although there is not a great disparity between the amounts of total carbon produced by hot and cold-blast, yet the hot-blast has evidently driven off a portion of carbon from combination, so that the cold-blast contains two and three-fourth times as much combined carbon. The hot-blast metal, however, meets with some compensation for this loss

of carbon by reducing by its intense heat a larger amount of silica, and assuming silicium. The wide difference in the amounts of slag in the two metals is also remarkable. The slag and allotropic (graphitic) carbon, being of a brittle nature and not united with the iron, coat the crystalline plates of metal and diminish their surface of contact; and consequently it follows that the tensile strength of the metal must decrease partly in proportion to the increase of slag and allotropic carbon." In these words we have an indication of a process that revolutionised the production of steel, and which depended on its relationship with cast-iron.

The experiments of the United States Ordnance Department gave an impetus to one branch of science, and in consequence in no country is the strength of materials studied with more avidity. The new volume by Professor J. B. JOHNSON, of Washington University, on the "Materials of Construction," is evidence of the fulness of knowledge on the subject which has been attained. In it we have chemical analyses, reproductions of microscopic views, sections of materials under various conditions, and, above all, several hundreds of stress diagrams and other graphic representations of facts and laws. There are also woodcuts of all varieties of machines which are employed in testing materials and photographs of the results of testing. Of late years America has gone far beyond England in the production of works upon the science of building, and it must be allowed that we possess no volume which will bear comparison with Professor JOHNSON'S.

Opinions will, of course, be divided concerning the advantages of such minute knowledge. In the beginning of the century PEACOCK, the City architect, gained a reputation by his advice to adopt as a fundamental axiom in construction, "a little stronger than strong enough." In those days there was a liberal use of materials, and what PEACOCK said was no doubt inspired by his artistic desires. He wished to see buildings express strength, but since we have become acquainted with the exact breaking weights of materials there is a tendency to reduce dimensions to the minimum which municipal regulations will pass. Whether, with increased knowledge, there will be a still further diminution is a serious question. But without considering applications in practice, there is a satisfaction in becoming acquainted with all the peculiarities of substances which are the servitors of architects and contractors. It cannot be complained that Professor JOHNSON is reticent. He has utilised the tests that have been made in the arsenal at Watertown since 1882, the report of the French Commission of 115 members on the standardisation of the tests of materials of construction, as well as the labours of Professors BAUSCHINGER, TETMAJER and MARTENS. But there are many other aids available in America. The author says he has one list of original contributions to the subject which fills 140 quarto pages. Professor JOHNSON'S own labours are also of importance. About 40,000 of the mechanical tests on timber and timber trees for the Agricultural Department of the United States were made in his laboratory at St. Louis.

Professor JOHNSON begins with an investigation of the principles of mechanics underlying the laws of the strength of materials. Then he treats of the manufacture and general properties of the materials of construction. Testing machines and methods are next described. The fourth part treats of the mechanical properties of the materials of construction as revealed by actual tests. Among the appendices are examples of American specifications for iron and steel, besides an important report by M. BACLÉ on the resolutions of various conventions which were held for investigating the strength of materials, with the conclusions from them adopted by the French Commission. There is also a memoir of the late Professor BAUSCHINGER, of Munich, whose name is honoured wherever scientific teaching is pursued. He established the first testing laboratory in Germany, which has been adopted as a model in other countries. He devised new apparatus, and introduced improvements in those in use. GAUSS'S method of mirror readings was applied by him to measurement. He has treated of the strength of cements, mortars, building stones, the effect of fire on columns of iron and stone, the mechanical properties of wood, and, in fact, the records of his laboratory are an encyclopædia on the subject. Professor JOHNSON believes so much is due to the late Professor in

\* *The Materials of Construction: A Treatise for Engineers on the Strength of Engineering Materials.* By J. B. JOHNSON, C.E., professor of civil engineering in Washington University, St. Louis, Mo., &c. New York: John Wiley & Sons. London: Chapman & Hall, Limited.



developing the scientific testing of materials, he has introduced BAUSCHINGER'S portrait as the frontispiece to the volume, and the German's influence is exercised throughout the pages. It is to be regretted that so little is derivable from English investigations.

Although Professor JOHNSON is an expert in testing, and it may be on that account, he has no exaggerated notions of what can be discovered by experiments on specimens. For example, he says that "chemical tests of stone are of little value in themselves, but taken in connection with microscopical examinations they may be of considerable value. In fact, as a general rule, no chemical test need be made unless it is required to explain the microscopic structure already examined." The freezing test he considers to be at best only a comparative test. On the subject of the weathering of building stone he remarks:—"A single illustration of actual weathering for many years is worth more than all the artificial tests which can be applied." The Professor has, however, much faith in the aid that can be given by the microscope when properly used:—

The microscopic test consists in the preparation of very thin slices or sections of the stone, and examining these under a microscope. A thin chip of the stone is first ground with emery to a plane on one side and polished. This side is then glued to a piece of glass with Canada balsam, and the other side ground and polished in a similar manner. The section is made so thin that it is quite translucent, and sufficiently transparent to read a printed text through it. It is then mounted regularly upon a microscope slide and covered in the usual manner. The examination under the microscope (magnifying about 25 diameters) consists in—

1. The observation of the structural arrangement.
2. The identification of its constituent parts (by an experienced lithologist).
3. A study of the character of the cementing bond.

The microscopic test, when made by an expert lithologist, will reveal more accurately the character and physical composition of a rock than any other single test. After such an examination, the question of further study upon the specimen can be decided more intelligently.

Many of the materials required in construction have been employed for centuries without any thought of tests on the part of those who specified them. But one of the effects of the access to power in industrialism of electricity has been a demand for new tests of iron and steel. Mr. LAYMAN'S chapter on the magnetic testing of those materials suggests that we may expect new revelations concerning the causes which affect many materials. His last words are enough to show that at least in one department continuous tests are indispensable:—

It is also desired to place great emphasis on the need as well as desirability of thorough, accurate and continued magnetic testing of materials. On the scientist's part this necessity is fully appreciated, for he understands that just as the present knowledge of their magnetic properties and the successful use of iron and steel in electrical manufactures is the result of careful testing, so also is future development along these lines dependent on testing. On the manufacturers' part there is a constantly growing appreciation of the great advantages to be gained from testing. The electrical manufacturer, knowing how great may be the variation in magnetic quality of the materials furnished him, is keenly alive to the fact that he cannot maintain nor advance the standard of his apparatus without testing. The iron and steel manufacturer, in turn, is coming to see that he cannot much longer furnish for electrical work such materials as are included in his regular line of manufacture. Electrical work is beginning to demand rather than accept, and soon must have materials which are shown by scientific study to best meet the requirements of this department of industry. The situation is one in which the consumer must not only protect himself, but lend all the assistance within his power to the scientific study of magnetic phenomena, while the iron manufacturer must, by the limitation of trade competition, know from his own investigations the quality of the materials he is turning out, and the part played by physical and chemical conditions of manufacture. From every point of view is clearly evident the importance of the magnetic testing of iron and steel.

We need not be alarmed about the use of the two materials in building and engineering construction, for if any new source of danger can be discovered it will be announced by Americans, if not by Frenchmen or Germans.

## BETTERMENT.

LOCAL authorities have to please the multitude of their constituents in order to retain their positions. With the crowd there is a desire of justice to the extent of wishing to have the masses brought up to the level of the classes, and their representatives have to appear in favour of the upheaval. Now it cannot be denied that in appearance at least many causes help to make the task more difficult in modern times. The progress which is supposed to be characteristic of England during the last fifty or sixty years has benefited in an especial degree many of those who were proud to be obstacles to all improvement. The history of private bill legislation exemplifies the fact most impressively. It will be found that the opponents of new streets and the like, who increase the cost of an Act enormously to a municipality, are generally the men who derive the largest financial advantage from the works. In the hope of diminishing the virulence of their opposition unusually liberal arrangements have to be made with them for any property which may be required, but the indirect gains are much more munificent. Ratepayers cannot help grumbling at the mischance which rewards those who are so little deserving. Another object lesson which is also irritating is the marvellous enhancement of property which arises entirely from the good sense exercised by tenants. In new districts in London and in many provincial towns the occupants of shops often have to wait patiently for years before success has been attained. Time at first goes slowly, but afterwards it passes faster than at a Derby race. The lease expires and a tenant is found who is willing to pay according to the new conditions of the district. The outgoing tenant is sure to have sympathisers and they endeavour to strengthen the prejudice which arises against all who, without any merit of their own, become the favourites of fortune. There is, of course, another aspect of the case. Public improvements inevitably bring losses to people, to landlords as well as tenants. But the crowd will not discriminate, and it is concluded that somehow owners are always lucky in escaping, and if there is a decline in the value of their property in one spot it is amply compensated elsewhere.

It happens also that property owners, or rather owners of sites of buildings in towns, are often brought into collision with municipal authorities. The latter are not more than human, and when they find themselves treated as inferior beings can we be surprised if they retaliate? The consequence is that the number of public bodies who are willing to apply to Parliament for power to recognise the principle of "betterment" is increasing. This year the Glasgow Corporation, that cannot be considered as wanting in discretion, can be counted among the adherents, and Mr. John Honeyman, R.S.A., is compelled to take the trouble of opposing the proposals. He will find many architects and surveyors who will take sides with him, but the public cannot be expected to judge of profits with the clearness which technical experience imparts. As long as the value of property increases through improvements which were carried out at the cost of ratepayers, and for which benefit not even gratitude is expressed by the owners, we must expect grumbling. At one time in such cases it seemed only an affair of individuals, but now, when property can be possessed by municipalities, it is natural to believe that all extraordinary rises in the value of property should in some way be followed by a proportionate reduction of taxation.

It seems to us that in his very carefully written pamphlet Mr. Honeyman has overlooked this third party or factor. He says it requires two to make a bargain, but in cases of betterment there is a third party more omnipotent than either. If improvements are for the public advantage and cause a depreciation in value some acknowledgment to the owner should be authorised, and "worsement" should therefore be recognised. It may be granted that neither the degree of betterment nor worsement can be calculated immediately, but after a longer or shorter term it can be ascertained with as much accuracy as is possible when dealing with variable qualities. A case which occurred in Glasgow, cited by Mr. Honeyman, suggests the danger of valuations on an assumed basis before time has exerted its influence:—

"About twenty years ago a builder purchased a plot of ground from the Improvement Trustees at the rate of 8*l.* per square yard, and the price was converted into a feu-duty at the rate then current. On this ground he erected a substantial and costly block of buildings; but about twelve years afterwards the Trust sold 'land in the neighbourhood,' within the same sphere of betterment, at the rate of 4*l.* per yard, thus immediately reducing the value of the first builder's property by four to five thousand pounds. The first builder, thinking that his position would be improved by buying up his feu-duty and that he had some claim on the favourable consideration of the Trust, entered into negotiations with them with this result—that they absolutely refused to take the capital sum represented by 8*l.* per yard, and insisted on the duty being capitalised at the present exceptionally high rate, thus practically adding about 16*s.* to the cost of land which by their own



act had been so greatly depreciated. This case should be sufficient to demonstrate how unjust it is to exact a charge for the alleged permanence of betterment without recourse in the event of this proving fictitious."

The case in question is undoubtedly not equitable. It would not, however, excite much attention if it were recorded of an ordinary landowner. Corporations are fallible, and in future transactions we suppose the Improvement Trust would show more consideration to investors.

Mr. Honeyman considers that the proposals of the Glasgow Improvement Bill concerning betterment "really amount to the introduction of the thin edge of the wedge of legislation authorising the taxing the land values, whether anything is derived from the land or not." We have more faith in the good sense of a northern corporation. What we imagine is sought is to prevent the repetition of such remarkable cases as are familiar in London, where an improvement becomes for some people a sort of magic wand that turns everything into gold. It is possible that in every change there will be inequalities, but it is hardly fair to compare a rise in the value of property an hundredfold with cheap fares of tramcars or the introduction of electric light into a particular street. Nor can we agree with Mr. Honeyman when he wishes to see the working-classes brought back to the districts in which clearances had become compulsory. Improvements in communication allow of the working-classes living in districts which are a little remote from commercial centres in a city without much inconvenience to themselves and with many advantages. Mr. Honeyman says:—

"We wish to see the poor people housed healthfully and cheaply on the ground they now occupy, and there are few insanitary districts in Glasgow where this could not in great measure, if not altogether, be accomplished were it not for injudicious municipal interference. There are more ways than one by which a poor population may be driven from a district, but probably the most effectual method is to pull their houses down, and then make the ground so dear that it is impossible to build houses upon it which they can afford to pay for. Now, charging for betterment must necessarily tend towards that result. This charge, as we have seen, like any other, must be borne by the occupiers of the new buildings. The inexpediency of doing anything of this kind which can possibly be avoided must be at once apparent to all who have taken any interest in the housing of the working classes.

"The public and public men have never properly realised the important bearing of cheap rents on the health of the community. Attention has been too exclusively directed to the overcrowding of dwellings on restricted areas, and the worse evil, so forcibly and scientifically expounded by Dr. Chalmers in his recent pamphlet—the overcrowding of the dwellings themselves: its cause and only cure—has been far too much overlooked. Municipal authorities do not seem to see that if they order a man to occupy a house which cannot be produced for less than 12*l.* per annum when he can only afford 6*l.*, they might just as well insist on the man taking beefsteak and champagne to his dinner every day when he can only afford oatmeal porridge. The overcrowding of dwellings is a necessary consequence of high rents. If a man cannot afford the rent, he has no alternative but either to become a lodger or to take lodgers. Let any one try to put himself into the position of the poor man with a wife and family reduced to such an alternative, and he will probably realise as he has never done before the misery and discomfort which either alternative may produce. If municipal philanthropy be permissible at all it cannot take a less objectionable form than the provision of cheap building ground for the erection of houses for the poorer section of the working classes—not in the outskirts or the suburbs, but in the congested localities where these classes prefer to live. Nothing would more directly tend to promote social wholesomeness, or more readily command the sympathy and approval of the whole community."

Mr. Honeyman has given much attention to the problem, but the majority of those who know what public improvements cost will hardly agree with him in believing that ground which is acquired at so much outlay should be dedicated to occupiers of the humbler classes. That would be an unwise set-off for enriching a few landlords at the cost of the public.

### DYNAMOS.

A PAPER, which was read by Mr. W. M. Mordey before the Institution of Electrical Engineers at the last meeting of the session, was by far the most important one. It deals with a subject which must become as familiar to the architect and borough surveyor as the steam-engine or pump. Mr. Mordey opens his paper by saying, "The development of the dynamo has been very rapid. The subject from the first proved attractive to engineers and scientific men, as well as to commercial people." He then goes on to describe the methods by

which the dynamo was developed. Up till 1886 the dynamo was constructed according to the ideas of the designers, and by the result of experience. Rapid progress was facilitated greatly by the paper read by Drs. J. and E. Hopkinson in 1886 before the Royal Society. The next paper which was of an epoch-making character was that read by Mr. W. B. Sayers in 1893 before the Institution of Electrical Engineers. For some years past little or no advance has taken place, and the dynamo has come to be looked upon as having reached its full development.

Mr. Mordey goes on to discuss whether it deserves its high reputation, and concludes that it does as a working machine, as it is reliable, durable, highly efficient, and has good regulating qualities, good collection, even in some cases with fixed brushes and varying load. He then points out that these good qualities, possessed by the best machines, are obtained at a great expense by the lavish use of costly material. The field magnets are too large, both as regards length and section. If dynamos which require a lavish expenditure of material to attain a desired end are unsatisfactory, then the best modern dynamos leave plenty of room for improvement. Mr. Mordey gives one simple fact to prove this:—"One-tenth of the present exciting power would amply suffice to magnetise the iron of the magnetic system (and a gap sufficient for clearance) to its required value, the other nine-tenths may be looked upon as spent, directly or indirectly, in overcoming armature reaction." This means that one-tenth of the power is used to produce the required magnetism, and the other nine-tenths in preventing sparking at the higher loads.

The lines along which the improvement will develop is in obtaining more work from a given value of material and labour, while retaining the good working qualities.

Mr. Mordey further says that the output is limited by sparking, heating, questions of regulation (*i.e.* drop in pressure at a fixed speed as the load is increased), and by the strength of working parts. It is better that the output should be limited by heating rather than sparking, that overloading may be possible for short periods. The life of a dynamo depends greatly on its cool working. Too much attention is being paid to reducing the heat losses, while too little is given to getting rid of heat when generated.

Good dynamos do not spark appreciably, but they are very expensive in cost or in magnetising current. Mr. Mordey thinks that a great deal of this cost can be prevented, especially the loss in magnetising.

If a dynamo could be made to run sparkless, having only sufficient air space between the iron of the armature and iron of the field magnet for clearance (this can be in a 5 horse-power machine  $\frac{1}{2}$  of a millimetre, in a 100 horse-power  $1\frac{1}{2}$  millimetre, in a 300 horse-power 2 millimetres) and with a short magnetic circuit, it would require very little excitation. The effect of putting a load on the armature would be to enable the magnetism of the armature to oppose and contort the magnetism of the fields, and sparking and loss of voltage would be the result. To render this reaction less the magnetic circuit of the armature must be made worse, and consequently the air gap is increased. To do this we must add field winding, add length to enable the wire to be wound in it, add section to the field magnet to convey the leakage magnetism caused by the increased air gap, and so on cumulatively until we have the excitation thirty to fifty times as large as originally, and have made the magnet larger (in length, section and in copper). The whole of this increase to reduce armature reaction.

Taking the Edison-Hopkinson dynamo of 1886, the distribution of the exciting current is for it:—

Air gap, 80.2 per cent.; compounding (increasing magnetism as load increases), 9.6 per cent.; armature core, .68 per cent.; field cores and yokes, 9.53 per cent.

The important part, the armature, only takes .68 per cent.; the other 99.3 per cent. is used in getting the magnetism through the rest of the circuit.

In earlier days (before 1886) Mr. Mordey says that the subject of debate used to be, What part of a dynamo should be the heavier? Now it is the object to make each part as light and inexpensive as possible.

A field magnet should be a mass of iron so arranged as to complete the circuit between one side of the armature and the other in as little distance as possible, and with as small a cross-section as is consistent with economy.

Mr. Mordey sums up the two kinds of armatures used—smooth-cored and toothed—in a very admirable manner. The former is preferred in this country, the latter on the Continent and in America. The smooth-cored armature gives very good results. It collects sparklessly and regulates well, but it is expensive of material, and is mechanically unsatisfactory when compared with a toothed armature.

The toothed type collects badly and is not a good regulator, but it has many good qualities, so it is important to improve it. Its latent advantages over the other are:—1. Small magnetising force required. 2. Small magnetic leakage. 3. Absence of eddy currents in armature conductors. 4. Armature conductors can



be solid. 5. Drag on armature conductors small. 6. Conductors are easily supported. 7. Its cooling qualities are good. 8. It is cheaper to make.

The advantages are not all realised at present. At least, Nos. 1, 2, 3 are not realised to the extent they should be.

Mr. Mordey calls attention to the very erroneous method of considering the magnetisation of a circuit. The mistake is to begin by magnetising the field magnet when the real object is to get the armature magnetised. This was recognised by Professor Forbes, and realised by Erckemeyer when he placed the exciting coil directly round the armature. By this means more magnetism goes through the armature than through the field magnet, and leakage is absolutely beneficial.

The Sayers winding is a still further development of this idea, and was led up to by the investigations of Hopkinson, Swinburne and others. Sayers obtained a solution of the problem when he arranged his armature reaction to help the field instead of opposing it, by giving his brushes a lag, *i.e.* placing them not forward from the middle position between the poles, but behind as the load increases. This in an ordinary armature would give rise to serious sparking, consequently he placed in each connection from the armature to the commutator an auxiliary coil which opposes and prevents the mischievous sparking.

Then follow the paragraphs which are the *raison d'être* of the paper, which describe the very latest advance in the winding of armatures to minimise armature reactions and the attendant evils, without any extra cost over an ordinary armature, and with the result that the full load-exciting current is much reduced and the regulation improved. The description of this is rather technical, and it is difficult to simplify it without sacrificing accuracy.

As is well understood, the ordinary ring-winding consists of a number of coils on the ring equal to the number of segments on the commutator, the end of each coil being joined to the beginning of the next, the connection to the commutator being taken from this joint. The winding described by Mr. Mordey is similar, but a portion of each coil is wound on the ring in advance of the rest by a distance equal to the air gap between the pole pieces. The result of this is that when one part of the coil is under the horn of one pole piece the rest is under the horn of the other. The E.M.F. of each portion of the coil is opposing the other, and the result is that when this coil is short-circuited under the brush, instead of there being a large current through the coil which must be broken when the coil is open-circuited, there is none, the pressures neutralising each other, and there is no armature reaction due to the short-circuited coil. If the two parts of each coil are not equal, the field may be strengthened in a dynamo as the load increases, instead of being opposed, and thus a similar effect is obtained to that with a Sayers winding, but with the difference that all turns on the armature are active. Several excellent diagrams are given which further elucidate the arrangement, and also the results of tests of the winding. It is claimed that at least half of the field winding is saved, and that a lower initial excitation is sufficient, while the machine will run practically sparkless.

With reference to this improvement, further experiments will, of course, be necessary, but at any rate a great advance will be made in the cheapening of dynamos, while retaining the sparklessness now only obtainable at a great expense, and in the best machines.

The paper goes on to discuss the subject of brushes and collection, and this part is a complete study of the subject in a very small space. It may be said here that the author has all through the paper treated the subject in a clear, concise and direct manner, and has kept wonderfully within the scope of the paper. It is, of course, a wide subject, but he has not given way to the temptation to discuss fully the side issues, while leaving the main subject incomplete, which so often vanquishes the writers of papers.

A few of the results of the inquiry into brushes may be of practical use to those who have dynamos under their notice which give trouble from sparking. The current should be induced to enter the heel of the brush and checked at the toe, but the brush as a whole should be of low resistance. The best brush is one which is made up of laminations of copper foil or carbon plates, each lamination insulated from the others along its whole length at the toe and only a portion of its length at the heel, by means of, say, an insulating cement; the top ends of these sheets soldered together, the contact-plate being fixed to the back sheet.

Such brushes have been found, says Mr. Mordey, to give a better collection, and with only half the lead required by copper-gauze brushes. Carbon brushes act in a similar way to copper-brushes constructed in the above manner, but the area of the carbon brush should be at least 1 inch for every 75 amperes carried.

The next division of the paper deals with the question as to whether there is any drag on conductors buried in the armature core, and the author gives particulars of experiments made by

him which prove that even when the conductor is not completely buried there is very little drag on it.

A short portion of the paper deals with excitation of the field magnet by the armature; it is only of theoretical interest at present, so there is no need to go further into the subject here.

The use of internal field magnets, *i.e.* dynamos where the field magnet is inside the armature, is advocated, as being an economical arrangement, owing to less magnetic leakage and a shorter magnetic circuit. The Ayrton and Perry motor, introduced many years ago, is mentioned, in which the field magnet and brushes revolved and in which the armature and commutator were stationary. The objection at present in force, says Mr. Mordey, is that the relative position of brushes and field cannot easily be altered while working, but the removal of this necessity by the various devices already mentioned leaves the way open for such machines. Even now on tramway and other motors the brushes cannot be altered while running.

The general result of the paper is to show that the dynamo is not yet a perfect machine, good qualities being too expensive; toothed armatures are better mechanically and electrically than smooth-core ones if the armature reaction and sparking can be remedied cheaply. It also explains a new method of winding by which this can be accomplished in an inexpensive manner.

The paper also goes fully into the considerations affecting the sparking, armature reactions, heating and expense of armatures, the theory of brushes, excitation of the fields by the armature, or, more correctly, the self-excitation of the armature and the possibilities of the internal field-magnet form of machine.

The paper stands out pre-eminently as the only really important paper on the subject of dynamos since that of Sayers in 1893, and it will rank in importance with the paper of Hopkinson.

It is to be regretted that such an excellent paper should have been crushed into the last meeting of the session, as more time could have been devoted to it with great advantage.

We notice that Mr. Mordey prefers to spell the plural of dynamo—"dynamoes."

#### DISCOVERY OF GREEK PAPYRI.

ONE of the largest and most important finds of papyri in Egypt has been made during the last winter by Mr. Bernard P. Grenfell and Mr. A. S. Hunt, of Queen's College, Oxford, working on behalf of the Egypt Exploration Fund at Behnesa, the ancient Oxyrrhynchus. The site of the old town, says the *Times*, which is  $1\frac{1}{4}$  mile long by half a mile broad, and is situated on the little explored edge of the western desert between Fayum and Minya, had remained almost untouched by dealers and antiquity seekers, and offered to the excavators—what is in Upper Egypt now almost a thing of the past—a practically virgin field. Very few remains of buildings were discovered, the place having been long used as a quarry both for stone and bricks, but many of the ancient rubbish mounds yielded a rich store of papyri, while in three mounds the quantity of rolls found together was large enough to warrant the assumption that part of the archives had been thrown there at different periods.

The papyri range from the Roman conquest to early Arab times, each century being largely represented, and are for the most part written in Greek, with a sprinkling of Latin, Coptic and Arabic. As the excavators had not time for deciphering, very little is yet known of their contents, but Mr. Grenfell's chief hope in digging the site of Oxyrrhynchus—the prospect of finding early Christian documents—would seem to have been to some extent realised. Among the papyri discovered at the very beginning of the excavation was a leaf from a third-century papyrus book, apparently containing a collection of Logia, or sayings of Christ. Some of those found in the fragment are not in the Gospels, while others exhibit several divergencies from the text of the parallel passages in the Gospels. The age, character and value of these Logia are likely to be the subject of considerable speculation, but there is no foundation for the entirely unauthorised and inaccurate reports connecting this discovery with the Logia which Papias states were collected by St. Matthew. It is hoped that when the papyri come to be examined in detail further discoveries of early Christian records will be made, as well as of fragments of lost classical literature, since in some of the mounds, notably the earlier ones, an unusually large proportion of the papyri found were written in uncials.

The cream of the collection in point of size and condition, consisting of 150 large and complete rolls in many cases several feet long, has been retained by the Gizeh Museum, the rest of the collection, of which the bulk is, of course, in a very fragmentary condition, is on its way to England, where the systematic examination and publication of it will be undertaken by Messrs. Grenfell and Hunt.

Besides papyri the excavators found a considerable number of coins, about 200 inscribed ostraca, bronze and ivory ornaments and other small objects of the Roman and Byzantine periods.



## LONDON BUILDING ACT, SECTIONS 13 AND 14.

UNDER section 14 of the London Building Act 1894, where a new building is erected at a less distance from the centre of the roadway than is permitted by the Act, the Council can serve a notice on the owner, occupier or builder requiring the building to be set back. Accordingly the London County Council applied for penalties against Rowton Houses, Limited, buildings which are in Churchyard Row, Newington, for not obeying a notice served upon them by the Council under the London Building Act 1894, section 14. Mr. A. A. Hopkins, the magistrate, having heard the evidence of Professor Banister Fletcher, district surveyor, and other witnesses, delivered the following judgment:—

These two summonses (Fletcher *v.* Farrant and Berry *v.* Rowton Houses) may be treated as, in effect, one summons by the London County Council against "Rowton Houses, Limited," for penalties for not obeying a notice served upon them by the Council under the London Building Act, 1894, section 14. The building in respect of which the complaint arises is Rowton Houses, Churchyard Row, Newington, and is now, as a building, practically complete. Churchyard Row is a carriageway bounded on one side by the wall of Rowton House and on the other by the open space of the churchyard of St. Mary. There is no dispute about the facts; I need not go into them minutely. It comes to this—that it is admitted that every fact necessary to raise this question must be found against the defendants.

Perhaps I ought to say one word as to how the case came here. The London County Council takes these proceedings, as I understand it, to establish its general authority in such a case as this, and to avoid the making of a precedent. But its counsel very fairly mentions that there was a time in the history of this building when the Council invited the defendants to apply for its consent to this building as it now stands. At that time the Council was, no doubt, prepared to consent to it in its present form, but the defendants declined to apply, and went on without the formal blessing of the Council, standing out, I suppose, for the exact rights of all builders. Without the consent of the Council they did that which they would have done with its consent, and, as far as this particular case is concerned, I do not understand that any person or building is any the worse off, or that anything has happened in the erection of this building which would not always have happened if the Council had been asked for and had given its consent.

The allegation which concerns me is that the defendants' building is so high as to infringe the last proviso but one of sub-section 5 of section 13 of the London Building Act of 1894, and if that proviso applies the building is certainly too high by many feet. The statutory height having been exceeded the London County Council served the defendants with the notice under section 14 requiring them not to complete and roof in at the statutory height, but to set back their external wall from the ground upwards to a certain prescribed distance from the centre of Churchyard Row. That procedure seems to be right under the statute, and I suppose it is only another curiosity of the Building Act 1894. The defendants, of course, did not comply with that notice, and the question is whether they must.

Rowton House (I have been to see it) is a large and handsome building, built round a large quadrangle, and is capable of providing accommodation for some 800 people. It is to be open, I believe, to men only; the accommodation includes board and lodging and the use of various conveniences and recreation-rooms; it is in fact, as Lord Rowton describes it, an immense poor man's hotel. It is, as a building, a great improvement upon the thirteen dingy cottages with their gardens that formerly occupied the site, but it is said to offend against the proviso which provides "that no dwelling-house to be inhabited, or adapted to be inhabited, by persons of the working class, shall, without the consent of the Council, be erected to a height exceeding the distance of the front wall from the opposite side of the street." Now if, say, the Gordon Hotels Company had done exactly what the defendants have done in this matter and after complying with the requirements of the statute, as the defendants complied with them, had erected on this very site one of their palaces of entertainment for their customers, Mr. Avory must, I think, admit that they might go to any height they pleased, and that no question could arise as to the height under this proviso, because the Gordon Hotels could not be said to be within it. Now for all the purposes of the London Building Act that I can think of, I can see no possible difference between, say, the Gordon Hotels Company building a rich man's hotel and Rowton Houses, Limited, building a poor man's hotel. On what ground is a restriction to be placed on the one that does not apply to the other? Of course the answer is that the statute has said so by providing "that no dwelling-house to be inhabited by persons of the working class shall be erected to a height exceeding," and so on; I do not so understand the words.

I do not want to go through the various clauses and interpretation clauses, or to criticise the wording very minutely. A very considerable experience of the diffuse and difficult lan-

guage of this highly technical statute has taught me that a minute examination of its language often lands one into a maze of contradiction. I prefer to take the larger and more general view, and to reason from the analogy of the position of two typical hotel builders. Doing so I have to ask myself whether these words are apt, and sufficient to impose upon the one builder an enormous restriction from which the other is wholly free. I think they are not. I understand them to be a prohibition intended to prevent in the future the building of narrow alleys and courts and little dwelling-houses, throughout the length of which the houses are higher than the courts are wide, and I have come to the conclusion that they have no application to such a case as this. Before I conclude I want to say that, while all the bare facts necessary to raise this question, must be found against the defendants, yet I am strongly of opinion that whether the case is viewed as an omission to obtain a consent they might have had, or as an instance of a great building improvement upon a site where air and light advantages are conspicuously prominent (for it must not be forgotten that the opposite side of Churchyard Row is an open-space churchyard) I am strongly of opinion, I say, that all the real merits are with the defendants. I dismiss the summonses.

Mr. Naldrett: Upon that I ask your Worship to give the costs to the respondents, and I think it is necessary to ask you to fix the amount.

The Magistrate: I have considered the question of costs, Mr. Berry, and I must hear Mr. Avory or you upon it. I suppose you cannot successfully contend that, bringing a test case of this sort here, you ought not to pay them.

Mr. Berry: I think we ought to pay the costs, sir, and perhaps, if the Council wish to go on, you would be kind enough to state a case, which possibly is an additional reason why we ought to do what is right with regard to paying them.

The Magistrate: I could not refuse to state a case, because there is plenty of argument to be got out of this Act of Parliament.

Mr. Berry: We came here because we were rather invited to raise the point, otherwise we might have settled the case in a particular way; that is all I wish to say about it.

The Magistrate: I allow 15*l.* 15*s.* costs.

## COMPETITIONS IN AMERICA.

AN agreement on the subject of engaging in competitions has been signed by the following architects of New York:—Messrs. George B. Post, McKim, Mead & White, Bruce Price, Henry Rutgers Marshall, R. H. Robertson, H. J. Hardenbergh, R. W. Gibson, Babb, Cook & Willard, Edward H. Kendall, George Keister, Rossiter & Wright, Carrere & Hastings, Berg & Clark, Renwick, Aspinall & Owen, James Brown Lord, Charles C. Haight, Clinton & Russell, R. H. Hunt. We give the full text of the document:—

The undersigned architects, being constantly invited by those not conversant with architectural practice to participate in competitions upon conditions with which it is impossible to comply, announce that they have mutually agreed that they will enter into competition upon the following terms only:—

That in any case the undersigned shall be paid at least a sufficient sum to reimburse them for their cash outlay in preparing their competition drawings.

That in case of limited competition the number of competitors shall be definitely named, and that the number shall not be increased without the consent of all competitors.

That it shall be definitely understood that the ordinary fees as published by the American Institute of Architects shall be paid as compensation for his professional services to the successful competitor.

That in work of any serious importance a professional advisor or advisors shall be appointed to act with the party instituting the competition in the preparation of a proper programme, which shall be definite in its specifications of requirements and explicit in its statement of the drawings required and their character and of the various rules which shall govern the competition.

In the opinion of the undersigned it is very desirable that the professional advisor or advisors should be practising architects, and the undersigned suggest that the best result can be gained by first appointing the architects to compete and by inviting them to meet with the party instituting the competition for the purpose of consultation with regard to the preparation of the programme of competition and to nominate the professional advisor or advisors.

It shall be the duty of the professional advisor or advisors to examine all drawings submitted by the competitors, and to place out of competition any competitor who has not submitted his designs at the date fixed for their reception, or who presents details or models which are not called for, or whose drawings do not conform exactly in number and character with the requirements of the programme, and that if placed out of competition his plans shall receive no further consideration by the party instituting the competition.



Inasmuch as the object of a competition is to adopt the general *motif* of a design to be further elaborated, and to select an architect for the work rather than secure plans perfectly studied in all of their details, the undersigned will enter upon no competition unless it shall be agreed that an award shall be made and that an architect shall be appointed on the consideration of the relative merits of the several schemes as shown by the drawings submitted, and that no demand shall be made for additional drawings or for a new competition.

The undersigned are of the opinion that all designs should be signed by their authors, and also that it is desirable that each competitor who has qualified by having his designs accepted by the professional advisor or advisors as complying with the terms of the competition, shall have an opportunity to personally explain his design to the party instituting the competition in the presence of the professional advisor or advisors.

### THE CANTERBURY CHAPTER-HOUSE.

ON Saturday the chapter-house, Canterbury, was opened after restoration, by the Prince of Wales. Although not comparable with the examples at Salisbury, York and Wells, the Canterbury hall measures 93 feet by 35 feet. Around the lower part, rising from the stone seats, is an arcade of columns and arches. The roof is of timber elaborately panelled.

The following address was delivered by Dean Farrar:—May it please your Royal Highnesses, my Lord Archbishop, my Lord Duke, my lords, ladies and gentlemen,—I will only occupy your attention for one or two moments while I say a very few words about this chapter-house, for the opening of which, after its restoration, your Royal Highness has done us the distinguished honour of visiting Canterbury to-day. We are this year celebrating the thirteenth centenary of the history of our cathedral, and three days hence will occur the 1,300th anniversary of the baptism of King Ethelbert, in consequence of whose conversion Canterbury became the first Christian English city and Kent the first Christian English kingdom. Parts of our cathedral are even more than thirteen centuries old, for it occupies the site of an ancient Roman and British church. In 1012 the church and city were burnt down by the Danes, when St. Alphege, who is represented on that window with the ox bones in his hands with which they pelted him to death, was martyred. In 1067 the cathedral was again burnt down, and Lanfranc, when he became Archbishop in 1070, rebuilt the Norman cathedral, of which great parts still remain. It was into Lanfranc's Norman chapter-house that Archbishop Becket came with his monks and chaplains on that memorable winter evening of December 29, 1170, just before his murder in the adjoining Martyrdom. The chapter-house was rebuilt in 1304 by the princely Lord Prior Henry, of Eastry, to whom is due all the work below the line of the arcading. It was completed about 1400 by another of my great building predecessors, Prior Chillenden. Roughly speaking, therefore, we are in a building of which the walls are partly 800 years old, the lower division 600 years old and the upper division 500 years old. The windows on the north side were always panelled as they are now, for they formed the southern wall of the great dormitory of the monks. Those on the south side which had been plastered up have now been reopened and reglazed. To Prior Chillenden are also due the great eastern and western windows with their quadruple tiers of stained-glass, of which the eastern, having been destroyed in the Puritan epoch, has been now refilled with stained-glass by Mr. Hemming. It represents the figures and symbols of all who have been most famous in our cathedral history, from Queen Bertha, the first Christian English queen, to Her Gracious Majesty Queen Victoria, who this year completes the longest reign of all our sovereigns, and is the most beloved; and from Archbishop St. Augustine to Archbishop Benson, whose successor, the ninety-third Archbishop of Canterbury, has offered up the prayers to-day. The window contains the figures of all the saints and kings who have most enriched our resources and adorned our annals; and among these your Royal Highness's great ancestor, the famous Black Prince, who built the lovely chantry in the crypt and is buried in our Trinity Chapel. His ostrich feathers are represented on that window, as they are on his tomb, and I am only saying that which the whole English nation will attest if I say that his world-famous motto "Ich Dien" has received most noble meaning and illustration in the ungrudging and unwearied services of your Royal Highnesses to every work of national progress and national philanthropy. This east window is the splendid gift of the Freemasons of Kent, and will be commemorated by a masonic gathering here in the autumn. Their Provincial Grand Master, Earl Amherst, represents them here to-day, and if I may venture, Sir, to give a desperate, audacious hint in the presence of your Royal Highness, as Grand Master of the Freemasons of England, I may say that if each English Freemason would, in commemoration of the honour you have done

us, give one shilling, the west window also could be filled with glass—there might be another royal and masonic celebration of the sixtieth year of Her Majesty's reign and of our great 1,300th anniversary. In 1644 this building, though it is not consecrated and has always been used for secular purposes, was arranged as a sermon house, and in the north-east corner was a royal gallery to be used whenever the king and queen were present, which in those days was a common event. The building gradually fell into a melancholy aspect of decay and disrepair, from which, by the aid of our restoration fund, it has been restored under the direction of Mr. Hemming and of our distinguished architect, Sir A. Blomfield. We trust that for centuries to come it may add to the usefulness and dignity of the cathedral; and, in conclusion, we most heartily thank your Royal Highnesses for a visit which will ever be memorable in the annals of our cathedral and of our city, and will help to impress on the imagination of the English people the fact that we have now enjoyed 1,300 years of the blessings of the gospel of Christ, and that those long centuries which we celebrate to-day should mean a mighty national advance in magnanimity and nobleness, in all that is lofty and generous and good. Once more we offer to your Royal Highnesses our loyal and grateful homage, and I will now ask your Royal Highness to declare this chapter-house opened for the many useful purposes of education, of philanthropy, and of the prosperity of the diocese, the Church, and the people for which it will henceforth be set apart.

### THE SURVEYORS' INSTITUTION.

THE annual general meeting of the members of the Surveyors' Institution was held on Monday, May 31, at the temporary offices, Savoy Street, Strand, Mr. Daniel Watney, the president, in the chair. The twenty-ninth annual report of the Council, submitted by the secretary, showed that during the last twelve months there had been a net increase of 112 in the number of all classes on the roll, the total membership now being 2,702. The entrance fees showed an increase of 169%, but there was a net decrease in subscriptions from all sources of 22% during the twelve months to Christmas last. The total revenue for the year was 7,334%, and the expenses amounted to 5,596%. The total investments calculated at current prices now represented a sum of 35,226%. At the preliminary examinations in January last, held simultaneously in London, Dublin and Manchester, there were 133 student-candidates, of whom 91 passed; and of 236 candidates who offered themselves for the professional examinations 151 passed. The Council congratulated the members on the progress of the Institution during the past year in every one of its numerous channels of activity. The report was adopted on the motion of Mr. A. Harston, seconded by Mr. Ernest Swain. Votes of thanks having been passed to the auditors and to the President and Council, the President presented a number of prizes gained by students in the recent examinations. On the motion of Mr. Robert Vigers, a vote of thanks was passed to Mr. Watney for his services as President during the past two years, and subsequently Mr. Watney invested the incoming president, Mr. Christopher Oakley, with the President's chain of office.

### IRON AND STEEL INSTITUTE.

THE autumn meeting of the Iron and Steel Institute of Great Britain will be held at Cardiff from August 3 to 6 inclusive in the house of the South Wales Institute of Engineers. The proceedings will comprise the reading and discussion of papers and visits to works of interest, besides several social gatherings, the second and third items being distinctly prominent in the programme. On August 3 there will be visits to the Bute Docks, the Cardiff-Dowlais Works and other establishments in the vicinity. On August 4 the Penarth Docks and works on the Taff Vale Railway will be inspected. On the following day a visit will be paid to the Dowlais and Cyfarthfa Steel Works, and on August 6 there will be a whole-day excursion to points of interest in the neighbourhood. On the evening of August 3 the Mayor of Cardiff will hold a reception at the Free Art Library, Art Gallery and Museum building. On August 4 the members and the ladies accompanying them will be invited to a ball by the Marquis and Marchioness of Bute. On August 5 the local committee will give a Welsh concert at the Park Hall. The members will be invited to luncheon by the Monmouthshire and South Wales Coalowners' Association on August 3, and by the president of the Cardiff Chamber of Commerce, Lord Windsor, on August 4. On the same day the members will also be invited to dinner by the directors of the Taff Vale Railway Company. The chairman of the local reception committee in Cardiff is Sir William T. Lewis, and the honorary secretary is Mr. T. Hurry Riches, M.Inst.C.E., of the Taff Vale Railway, Cardiff.



## NOTES AND COMMENTS.

It may well be asked when taste will determine the value of TURNER'S works less blindly. When within the past twenty years Sir JOHN PENDER gave about 8,000*l.* for four of the artist's paintings he was supposed to have purchased without discretion, yet on Saturday the four realised 30,345*l.* *The Wreckers* was exhibited in 1834. It was purchased by Mr. E. BICKNELL, at whose sale in 1863 it brought 1,984*l.* As on Saturday it was bought for 7,980*l.*, the value has quadrupled in a third of a century. Sir JOHN PENDER gave 2,000*l.* for *Mercury and Herse*, and it realised 7,875*l.*, or nearly four times his price. *The State Procession bearing Giovanni Bellini's pictures to the Church of the Redeemer, Venice*, which was exhibited in 1841, sold for 7,350*l.*, and another picture of that year, *Venice: The Giudecca, Santa Maria della Salute and San Giorgio Maggiore*, which TURNER valued at 262*l.* 10*s.*, reached 7,140*l.*, or over twenty-seven times the original price. The sale is creditable to the investors, but we hope it will not induce the world to conclude that modern pictures are an unprofitable investment. At the PENDER sale, MILLAIS'S *Proscribed Royalist* found a purchaser at 2,100*l.*, and JOHN PHILLIPS'S *La Gloria: A Spanish Wake*, was purchased for the National Gallery, Edinburgh, at 5,250*l.*

So much discontent prevails in Paris about the management of the Louvre and the operations which are performed on some of its treasures, especially important examples of painting, it is no wonder that a sort of protective association has been constituted. The new Société des Amis du Louvre is composed to a large extent of amateurs, but some of the officials have been invited to join it. It will correspond with the Rembrandt Society of Amsterdam. The committee appointed to make preliminary arrangements consists of the following members, viz.:—M. le Comte GREFFULHE, Le Comte DE CAMONDO, Le Baron EDMOND DE ROTHSCHILD, MM. MACIET, PUVIS DE CHAVANNES, DETAILLE, C. GROULT, TRÉLAT, DENYS COCHIN, EMILE MICHEL, BARDOUX, DERVILLÉ, BOURGEOIS, POINCARÉ, REDON. The ostensible object of the Society is to enrich the galleries, but a party so influential cannot fail to exercise supervision over conservators and assistants. There will be henceforth less grumbling over purchases of doubtful value and chemical experiments which deprive paintings of their most admired qualities.

THE Place de la Concorde in Paris is at night brilliantly illuminated, but it is desired to have it still more bright during the time of the International Exhibition. In the daytime the obelisk of Luxor is the most interesting object, for the statue of Strasbourg is not in a position which can vie with it. The question has been raised, Why should not the old Egyptian monolith become equally prominent at night? That end can only be accomplished by surmounting it with an electric lamp of great power. For that purpose it would be necessary to have wires or tubing along one or all of the faces of the obelisk. It is therefore proposed to drill a hole through the entire length of the obelisk and its pedestal, which together measure about 100 feet. In that way the hieroglyphics, which are gilded, would not be obscured. It is possible to make a passage for wires by improved drills without any injury to the stone, but will not the boring be to some extent an act of vandalism? It would, however, be in keeping with many acts of restoration in France in which the past was sacrificed to the present.

THE rules of the Science and Art Department concerning registration and grants for students' attendances in art classes have been recently altered. Last year it was stated that "the attendance grants are  $\frac{1}{2}$ *d.* to 3*d.*, 1*d.* to 4*d.*, 3*d.* to 6*d.*, or 4*d.* to 8*d.*, for each attendance in an art school or class, according to the subject or stage of subject. But no more than twenty attendances in any one subject or stage of a subject in art will be counted during one session on behalf of a student, or more than thirty altogether in the elementary stages of two or more subjects, or more than sixty altogether in the advanced stages or in the elementary

and advanced stages together of three or more subjects." This year the fees in Group II. have been increased from 1*d.* to 5*d.* The numbers of attendances for qualification are to be as follows:—"No more than forty attendances in Group I. will be counted during one session on behalf of a student, or more than sixty in one or more of the other three groups. But if Group I. be taken with the other groups, not more than fifty attendances can be counted altogether." Last year it was one of the conditions for obtaining a grant that the inspector should report "the class or classes are not too large for instruction by the staff of teachers." In the new regulations the clause is omitted. As long as the teaching and equipment are considered satisfactory there is no limit to the number of pupils that can attend a class.

THE Tudors are not favourites with the Manchester people, and beyond the wearing of rich costumes and the employment of an occasional painter it is not easy to discover what the family did to earn the admiration of Lancashire. The chairman of the art gallery committee is not satisfied with the indifference of the people to the exhibition which is now open, and he said on Wednesday that if the committee had to depend on Manchester for the success of the exhibitions they might as well resign their office. If they asked the people of Manchester to pay sixpence or a shilling to visit the autumn and other exhibitions they received no reasonable support. A great many of the visitors came from the surrounding towns, and the attendance, so far as Manchester was concerned, was of the most meagre description. The Tudor Exhibition contains much which is interesting, but the title is against it. Although there appears to be little interest in art, the committee considered they were justified to expend 1,600*l.* on a picture by WILLIAM MÜLLER which formed part of the Pender collection.

ANCIENT as is the Egypt of the history of architecture, there is another and much older Egypt, of which Mr. H. W. SETON-KARR has afforded a glimpse by means of the collection of prehistoric flint implements which can be seen at the Royal Archæological Institute. The majority came from flint mines in the Eastern Desert, at a distance of about thirty miles from the Nile. The workings were in some cases along ledges on the face of the cliffs; in others on level ground on the step-like tiers or plateaux which descend from the high, table-topped mountains to the dry sandy bed of the Wady-el-Sheik. At some of the mines were shafts about two feet in diameter, filled up with drifted sand, and surrounded by masses of excavated rock neatly arranged. There was usually a central work-place where most of the objects were discovered. But in some mines a number of clubs or truncheons lay distributed uniformly, as though hurriedly left when the mines were last abandoned, at a period probably long anterior to historic record. Many of the implements differ from those which have been found in Europe. Mr. SETON-KARR also shows quartzite and flint implements from Somaliland which are supposed to be of earlier date than any found hitherto in Africa. They were evidently buried, and suggest that they belonged to a more ancient race than any of those of which relics remain. Sir JOHN EVANS considers that they "have an important bearing on the question of the original home of the human race. Of their identity in form with some from the valley of the Somme and other places there can be no doubt, and we need not hesitate in claiming them as palæolithic. The cradle of the human race must have been situated in some part of the world where the climate was genial and means of subsistence readily obtained."

## ILLUSTRATIONS.

CATHEDRAL SERIES.—NORWICH: THE CLOISTERS.—VIEW FROM CLOISTER COURT.

ROOM DECORATION.

SHEFFIELD MUNICIPAL BUILDINGS.—MAYOR'S SEAT IN COUNCIL CHAMBER, FROM GROUND LEVEL.













PHOTOGRAPHED BY S. B. BOLAS & CO

INK-PHOTO, SPRAGUE & CO 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

**SHEFFIELD MUNICIPAL BUILDINGS.**  
**MAYOR'S SEAT IN COUNCIL CHAMBER, FROM GROUND LEVEL.**  
E. W. MOUNTFORD, Architect.



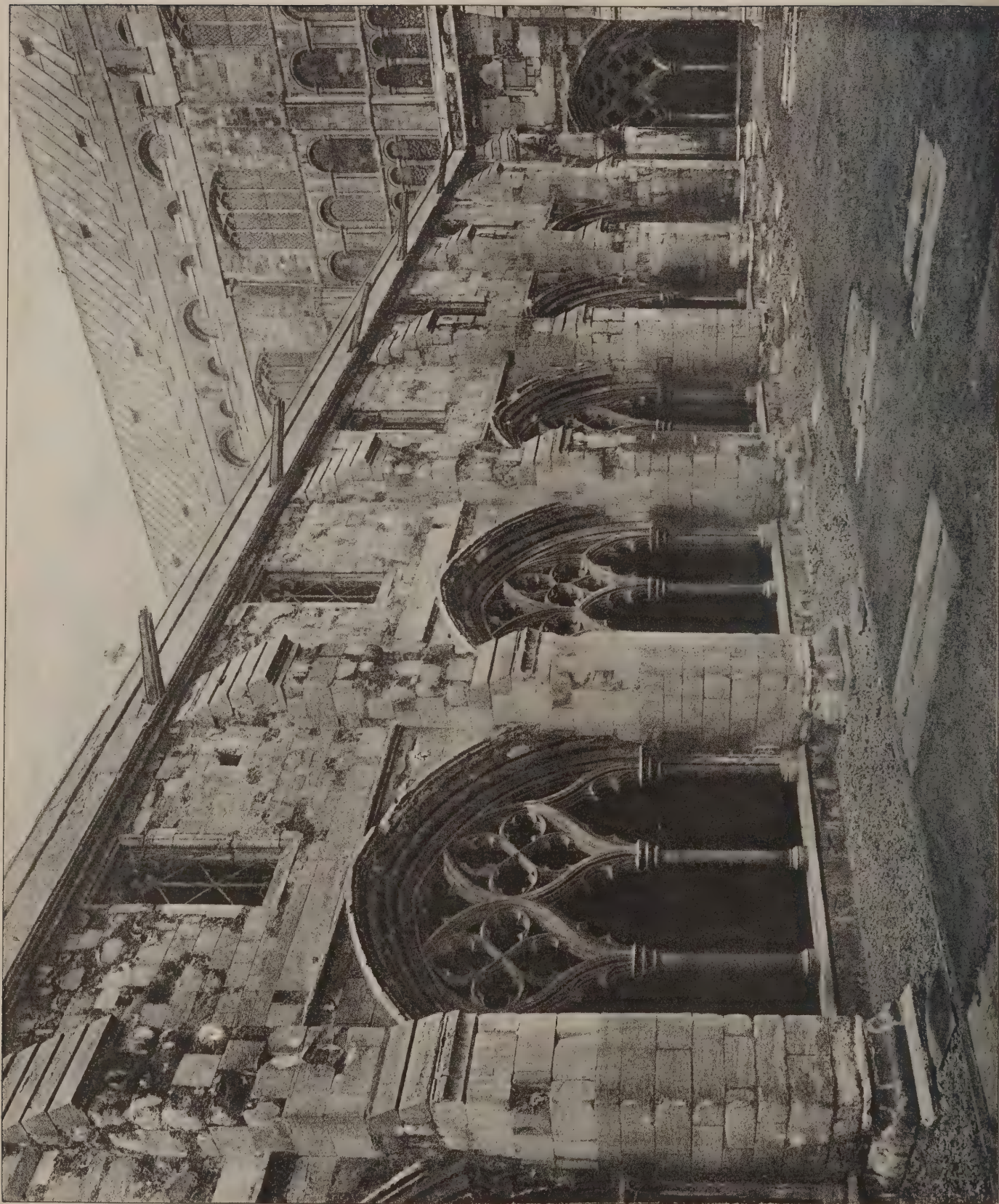








The Architect, June 4<sup>th</sup> 1897



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CATHEDRAL SERIES, No. 38.—NORWICH: THE CLOISTERS.





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CATHEDRAL SERIES, No. 39.—NORWICH: VIEW FROM CLOISTER COURT.

















ROOM DECORATION.  
By C. T. G. FORMILLI.

INT. PHOTOGRAPHED BY J. S. EAST HARDING & J. S. FETTER LANE, E.







## NORWICH CATHEDRAL.—IV.

THE plates we have published will suggest that the main part of Norwich Cathedral, including the tower, may be described as Norman in style, the exceptions being the upper tier of windows in the choir and the vaulting. There are, however, accessories of a later time, the most important being the cloisters which are shown by the illustrations in the present number.

The cloisters were commenced during the episcopacy of Ralph de Walpole, which lasted from 1289 to 1299, when he was transferred to the diocese of Ely. At his consecration he was advised to avoid applying to his own use the firstfruits of the vacant benefices in his diocese, as was customary, and he consented to that reform. He commenced the cloisters at the north-east angle.

Richard de Uppenhall, the undertaker or builder of these works, erected three more arches or compartments on the same side of the cloister. The remaining five arches of the cloister on the east side, with the whole of the south walk, were built by Bishop Salmon and his friends. At this time part of the revenues of the monastery was applied to an officer called the *pittancer*, who being dispensed with, his salary, called *pittance money*, was expended on the new works. The cloister was continued by other patrons or contributors. Accordingly we find that the north walk attached to the wall of the church was erected by Master Henry de Well, who expended 210 marks on it, and twenty pounds more were given by John de Hancock. Bishop Wakeryng built the entrance doorway to the church at the north-west angle of the cloister, as well as a portion of the cloister at that part, and the remainder to the lavatories with some doorways were raised at the expense of Jeffrey Simonds, rector of St. Mary-in-the-Marsh, at an expense of 100*l*. The refectory, strangers' hall and other parts of the monastery were connected with this end of the cloister. In the year 1302 Walter de Burney, a citizen of Norwich, gave 100*l*. and much of the ironwork towards glazing the windows of the cloister. From the armorial bearings painted on some of these windows and sculpture on the ribs, &c., Blomefield concludes that the rest of the building was "finished by the several families of Morley, Shelton, Scales, Erpingham, Gourney, Mowbray, Thorp, Savage, &c., and thus this famous cloister was finished in the time of William Alnwyk, lord bishop here, and in the third year of William Worsted, prior of the church, who were both considerable benefactors in the year of Our Lord 1430, and in the 133rd year from the first beginning of the work."

Although the cloister was built at different periods, and by different persons, we find a general uniformity of style prevail in the details of columns, capitals and groinings, and even in many of the mouldings of the four sides. Yet by close examination a progressive change in architecture may be found in the tracery of the windows, commencing at the east end, and continuing through the south, the west, and terminating with the north. By the rabbits in the mullions of the upper part of this cloister, it is concluded that it was originally glazed. At the south-west angle of the cloister are two lavatories; and the whole roof is enriched with a great number and variety of sculptured bosses or orbs. Many of these are interesting as specimens of sculpture, and as representations of scriptural and monastic events.

The names of Bishops Salmon, Wakeryng and Alnwyk, as well as of Ralph de Walpoles, are therefore connected with the construction of the cloisters.

John Salmon was appointed by the Pope to this see in 1299, and proved an active and distinguished governor of the diocese. In 1303 he addressed an hortatory letter to the people of his bishopric, urging them to contribute to the repair of St. Paul's Church in London. On the death of Edward I. he received letters to pray for the health of the new monarch and prosperity to the kingdom, and soon afterwards was appointed one of the ambassadors to demand Isabel, daughter of the French king, as queen for Edward II. On January 18, 1307-8, he was summoned to attend the coronation, and shortly after was deputed, with several English lords, to wait on the Pope. In 1316 he was again sent to his holiness at Avignon, to pay one thousand marks pension for the kingdoms of England and Ireland. One of this bishop's letters is preserved in his own register at Norwich, dated from York, and complaining that he was obliged to attend the Parliament in that city and thereby incur an "insupportable expense and be unable to visit his diocese." Being highly in favour with the king and Parliament he was appointed Chancellor of England in 1320, and had the broken fragments of the old great seal allowed him as his fee. After fulfilling the duties of many distinguished offices he died at Folkestone Priory, in Kent, July 6, 1325, and his remains were conveyed for interment to his own private chapel at Norwich. Besides this building he erected the greater part of the charnel chapel, the hall in the palace and the north walk of the cloister.

John de Wakeryng, born at Wakering, in Essex, was one

of the Privy Council to King Henry VI., Lord Privy Seal and Lord Keeper of the Great Seal, before he was advanced to the See of Norwich. Immediately after installation he constituted John, Archbishop of Smyrna, his suffragan, with full powers to "consecrate and reconcile, or reconsecrate churches, churchyards, altars, cups, patins, corporals, vessels, vestments and other ornaments, and to confirm and confer the clerical tonsure on learned men, and to ordain to all orders, during the bishop's pleasure." About this time there was a great struggle for the Papal See by three different persons, who referred their respective claims to the pontifical throne. A Council was called at Constance to settle this dispute, when many of the English nobility, clergy and gentry, to the amount of 800, were deputed to attend the meeting. Bishop Wakeryng was one of the number, and was nominated with five others to elect the Pope. Martin V. was chosen; and the conduct and ability of Wakeryng excited the approbation of the assembly, and induced the Pope to ratify his confirmation and consecration free of expense. Though our prelate obtained the character of "a pious, chaste, bountiful and affable person," yet he was intolerant towards the Lollards, and carried his persecution to a great extent. He built a covered way or cloister from the palace to the north transept, also a chapter-house, and after governing the See nine years died in 1425 and was buried on the south side of the altar-steps.

William Alnwyk, or Alnwyke, a native of Alnwyk in Northumberland, was appointed the first confessor and priest to the nunnery of Sion, Middlesex, and was afterwards made Keeper of the Privy Seal and Confessor to Henry VI. After being installed in Norwich Cathedral, December 22, 1426, he directed his attention to the repairs and embellishment of his church and palace, and built the western doorway with a window, &c., to the former, and commenced a tower gateway to the latter. He presided here ten years, and was then translated to Lincoln, where, and at Cambridge, he is said to have executed some architectural works.

## SIR JOHN SOANE'S MUSEUM.

ACCORDING to the report for 1896 the tendency to improvement recorded in 1895 in the affairs of Sir John Soane's Museum has been steadily maintained and further augmented. Had it not been for the exceptionally wet and unsettled weather which distinguished the autumn of last year, a much larger attendance of the general public would probably have been recorded. The very slight diminution in numbers was due and attributable solely to that cause. In 1894 the number of visitors was 3,512; in 1895 the number of visitors was 4,940; in 1896 the number of visitors was 4,860; while the number of students for the same years was 12, 107 and 209. These figures are a proof that Sir John Soane's noble gift to the nation is becoming better known and more fully appreciated by those for whom it was primarily intended.

With the permission of the trustees the museum has been thrown open on Saturday afternoons to various clubs, technical classes and institutes, the various societies having the museum and its contents described to them by the curator. This privilege seems to have been so very fully appreciated that in several cases the members asked to be allowed to pay a second visit; about nineteen different societies availed themselves of this permission.

In classifying the various nationalities among the general public, the United States of America head the list with 287; France, 51; Germany and Austria, 38; Belgium and Holland, 18; Italy, 13; Russia, 5; Norway and Sweden, 8; Denmark, 3; Brazil, 3; Armenia, 2; Canadians, Australians, South Africans and other colonials are included with ourselves. On students' and private days the museum is practically never closed, for all foreigners and strangers in London are invariably admitted on presentation of their cards, while the general public have but to write for tickets, and they can also view it on closed days, but as there are no attendants present during the period the museum is closed to the public or on private days, it is necessary to give sufficient notice to the curator.

The funds by which the museum is maintained were settled by Act of Parliament in the lifetime of Sir John Soane, and at the time were fully sufficient to permit a small surplus being invested each year so as to form a reserve or building fund, in case of repairs, painting, &c., but the heavy increase of rates and taxes and the consequent diminution of the revenue by the change of the rate of interest on Consols from 3 per cent. to 2½ per cent., in addition to the extra expenses for attendants involved by opening the museum to the public four days a week instead of two, and six months in the year instead of three as originally settled by the Act, make it necessary to be economical in the management of the trust, especially as a further reduction of income will take place in a very few years when Consols will drop to 2½ per cent.

The balance at the end of 1896 being exceptionally larger in



consequence of the long-deferred payment by the London County Council of the compensation money for the loss of the freehold rights in the Lincoln's Inn Gardens enclosure, nearly two years after the Council obtained possession, has been partly expended on providing artificial light, so that on dark days during the winter months the collection can still be seen, which before was almost impossible. In the *personnel* of the museum great changes have taken place during the past year. The trustees have lost three of their most distinguished colleagues by death and one by resignation on account of ill-health, viz. Lord Leighton, Sir John Everett Millais, Bart., Sir Benjamin Ward Richardson; Sir William Flower, K.C.B., wishing to concentrate his remaining energies on the Natural History Museum, South Kensington, has resigned the trusteeship he held for over fifteen years. In their places Sir Edward J. Poynter, president of the Royal Academy; Sir George M. Birdwood, K.C.I.E., C.S.I., and Professor Arthur H. Church, M.A., F.R.S., have been elected. With such trustees, in addition to those who have been identified with the trust for many years, there is every guarantee that Sir John Soane's museum and library will prove to be a most useful institution for those of the student class in either arts or literature who choose to make use of its treasures, a class for whom, rather than the general sight-seeing public, Sir John Soane founded and endowed it.

### PLUMBING AND SANITARY WORK.\*

(Concluded from last week.)

**I** NOW come naturally enough to valve-closets, the prince of water-closets for private use and for places where such a convenience is not used for several days together and when the supply of water is not limited to two gallons. The "Bramah" valve-closet was invented by Joseph Bramah, of London, in 1778, but it has been much improved upon since then, especially during the last ten or twenty years. In turning out some drawers recently I came across a printed circular of a valve-closet by the founder of my business, which was established upwards of a century and a half ago, and I have thought it of sufficient interest to reproduce upon the screen to-night for you to see. It was printed by T. Bensley in about 1790, I think. His printing press was next to Dr. Johnson's house in Bolt Court. If you look at the type you will see that the long S is used, and the Caslon foundry abandoned that form of letter in 1785.

The illustration shows a D-trap under the closet, but according to the text this trap was at that time called an "air" trap; and although they seem to have preferred that its position should be immediately under the floor of the closet, they do not seem to have been very particular about this, for in the directions for fixing it is specified to be "fixed under the floor of the closet, if the joists are of sufficient depth to allow it; if not it may be fixed at the bottom of the funnel-pipe." It is interesting to notice that at this time soil-pipe was called "funnel-pipe"—the name by which it is still called by some old plumbers—and, what is still more interesting, as shown by the circular, the conservatism of that day was very strong, for they stored the sewage in cesspools built at the bottom of funnel-pipes inside their houses. But they saw a danger in this unless matters were well suppressed, for the specification states that "great care must be taken to make properly good round the bottom of the funnel-pipe where it enters the drain or cesspool, so as to entirely prevent the foul air from being emitted." There is nothing said about the ventilation of the soil-pipe or of the cesspool; the authorities were content to "bottle up" such matters, and there was wisdom in this with so much storage of sewage in closet-trap and cesspool.

But I must return to my subject. I have called the best kind of valve-closets the prince of water-closets, and I have done so because I know of no other which embraces so many good points. It has a larger and a deeper body of water than any other closet for receiving a motion, submerging it and carrying it away in what I have called elsewhere a water-envelope, whilst the valve which keeps the water in the basin enables its sides to be so extended that they are practically protected from the dejecta, no matter what state the body may be in. And to protect the flushing-rim of water-closets I have recently introduced a receding-rim.

Then, with the attached supply-valve, at the same moment of time the closet is discharged a very vigorous flush of water is made to cleanse the whole of the interior of the closet together with its trap; and not only so, the sides of the basin are rinsed down at the same time, so that not a vestige of foreign matter may remain behind.

Then the valve-closet is superior to all other closets, whether of the "wash-out," "wash-down" or "syphonic" kind, in that

its basin water—the water which is open to the apartment and the house—is separated from the water which stands in the closet-trap, in fact is "disconnected" from the water which is exposed to the air in the soil-pipe, as shown in section upon the screen, which is an illustration of a valve-closet which I have had specially made for fixing upon fireproof floors and places where it is desirable that the floor under the closet should remain intact.

There is also another great advantage attending a good valve-closet, viz. with an efficient lead trap under it having a wiped soldered joint to the lead soil-pipe there will ever be a reliable connection with the soil-pipe, and a reliable water-seal; so reliable that the trap and its jointing may be depended upon for many generations.

In the case of earthenware closets with earthenware traps in one piece—the pedestal kind—or in two pieces, it is not so; for there is not only the risk of a breakdown of the connection with the soil-pipe, but there is also the risk of the breakage of the closet itself, its trap or its basin part, which would mean a defective water-seal or no protection at all from the soil-pipe air, pending the changing of the closet for a new one.

I know that some authorities have been content to fix valve-closets without a trap between the closet and the soil-pipe, but it is astonishing what may be done in the name of sanitation. Now, though something may be said in favour of fixing a valve-closet without a trap on a very short length of soil-pipe, which has its discharging end open to the air, what can be said in favour of such a closet fixed upon a long length of soil-pipe into which other valve-closets discharge with no trap to any of them? And yet scores have been so fixed. Only within the last few months I know of such cases where the closets have had to be resanitated.

I will not insult you by arguing in favour of fixing traps under water-closets—that is a sound principle conceded by us all; but I shall be glad of your attention whilst I demonstrate the fact that a round pipe-trap—the syphon trap, the kind often fixed in ignorance of its behaviour—under certain circumstances loses its water-seal, and for a time ceases its work of safeguarding the house from the soil-pipe, and perhaps the drain as well. It seems a waste of words to say that if a trap be necessary at all it should be of that kind which could be relied upon under any condition to which it would be liable.

With a round-pipe or syphon trap the discharges pass through it in so unbroken a form and with so much momentum, gained in the fall from the closet-basin, that the combined action of syphonage and momentum is not arrested in time to leave sufficient water in the trap to reseal it.

With an "anti D-trap," as I shall show you by one or two tests, the water is just sufficiently broken up at the outlet of the trap to retard both the action of momentum and syphonage, for insuring the retention of an efficient water-seal, no matter how small or how large a body of water may be sent through it, whilst to insure an entire change of the previous contents of the trap its body part is purposely made smaller than its inlet, and as it holds about 40 per cent. less than a 4-inch syphon-trap, I need hardly say which is the more wholesome of the two, although both kinds may be considered as self-cleansing. By the favour of the Worshipful Company of Plumbers I have here an apparatus which the Company fitted up at King's College in connection with their museum and workshops—those for the extension of the technical training of student plumbers. I have had a photograph taken of the apparatus, and before demonstrating will show it upon the screen.

Next to the importance of an efficient trap to a water-closet is an efficient water-supply, for the best closet in the world may not only be marred, but may be ruined by the want of either. To expect two gallons of water to carry a motion through the closet, trap, branch soil-pipe, the vertical stack, and a long length of branch drain to reach the main carrier, and not leave a vestige of filth behind, is expecting too much. The fact is, if the water flush is to be efficient, it must be made to depend somewhat upon circumstances, upon the necessities of the case, and that only where water is scarce, or where it is imperative to economise its use in order to maintain a general supply to the house, should it be limited to two gallons.

Two gallons of water with an efficient flushing-cistern may fairly suffice for the best kind of wash-down pedestal closets with small water areas, when they are situated near to the main carriers with a general flow of water in them, or into which copious flushes are automatically and frequently delivered. But two gallons of water are insufficient for water-closets which hold a good body of water, especially when they stand or are fixed at any great distance from the main drain, that is, if the soil-pipes, drains and ventilating-pipes are all to be kept clean and wholesome. In my own house—I pay by meter—I have valve-closets for the best closets, with the water supply so arranged that each user may give a flush of two, three, or four gallons very rapidly and at pleasure, and during the thirteen years that I have occupied the house I have never had to pay extra on that account. I say this to encourage water companies in giving a larger license to consumers.

\* A paper read before the Architectural Association by Mr. S. S. Hellyer on May 21.



As only, however, two gallons of water are allowed by most companies, it is most important that this quantity should be utilised in the best possible way, and as there are flushing-cisterns and flushing-cisterns only the most efficient should be used. You all know well enough what difference there is in their discharging power; I have here one taking not quite five seconds to discharge, the size of the flushing pipe being 1½-inch and the cistern being nearly noiseless. With a noisy advertiser in a house, it is vain for any person to pretend he only left the room to get a pocket-handkerchief. Such fittings are most unpleasant to retiring dispositions, and they ought not to be fixed in private houses. I was dining a month or two ago at a friend's house, and wishing to give a second flush to the closet I waited four minutes by my watch for the flushing-cistern to fill; when I left it was still filling, and I dare say by this time it is filled ready for the second flush.

A properly fitted valve-closet with an attached supply-valve and bellows regulator is the least noisy of all water-closets, and when it is so fitted up that the lid of the enclosure can be put down before the handle is pulled, it is practically noiseless in its action. The next slide will show a view of such a closet. It is so arranged in my house, where, for the sake of convenience and for good general flushing when necessary, the service to it is taken from the general service pipe to other fittings. When this is properly done I do not see how any contamination can take place, but as it is most difficult to always rely upon things being properly done, it is better to separate the water-closet supply from all other services. When the cistern for this purpose would have to be fixed in the water-closet apartment it should be kept as small as practicable, holding only about half a dozen gallons of water, so that its entire contents may be frequently changed, for, notwithstanding any lid it may have, the effluvia of the apartment would gain access to the water and taint it. Where a good flush is desired, and the head of water would be under 5 feet or 6 feet, the service-pipe to the closet should be of 2-inch bore.

If we were not influenced by fashion or carried away by the current of things, I should wonder much why pedestal closets with narrow ring seats ever came into vogue for the best closets in private houses, especially for ladies' use, for I suppose the least observant must know that it is cleaner and nicer for a lady's dress, especially with a long skirt, to rest upon the dusted seat of an enclosure rather than upon the floor, remembering what closet floors are like at times. With a table-top closet basin protecting the enclosed space, and with an air-tight joint to the top of a nicely-fitted enclosure, as shown upon the screen, not only is the vapour excluded from the space inside the enclosure, but dust and the sweepings of the apartment as well. And with such an arrangement no cold draughts can blow upon the person using the closet. And even for the use of men, when they are feeble and advanced in years, a table-top pedestal closet affords better means for raising themselves from the closet than the ring-seat, allowing them, as it does, a firm place to rest their hands upon, as shown by the closet illustrated upon the screen.

Before leaving the subject of water-closets, I ought to say something on the apartments in which they are fixed, though there is no time for more than a word or two. The apartment in itself, apart from the closet, may become an accumulator or disseminator of disease. Dark and dangerous water-closet apartments may be found with the aid of a candle in the interior parts of old mansions with no natural light or ventilation. The vapour generated in them or escaping from the closet apparatus may be as difficult to remove as air out of a bottle.

One side of a water-closet apartment should at least stand next the external air, having a window in it reaching up to the ceiling, as was shown in the last slide but one, and as is shown in this case also. Where it would be much used it should be provided with independent ventilation—should have, in fact, an air inlet and an air outlet.

It is important that the walls and ceiling should be made practically air-tight, and that there should be no places or parts about them where dust could collect and accumulate. And in public water-closets, and in water-closets which would be liable to be used as urinals, the floors should be impervious.

For the best water-closets with enclosures, as just shown, and for table-top valve-closets in private houses and important positions, a floor of solid marble from wall to wall, or to a point 6 inches or so beyond the sides and front of pedestal closets, is very desirable, as shown. The marble is sunk a little to catch any little leakage of the supply-valve, should such ever occur, and carry it away by an overflow pipe being fixed to the floor, and discharging into the open air. Where marble cannot be afforded the boarded floor inside the enclosure should be protected by a lead safe to which the lead trap under the valve-closet should be soldered. I should just say here that the overflow pipe from the safe being a clean water-pipe can be utilised for introducing a constant stream of fresh air into the apartment; but when this is done in exposed positions, the grated opening in the marble floor should be kept outside the enclosure,

so that the incoming air, when frosty, may not come directly in contact with the service-pipe, service-valve or closet-basin.

I now come to soil-pipes. According to the by-laws of the London County Council, under seal dated June 1893, all soil-pipes in buildings erected after that date are to be outside. Now, although I have done, perhaps, as much as anybody to encourage the fixing of soil-pipes outside, and still prefer such pipes to be outside, I have never slavishly chained myself down to such a restriction, and I think it is a pity the by-law should be so stringent, or that architects and plumbers should be so hampered, for it requires no great imaginative power to conceive of circumstances where the disadvantages would be greater than the advantages.

If it is a question of durability and sanitariness, in certain cases a soil-pipe fixed inside a house would be more durable and more sanitary than if fixed outside.

When they are situated on south fronts, where no shadow protects them, they often become so hot that the naked hand cannot be kept upon them; and their variation in temperature, from mid-day to midnight in the summer months, would be three times greater than upon pipes fixed inside or with a northerly aspect. The strain upon the joints of iron pipes, and the unequal expansion and contraction of lead pipe, would tell much upon their durability. And of course in such cases sewage matters would adhere and dry upon the soil-pipe in a different manner to that upon a pipe which did not become so heated, and it would, therefore, be less sanitary, unless, indeed, the water-closets upon it were well flushed at every usage by more than the water companies' restricted two gallons.

Then in certain cases it is most difficult to find a good course for an outside pipe, free from a doorway or a pilaster, free from mouldings and enrichments; difficult to prevent it disfiguring the building. Of course I am sensibly alive to the fact that such pipes may often be made to improve the elevation, but that they are always so treated I will not attempt to prove to this Association. So ugly are they at times that one fancies they must lower the value of the property on which they are fixed. I have had some photographs taken of a few such, and will show some upon the screen. They are to be seen here, there and everywhere in hideous fashions, being fixed neither vertically nor horizontally, nor in any pleasing line, crossing chimney-breasts, coming out over stringings, cornices, roof gutters and parapets, going up to the roof over all the obstacles of their course victorious.

Then often no attempt is taken to disguise their purpose. Branches from water-closets are brought out, and carried along on the face of the wall to the main pipe; whereas a little alteration of the water-closet apartment, or a little shifting of the water-closet, or a little graceful bending of the main pipe, or a dexterous treatment of the branches, and they could have been brought through the wall, and soldered to the back of the pipe, where they would never be seen. The poor arrangement now shown is a photograph of such a pipe, showing its ugly advertising water-closet branch as recently fixed on the face of a house in one of the best streets in the medical world. I will now show you a stack where the branches are brought in at the back of the pipe, and though it was fixed ten years ago you will see how well it stands and how well it looks—the photograph of this was only taken the other day.

Now as to the material of which soil-pipes should consist. For my own house, though I were as rich as Croesus, I should be content with lead pipe, and I should prefer it to any other kind of pipe that I know. I should be satisfied that the pipe was more wholesome than iron, being easier cleaned and more durable, being less corrosive, and that its wiped soldered joints could be more relied upon than even the caulked lead joints of cast-iron pipe, and remembering that they are much fewer in number, there being at least two more joints with iron pipe than with lead in every closet branch. In fact, when the main pipe is of iron and the branches of lead there would be four joints to every junction, as shown, for the London County Council rightly enough require such connections to be made with a brass ferrule, as shown, on the face of the external wall. But whether the branch be of lead or iron the joint with the iron junction should never be allowed to come into the wall, as shown in the next photograph. Then, with iron pipe there would also be more joints on the main pipe, lead pipe being made in 10-foot or 12-foot lengths to suit circumstances, and the iron pipe as generally used in 6-foot lengths.

Then the character of lead pipe compels the plumber to connect the ends neatly and nicely together, if he is to make a well-wiped soldered joint upon them, and with such yielding material as lead he has no difficulty in doing this, for he can bend or boss or alter either end at will, and rasp them to a great nicety; whereas, with a rigid spigot or socket end of a cast-iron pipe, what can he do when the two pipes do not come together in true correspondence in their interior surfaces, or when he has been a little out in his measurements? The pipe may be a little too long or too short, but he cannot alter the socket, nor can he tamper with the spigot without destroying the bead or shoulder which is to keep the caulking material



from getting into the interior of the pipe. Indeed, he may aggravate the case in caulking in the lead by shifting the upper pipe away from its true bore with the lower pipe, and so leave a shoulder inside for matters to catch and collect upon. At any rate, such connections often afford places for particles of filth to accumulate in, and though this may not mean much in one joint, in the aggregate—in the tens of thousands of joints—if all the soil-pipes of a large town or city were of iron, it would mean something. I mean that a stack of iron soil-pipe with several water-closets upon it would not be so free from smell as it would be if it were of lead with precisely similar closets and water flushing.

In my house in Newcastle Street there is a stack of 4-inch soldered seam lead soil-pipe which was fixed more than a century ago, and I see no reason why it should not last as long again. It is made of cast sheet lead about  $\frac{1}{4}$  inch thick, and for you to see its present condition I have had two pieces cut out of its lower part and photographed. The piece showing its exterior is splashed over with the many whitewashings given to the cellar during the century, but as you see, the pipe is quite sound and good, and fairly clean in its interior, as shown by the other piece. A Bramah closet, similar to the one shown earlier in the evening, discharged into it on the second floor, and was, I expect, in daily use for three-quarters of a century, when it was changed, together with its D-trap, for a "Vortex" closet, since when it has only been in use six days out of seven. It is interesting to know that the apartment, though well lighted, has only a borrowed light, viz. through a glazed fan-light and semi-glazed door, both of which open into the staircase for access and ventilation, just under a well-ventilated lantern light.

But we all know how well lead pipe stands the London atmosphere. I will show you a photograph of a lead R.W. head and pipe which was fixed on the old dining-hall of Staple Inn in 1655, and also of another head and stack which was fixed on the Chambers in the same Inn in 1729, both being in very good condition to-day. I will also show you a photograph of a stack of lead soil-pipe fixed in 1881, and that of another fixed in 1888, both being straight and good to-day and showing no sign of deterioration.

To prevent sagging and "telescoping," lead soil-pipes should be well supported about every 5 feet with a pair of tacks, and the strength of the pipe should be equal to sheet lead weighing 8 lbs. to the superficial foot.

For every unsound soldered joint on lead soil-pipe I should expect to find a thousand unsound cement joints in cast-iron pipe, and even when a joint is made with great care in iron pipe after a time it is liable to breakage by the expansion and contraction of the pipes as shown. The pipe generally used is of insufficient strength and is liable to fracture like that shown, which also shows a defective joint with its fellow pipe and with that of the drain.

But I have no desire to unfairly decry iron soil-pipe, especially when such pipes are of good strength ( $\frac{1}{4}$ -inch metal for outside situations), and the joints are well and carefully made with blue lead or Spence's metal. In fact where hot-water is discharged into a soil-pipe, lead pipe with soldered joints would not stand the continual strain of expansion and contraction, and therefore iron pipe would be much preferable in such cases. But, in my opinion, hot-water ought never to be discharged into soil-pipes; their temperature should never be so raised. I know well enough that in America not only are the baths and lavatories discharged into soil-pipes, but also the sinks; but we can afford to treat plumbers' work more sanitarily; we can carry the waste-pipes from such fittings through the open air and discharge them into intercepting-traps, for we are not subject to such severe frosts.

All soil-pipes, no matter of what material they are made, should be carried up at least full-bore to the highest parts of the roof, where the air coming out of them would have no chance of getting into the house, and where the wind from any point would blow over them to carry the bad air away. I think it is only right to say that this matter is now much more considered by the authorities than used to be the case, but I am going to show you directly a few instances of bad treatment where the pipes have been recently fixed, some even this year. The photographs will be sufficiently graphic to need no words of mine to point out the evils. It will readily be seen how the emanations of soil-pipes and drain ventilation-pipes can contaminate the cistern-water or enter a house through its windows or chimneys; and how even though the people of one house may be friendly and neighbourly enough on the lower part of their houses, they are not really so in the upper part, the air from the soil-pipe of one house being allowed to enter the window of the other house and poison the air within, as shown in the illustration.

Now, as to the size of a soil-pipe. Before determining the size of the pipe, it is important to know what it has to do. In addition to its work of carrying away the discharges of a tier of water-closets, it has also to act as a ventilator to the drain, it ought not to be less than 4 inches. And if no syphonic action is to take place in it, that is if no anti-syphonage pipe is fixed

to its trapped branches, it should be of larger bore still—5-inch or 6-inch pipe. And even this size would not be large enough to prevent syphonage when the air had to come down a long length of piping, as in the case of a very high building, unless its upper part—the ventilation pipe—was of a bore still larger, for the air to pass down the pipe free from friction and in a body sufficiently large to prevent a vacuum.

When no anti-syphonage pipe is fixed, and the main soil-pipe is only  $\frac{3}{4}$ -inch or 4-inch bore, it is of paramount importance that only water-closets which have special traps should be fixed, which means a deeper seal and a larger body of water. Now, except in the case of valve-closets, as we have already seen, the water-seal of a closet is in open contact with the air in the soil-pipe and the drain, and where the closet is not in constant use the water held in its trap would become tainted and surcharged with gases. It is, therefore, important that the whole of this water should be changed every time the closet is used, and I confess that I do not see how this is to be done satisfactorily with a two-gallon flush, if the water-seal of the closet-trap is to be of a depth great enough to withstand the action of syphonage without the aid of an anti-syphonage pipe, and the closet is to be left with its full water-seal.

Moreover, without anti-syphonage pipes there would be no ventilation of the closet branches, no matter how long they might be. In fact, such branches would be like inverted bottles, for there would be no escape for the gases in them, except by diffusion or by passing through the water-seals of the closet to the house.

To show the power of such pent-up gases I have had a lantern slide made of a photograph which I had taken the other day of the interior part of a piece of lead pipe which was branched into a stack of soil-pipe about fifteen years ago. As you see the lower half, which carried off the matters sent into it, is practically intact; but the upper half, the part exposed to the gases and vapour, is eaten through in many places. The main soil-pipe on which it was fixed was open full bore to the air about 50 feet above it, and for a few years it was trapped off from an old drain with which it was connected, when it was reconnected without a trap to a system of drains which had several other open soil-pipes upon it for ventilation. The piece of lead water main shown in the photograph has nothing to do with it. It is, as you see, quite perfect, though it is supposed to have been in use at Hampton Court Palace 350 years. It will be found with an anti-syphonage pipe of 2-inch bore that a  $\frac{3}{4}$ -inch or 4-inch soil-pipe will answer very well for a tier of many closets, except in the case of very high buildings. And as the London County Council allow nothing smaller than  $\frac{3}{4}$  inches and require 4 inches when it is connected with a 4-inch drain, I say nothing about smaller sizes.

I have no time to add much to what has already been said or implied on ventilation. The ocean of air surrounding every house ought not to make it too difficult to give full and free ventilation to every soil-pipe, waste-pipe and drain, and in such a manner that no air coming out of either outlet or inlet of the system should enter the house or be breathed before it has been well broken up and purified.

When many stacks of soil-pipe are directly connected to one large system of drains, having only one low-level inlet upon it, viz. at its "disconnection chamber," with the sewer, the several stacks will not have such currents of air in them as they would if each drain into which each stack discharged had its own independent inlet, especially when all the stacks are of equal height, and the air in them is about equipoised, though there is generally some different influence acting on one pipe more than another, difference of temperature, wind or weather. When no such influence exists the vapour will at times go up and down the pipes for hours together in a sort of seesaw movement. Backwards and forwards in the dark drains the injurious microbes may move, playing a sort of hide-and-seek; for I know little of their behaviour and less of their habit, except that I believe that light is not conducive to their longevity, and that fresh air annihilates them. But I must mind what I say, for are we all not made up of microbes? So I say no more on ventilation, except to remind you that, like money, there can rarely be too much of it where it is most needed. I have had some photographs taken of badly-positioned ventilating terminals from soil-pipes and drains, and will show them upon the screen, pouring their emanations into windows, cisterns, chimneys, &c.

Knowing that our time to-night would be too short to cover the whole field of sanitary plumber's work, I thought it better to pretty closely survey the parts looked at rather than give a galloping glance over the whole area. I shall therefore only call your attention to but one or two matters more.

The by-laws of certain district councils require the waste-pipe from every bath, sink or lavatory, the overflow pipe from any cistern and from every safe under any bath or water-closet, and every pipe for carrying off waste water, shall be taken through an external wall and discharge in the open air over a channel leading to a trapped gulley grating at least 18 inches distant; that is, such authorities prefer insanitary methods to



sanitary ones, for such treatment is sure to lead to a nuisance in some such way as shown by the slides taken from two original photographs.

Soap-suds and bits of soap will generally be found decomposing and throwing off bad air, and often bits of paper, orange peel, hair and the like will also be there, blocking up the grating, offending the eye and needing almost daily attention to keep clean. The ground, too, surrounding such gullies will often be found to be quite sodden with splashings and overflows. Whereas with such waste-pipes made to discharge into self-cleansing intercepting traps just under the grating no mess would be made, and no attention needed to keep the surroundings clean. And when such waste-pipes were properly trapped and ventilated, their air disconnection would be all that could be desired. I will show the two methods.

No doubt some years ago there was a reason for keeping the discharging ends of the waste-pipes well above a gully when the latter was generally a little cesspool in itself, and when waste-pipes were often fixed without traps, in which condition they acted as ventilators to the house. But no such reason exists now that self-cleansing intercepting traps are generally fixed, and that the waste-pipes are trapped. And yet only the other day a Board surveyor, against his own judgment, caused some waste-pipes to be altered because they delivered under the grating of a drain-interceptor instead of over it; that, too, notwithstanding the fact that each waste-pipe was trapped. A soil-pipe may discharge directly into a drain which may have no air disconnection within several hundred feet of the soil-pipe, although there be but the water-seal of the closet trap between the drain and the house; but for a waste-pipe to have its air-disconnection under a grating—oh, blissful ignorance.

No sink, bath, lavatory or other fixture through which dirty water may be emptied should be fixed without a trap of a self-cleansing kind, and one that will, when properly ventilated, retain an efficient seal, no matter how large the body of water may be which is sent through it. And to prevent the discharges of one fixture backwashing up into the waste-pipe of another and fouling it, each fixture should have its own separate trap, which should be situated as close to it as practicable, so that the piece of outlet pipe, standing between the house and the seal of the trap, may be as short as possible. I have so good an example of the very reverse of this that I have had it photographed for you to see. It is a 9-inch D, with no less than seven waste-pipes connected with it. Less than a year ago it was doing duty in one of the greatest university colleges of the country, receiving, as it did, the waste-pipe from a cistern, a bath, a drip-sink, a lavatory, a bath safe and other pipes.

As only a very short length of unventilated waste-pipe is sufficient to cause syphonage, the upper ends of such pipes as well as their discharging ends should be carried through the external walls to the open air. To show how small a fall suffices for this, I have here a little lavatory with 1½-inch syphon-trap and a short length of 1½-inch waste-pipe, with its discharging end standing only a little below the bottom of the lavatory trap, and yet the drop is sufficient to set up syphonage and to leave the trap practically unsealed with but a small discharge from the basin.

I was staying at an hotel in Germany last year, and noticing a horrible smell in a lavatory more than once, I searched out its cause and found that the lavatory trap was most easily syphoned, in a similar manner to that just demonstrated; for although it was connected with a soil-pipe, the latter was about 7-inch bore and could not, therefore, have caused the syphonage. It arose from its own unventilated waste-pipe.

Opening up the upper end of a waste-pipe to the air not only prevents syphonage, it also ventilates the pipe and keeps it wholesome. Where more than one trap is connected to a waste-pipe, through which quick discharges may pass, it is not sufficient for the upper end of the main pipe to be carried through full bore to the open air to prevent syphonage; each individual trap must be ventilated—must have an anti-syphonage pipe, in fact.

I think most authorities are now alive to the value of providing quick discharging arrangements to baths, sinks and lavatories, though only the other day I came across a small washhand-basin which took nearly one minute to empty. A 5-feet 6-inch bath ought to empty under two minutes, and where it would be in daily use, and was situated near the head of the drain, as the chief means of flushing it, it might be made to empty in one minute, a 3-inch waste valve being fixed to the bath for the purpose, and the trap and waste-pipe of equal bore.

I have no time to say more than a word or two on drains. When circumstances require a soil-drain to be fixed inside a house or outside it, where a leakage from it would find its way into the house or under the footings, I should strongly prefer it to be of cast-iron, with caulked lead joints, rather than of stoneware—whatever kind of joint may be adopted—the thickness of the cast-iron pipe being not less than ¾ inch in its thinnest part for 4-inch or 5-inch drains, and greater still for larger drains.

I know that some authorities still prefer stoneware drains to iron, even for fixing inside a house. I had an argument with

one only last year, but "a man convinced against his will is of the same opinion still." I think it would be almost impossible to find anywhere a stoneware drain of any great length inside a house absolutely water-tight from end to end which has been in use for, say, fifteen years. Even when every precaution has been taken and a stoneware drain has been very carefully laid and its joints specially made, one could not be certain how long it would remain perfect. After many years of existence there may only be a slight leakage in it, but if that occurs inside a house it will be sufficient to create great unrest in the minds of sensitive inhabitants, even if no illnesses arise from it. And the misfortune in such cases is that such leakage or leakages are generally difficult to repair, and are practically impossible of repair without danger of doing further injury to the drain.

I have just had a cast-iron soil-drain examined which was fixed inside a house in the City twenty-six or twenty-seven years ago by my firm. The pipe is of water-main strength, and is suspended from the ceiling joists in the basement. Both the pipe and the caulked lead joints were found in excellent condition, nothing having been done to them from the time they were executed, except that in whitewashing the basement the drain had also been whitewashed from time to time.

In 1881 I had some manholes built in brick and cement on the first floor of my offices as examples, together with some sanitary fittings and a specimen length of iron drain. I had a photograph taken of certain parts before their removal last year, and you will see that the iron pipe and the caulked lead joints are quite good and show no signs of wear, though they were experimented with for fifteen years. Also you will see from the same photograph, that though apparently no action has taken place between the lead and the Portland cement which connected a piece of lead soil-pipe to the stoneware drain, the cement joint shows that there was no real adhesion of the cement to the glaze of the stoneware socket, and this accounts for the leakage which quickly showed itself when tested with water.

Notwithstanding that many authorities require that even cast-iron drains should be embedded in concrete, I consider such treatment a wicked waste of money, for with a pipe of proper strength all the support it needs is from its under-side, except in very exceptional cases, and this is best done by brick piers built on concrete bases, with a stone or concrete resting slab for the pipe to nicely fit in, or by making a continuous bed for the drain in Portland cement concrete. This arrangement readily admits of the removal of the earth surrounding the drains and the joints, for any future examination of the pipe, and for recaulking of the joints when necessary. When such drains are encased in concrete, the cost of cutting away the concrete to find out a leakage or to get at the joints would lead to great expense and do damage to the drain.

Where practicable, instead of laying an iron drain in the ground, where it is inside a house, it is better that it should be carried on the face of some wall, or be suspended from a floor, or be carried in a subway, or have a tunnel or creeping trench specially built for it, in brick and cement, with openings into it only from the external air, so that the drain may be readily examined, and in the latter case be completely isolated from the house.

The many improvements in sanitary plumbers' work which I have brought before you to-night, or to which I have alluded, as well as many others which I have had no time even to mention, have almost entirely been made during the latter half of the long and magnificent reign of Her Majesty, whose Diamond Jubilee we are going to so gloriously celebrate next month. And when dipping my pen into the ink-bottle to write the finishing words of this paper, it occurred to me that instead of attempting any kind of peroration, the better thing to do would be to drop the pen for the pencil, and portray in a sort of transformation piece the progress of plumbers' work between 1837 and 1897.

Before showing this set-piece, which my draughtsman has so well got out, I should like to remind you of the great power you possess for raising and maintaining the standard of plumbers' work. Other authorities may desire it, may even expect it, but architects, from their privileged position as advisers, and as the designers and directors of building works, can demand it—can to a large extent secure it—by providing for it in their specifications, and by being prepared to properly pay for it. And though plumbers may not everywhere throughout the country be equal to the demand for very high-class work, they will be much stimulated by the desire of architects for such work. At any rate, more than any other class, more even than medical men—who have so nobly and so disinterestedly done so much for the craft, for sanitation—can the architect aid the plumber in making our homes healthy to live in.

When the handworker—greatly interested in his work—produces with skill and intelligence what was required of him, what was portrayed to him by the headworker, he is ever so much helped by some appreciative acknowledgment, however slight; and a word of praise to the deserving—how good it is. Like mercy, it is twice blessed. Gentlemen, in your works may it be your privilege to make the workers happy in their work.



## AMERICAN COUNTRY HOMES.

EVERYTHING in nature seeks in its environment, says Mr. H. Neill Wilson in the *Engineering Magazine*, the shelter or home that is individually its own. From the snail carrying her habitation upon her back to the fowls of the air; from the mole and rabbits burrowing under the earth to the larger animals seeking their lairs in mountain fastnesses—the creature is led by instinct to find for itself an abiding place and to build or select that shelter which is adapted to the needs of the life to be lived therein.

Only man, the highest form of animal life, has, from age to age, changed the form of his habitation, and it is curious to note, in reviewing the past, the evolution of the home. Progress in every form has pushed us from the rude shelter of tents and boughs, log cabins and huts of mud and wood, to the lofty buildings that to-day tower in the Metropolis and fill many of us with apprehension as we gaze upward, optical illusion leading us to see them apparently swaying in space, threatening death and destruction to all beneath.

It has been left to America to illustrate in domestic architecture, in infinite variety, the uses of wood in house-building. One of the first impressions made upon a foreigner is this multiformity in the wooden construction of the dwelling-houses of America. Nearly every order of architecture has been reproduced in wood, to the bewilderment of men who have studied their profession in countries where stone and brick are universally used in building.

America, if it did not inaugurate, may be said at least to have amply exemplified the wooden age in architecture. Criticism in regard to this prevailing use of wood varies with the nationality of the critic. If he be English or Scotch, he is appalled by the apparent lack of stability. The Frenchman is amused at the ornate nature of the ambitious reproductions in wood of that which he conceives should be built only in stone. Germany is more lenient towards American peculiarities, owing to having long been well versed in the adaptability of wood in architecture, and also owing to the German temperament which is endowed with a commendable degree of toleration and a great spirit of criticism, the result of which is seldom given unsought.

The reign of wood, however, is gradually being superseded, even in the United States, and the Stone Age in architecture is advancing with remarkable celerity. In the not far distant future the new continent may even gratify that most severe critic, Mr. Ruskin, and boast of and luxuriate in its ruins. Should fire, storm or earthquake visit Biltmore to-day, the much-admired result would be obtained, and time, which moulds and softens every outline, would soon produce the imperfect and consequently the picturesque which Mr. Hopkinson Smith declares so necessary to the landscape. "It is only," says he, "when the hand of man smirches the face of nature that we really find the picturesque."

Probably no locality is more famed for its summer or country homes than Berkshire county, Massachusetts, and a few illustrations will show better than the most extended critical comment what study and thought have been expended and what results accomplished. Lenox, Stockbridge, Great Barrington, Williamstown, Pittsfield and Dalton are represented; yet there are so many others that are worthy that one must resort to that very charming and healthful recreation and go a-coaching or a-wheeling through the Berkshires to obtain an adequate idea of its beautiful and charming country homes.

Probably there is no more encouraging sign, in these times of advancement and prosperity, than the desire for information upon and understanding of the arts and sciences, and the study devoted to them. Many people are to-day interested in and labouring for the institutions that help toward better things. In the United States, museums, libraries and galleries are slowly but continually growing, and the advancement is just as surely being developed to the welfare of all. The results of this great movement are seen on all sides, and what is more natural and logical than that those so active and instrumental in creating and in maintaining these beautiful influences should themselves dwell in houses that are examples of cultivation and refinement? When one reads the criticisms on public and commercial and on ecclesiastical designs and results, and recognises their justice and force, the task of writing upon domestic architecture becomes a difficult and hazardous one. For if a home expressing the sentiment, taste and refinement of its inmates be not beyond the intrusion of the critic and scoffer, where may we look for seclusion, freedom and relaxation? The difficulties surrounding the designer of a country house are so numerous and insinuating, and so hard to overcome, that many good things are harmed, and the best intentions diverted through sheer discouragement. A design in harmony with the surroundings, and in some degree adapted to the needs and requirements of the occupants, is submitted to the criticism of friends and relatives "who have had great experience in building," and then the mischief begins to develop. Their suggestions, made in all sincerity and honesty, yet without understanding the

situation or object of the design, frequently destroy the scheme of the architect, and the whole is ruined from his point of view, and the spirit departeth from the house. When the architect receives the degree of confidence and reliance shown the legal or the medical adviser, "then shall his sins be upon him." But so long as "we made the plans ourselves, and only got Mr. Blank to draw them out," then should their sins be upon them. One of the first inquiries made when a client explains his wants is, What style or character of a house do you wish? Colonial is popular and frequently desired, and naturally the question arises, What is Colonial? Is it an effort to repeat from memory and without skilled or professional assistance the continental or Adam Brothers style, as so many examples in the southern States and the old manor-houses of the northern would indicate, or is it the low-hipped and gabled style of New England, so attractive in its simplicity and quiet? And here is an opportunity to say a few words upon this problem of the owner's right to build as seemeth best to him and for his own pleasure and comfort, rather than to satisfy the critic or tourist who chances that way. Whom should the architect and landscape gardener first consider? Whom please? and why? Will someone more enlightened give the answer, and thus relieve the minds of many now labouring under the weight of uncertainty and doubt? Another not unusual experience is that the needs and requirements of a family change frequently and radically, and what was at one time the ideal for comfort, convenience and utility becomes insufficient for the needs of the household. This may lead to disappointment and to criticism; but who may see and provide against such emergencies?

Some difficulties are encountered in Berkshire that are not met with in the southern or coast climates, and, after experience, the architect learns to discard many of the features that are so attractive in less severe regions. The middle south, about the vicinity of Cincinnati and St. Louis and similarly situated cities, for instance, permits of treatment that is entirely unsatisfactory in Berkshire, and still greater liberty may be indulged in the cities of Savannah and Charleston, and locations corresponding to them in environment and climate.

The north-west, on the other hand—Minneapolis and St. Paul being typical examples—is more like Berkshire than any other section in its climatic conditions. The severe cold and the curious and damaging results produced by the formation of ice on the shady portions of the roof while the snow melts on its sunny slopes, have taught house-owners and architects many lessons that are not readily forgotten. Yet who, having lived in Berkshire long enough to enjoy her people and her hospitality, has been quite satisfied to leave it? It seems a country so full of beauty, strength and nobility in her landscape that one wonders how any one can live in it and not be generous, strong and true. Nowhere can be seen so many exponents of different styles of architecture, and some, no doubt, deserve severe architectural criticism. But, thanks to the wondrous hills and forests, every outline softens into an effect that gratifies the eye, even while it may sometimes offend the taste of the witness of truth in art. Truly Berkshire, with her inspiration to elevate the standard of the homes of America, need not be ashamed of the results thus far accomplished, and happy is the man called by his profession to add his conception of truth and beauty to its charm, and happier still he who may own, be it a castle or cottage, a home in Berkshire.

## TESSERÆ.

## Flaxman's Sculpture.

THE most distinguished proof of Flaxman's powers in heroic composition, and the strongest mark of his genius may be discovered in the colossal group of "St. Michael subduing Satan," now in the gallery at Petworth, an attempt as successful as daring in columnar grouping, and which affords an example of the difficulties imposed not only by material, but by the nature of the subject, being overcome without a recourse to adventitious aid, by which the eye or mind might be diverted from the impression proposed, and is strictly within the limits enjoined by sculpture. It is, indeed, a work not less skilful in the arrangement of its composition than great in its conception. The archangel is produced in the spirit of the art itself, his countenance denoting a generous indignation tempered by angelic nature. There is an ardour and energy revolving around him which might be supposed to influence him in the execution of his Divine mission; we want no type or wings, but at once admit his presence. The character of the whole is finely marked, and possesses in the choice and structure of form, and in the unity of expression and action, all the ideal qualities appropriate to the exalted subject. In the personification of Satan he has been not less successful. Half monster and half man, with all the characteristics of mighty stature and Titanic strength, in the malignant subtlety and inflexibility of purpose, in expression, and in the writhing



action of the demon, we see him evidently withheld by the presence of a Divine power, in which he is no longer able to sustain himself. In alto or basso-relievo, Flaxman, since the revival of the art, stood pre-eminent. The illustrations from the Lord's Prayer are fine examples of his talents in the simple and natural, whilst the heroic is powerfully displayed in the unrivalled composition of the shield of Achilles. If examined as compositions by the test of analysis or separation, they will bear the strictest scrutiny; if contemplated for the character each bears to the subject, we would not desire more perfect harmony. If regarded for form, grace and the taste which pervade the whole, we may pronounce it a work worthy to be ranked with the distinguished discoveries at Dodona.

### French Medals.

Next to Italy, France is the most remarkable country for medals. Louis XIV. is celebrated for his encouragement of the fine arts; he founded L'Académie des Inscriptions for the purpose of selecting subjects and making designs for medals to commemorate the great events of his reign. The result of the labours of the Academy was the production of nearly 300 medals. The style of art exhibited in these was in accordance with the taste of the period—it wants simplicity. Landscapes and a variety of emblems are crowded together in the backgrounds for the purpose of giving a picturesque effect, which is injurious, the resources of the art being limited in comparison with those of painting. What Flaxman remarks of the limited powers of basso-relievo is particularly applicable to medals, "that a tree or two, some rude stone or a wall slightly marked in the background must indicate a forest, a mountain or a palace without detailing a portrait of their component parts." Napoleon well understood the moral and political influence of the fine arts; his series of 160 medals is an evidence of the care and attention he bestowed upon the Mint, and these imperishable memorials will give immortality to his extraordinary career. They were executed under the direction of Denon. On the obverse of all of them we have the fine profile of Napoleon, and many of the reverses are admirable works of art. The Battle of Jena, Jupiter launching his thunder against the Titans, Mars sheathing his sword after the Battle of Friedland, Napoleon personifying Hercules, with two female figures kneeling and presenting him with the keys of Vienna and Presburg, may be mentioned as examples; but, for the most part, they rather astonish us with a display of mechanical execution. The large medal of the Battle of Marengo is surprising for the minuteness of the workmanship, and the medal of Pope Pius VII., in the coronation of Napoleon, is also remarkable for the execution of the building of Notre-Dame on the reverse. Andrieu, Galle, Droz and Brenet were some of the most celebrated artists employed. But the Napoleon medals are not always implicitly to be relied on by the historian. For example, Bonaparte caused a medal to be struck as a memorial of his invasion of this country. On the obverse, as usual, is the head of the Emperor, and the reverse represents Hercules strangling a marine monster. Around is the legend "Descente en Angleterre," and in the exergue "Frappée à Londres." Happily for us this was struck in anticipation only, and was not issued from our Mint. The medal was afterwards destroyed; some few specimens, however, were rescued.

### An Egyptian Feast.

It was a custom of the Egyptians during or, according to Herodotus, after their repasts to introduce a wooden image of Osiris, from 1½ to 3 feet in height, in the form of a human mummy standing erect, as Plutarch informs us, in a case or lying on a bier, and to show it to each of the guests, warning him of his mortality and of the transitory nature of human pleasures. He was reminded that some day he would be like that figure, that men ought "to love one another and avoid those evils which tend to make them consider life too long, when in reality it is too short," and while enjoying the blessings of this world to bear in mind that their existence was precarious, and that death, which all ought to be prepared to meet, must eventually close their earthly career. Perverted by the Greeks, this warning of the temporary pilgrimage of man served as an inducement to enjoy the pleasures of life while in this world, as if death closed the scene and no prospect was held out of a future existence, a notion directly at variance with the maxims of the Egyptians and the constant mindfulness they were exhorted to cherish of a hereafter, and we find that the Greeks advocated the principle "Live while you may" with unblushing earnestness. The beauties of poetry were summoned to assist in its recommendation, and every lover of excess welcomed and adopted it with sentiments evincing the same spirit as the exhortation of Trimalchio, which is thus given by Petronius:—"To us, who were drinking and admiring the splendour of the entertainment, a silver model of a man was brought by a servant so contrived that its joints and movable vertebrae could be bent in any direction. After it had been produced

upon the table two or three times, and had been made by means of springs to assume different attitudes, Trimalchio exclaimed, 'Alas, unhappy lot, how truly man is naught! similar to this shall we all be when death has carried us away; therefore, while we are allowed to live, let us live well.' The same sentiments were used by the Jews in the time of Solomon." The intent, however, of this custom with the Egyptians was widely different, and even if from long habit and the increase of luxurious manners the good warning it was intended to convey was disregarded or failed in its effect, still the original intention was good and cannot in justice be condemned as tending to immorality; and though Herodotus, who merely says that the guests were requested to "observe that man whom they would all resemble after death," and were exhorted "to drink and enjoy themselves," omits to inform us if it intended to convey a moral lesson, Plutarch expressly asserts this and removes all doubt respecting the object they had in view. The idea of death among the ancients was less revolting than among Europeans and others at the present day, and so little did the Egyptians object to have it brought before them that they even introduced the mummy of a deceased relative at their parties and placed it at the table as one of the guests, a fact which is recorded by Lucian in his "Essay on Grief," and of which he declares himself to have been an eye-witness. After dinner, music and singing were resumed, men and women performed feats of agility, swinging each other round by the hand or throwing up and catching the ball, and the numerous tricks of jugglers, both in the house and out of doors, were introduced to amuse the company.

### Mediæval Vaulting.

Very few Greek or Roman architects have carried technical ability and a strictly correct calculation of the proportions between strength and burthen beyond the master masons by whom churches in the fourteenth century were built. The vaults of several of the larger dimensions are only from 9 to 10 inches thick, and the outer walls, though more than 50 feet high, do not exceed 2 feet in thickness at their summit. The equally clustered pillar, with a comparatively low and sharp arch, prevailed in the first part of the reign of Edward III., over which was placed an open arcade as originally introduced into the Norman churches, and was adopted, as far as the idea only, from them. Of the beauties which characterise the style of this era in particular, a complete specimen offers itself in the octagonal louvre at Ely, which, and the chapel of our Lady attached to the cathedral, were the sole design of Alan de Walsingham, and executed by himself between the years 1322 and 1349. It is certain that architecture was understood and encouraged by ecclesiastics in that age, and it is pleasing to rescue the name of a single practical architect, so eminently superior to others of his own time. Whilst those who designed and completed the great churches on the Continent are recorded scrupulously respecting their talents and works, our own, not greatly inferior to them, are rarely to be ascertained.

### Robert Burns's Experiment in Building.

The poet undertook, for a sum not exceeding 300*l.*, to build a complete farm onstead at Ellisland, on the south side of the Nith, some six miles above Dumfries, consisting of a dwelling-house, barn, byre, stable and sheds, and to permit the proprietor to plant with forest trees the scaur or precipitous bank along the side of the Nith, and a belt of ground towards Friars-Carse, of not more than two acres, in order to shelter the farm from the sweep of the north-west wind. The poet was now a busy and a happy man. He had houses to build and grounds to enclose; that he might be near both he sought shelter in a low smoky hovel on the skirts of his farm. There he was to be found by all who had curiosity or taste, with a table, books and drawings before him; sometimes writing letters about the land and the people among whom he had dropped like a slung stone; sometimes giving audience to workmen who were busy dyking or digging foundations; and not unfrequently brushing up, as Mrs. Burns said, an old song for Johnson's Musical Museum. The walls of the poet's onstead began now to be visible from the north side of the Nith, and the rising structures were visited by all who were desirous of seeing how he wished to house himself. The plans were simple; the barn seemed too small for the extent of the farm, and the house for the accommodation of a large family. It contained an ample kitchen which was to serve for dining-room, a room to hold two beds, a closet to hold one, and a garret, coom-ceiled, to contain others for the female servants. One of the windows looked down the holms, another opened on the river, and the house stood so nigh the lofty bank that its afternoon shadow fell across the stream upon the opposite fields. The garden was a little way from the house, a pretty footpath led southward along the riverside, another ran northward, affording fine views of the Nith and of the groves of Friars-Carse and Dalswinton; while half-way down the steep declivity a fine, clear, cool spring supplied water to the household. The situation was picturesque, and at the same time convenient for the purposes



of the farm. During the progress of the work Burns was often to be found walking among the men, urging them on, and eyeing with an anxious look the tedious process of uniting lime and stone. On laying the foundation he took off his hat and asked a blessing on the home which was to shelter his household gods. On being asked whether Burns did not put forth his hand and help them in the progress of the work, one of the workmen said:—"Ay, that he did mony a time. If he saw us like to be beat wi' a big stane he would cry, 'Bide a wee!' and come rinnin'. We soon found out when he put to his hand—he beat a' I ever met for a dour lift." When the walls rose as high as the window-heads he sent a note into Dumfries ordering wood for the interior lintels. Twenty carpenters flocked round the messenger, all eager to look at the poet's handwriting. In such touches the country is well expressed.

### WANTAGE CHURCH.

**A**BOUT twenty of the members of the Oxford Archaeological Society paid a visit to Wantage on the 25th ult. They were met at the parish church by the vicar, who explained that Wantage parish church dated from the thirteenth century and was probably designed a cruciform church without aisles, the aisles having been added later. The earliest part was the tower, and next oldest portion was probably the chantry on the north side. He called attention to the beautiful fifteenth-century roof of the nave and also to the several old brasses in the church, the oldest being to "Master William Ledding," once vicar of the parish. The tomb of Sir Wm. FitzWarine in the chancel was very old and interesting. The church was restored by Mr. Street and reopened in 1857, and sixteen years ago the church was enlarged by the addition of one bay. The chapel on the south side was restored, decorated and reopened in 1895 as a memorial to the late Dean of Lincoln, who was for thirty-four years vicar of the parish. The architect was Mr. Bodley.

Mr. James Parker, in giving a short history of the church, said it was exactly twenty-five years ago that the Society visited Wantage, when he had the honour of giving them a short address. Having alluded to Wantage as the birthplace of King Alfred, who was born in 849, and who devised several pieces of land in and near Wantage to his wife, he said he thought it probable that the great ruler did build a small chapel or church, though it was not recorded. In the Domesday Book 1085-86, a church was definitely mentioned at Wantage. At one time another church was standing in the churchyard at Wantage, but how long it existed he did not know. There was an old Norman doorway which, when the building was pulled down, was removed to the present Grammar School, where it still remains. He suggested that the smaller church not being large enough for the inhabitants was probably pulled down in the thirteenth century, and instead of enlarging it they built another. He called attention to the massive pillars of the tower arches. He thought the church was enlarged about the time of Edward I. The church, which was originally cruciform in shape, had aisles added to it, and he pointed out the staircase to the belfry on the south side, which was probably built on the outside. The moulding being of different dates showed that the enlargement was not all done at the same time. The work of the fifteenth century was to add the clerestory windows, which would give a better light to the church. The chancel had been considerably enlarged, the character being now rather nineteenth-century although it was originally fifteenth. There was some interesting work of the fifteenth century in the north chapel. The tomb in the chancel seemed to be of one date, while the figure on it was of another date, but judging from the armour it probably belonged to Sir Wm. FitzWarine. He mentioned that lords of the manor did not think their estate complete without a proper church, and that was the reason they had so many beautiful churches throughout the land.

The party then took a walk around the interior and exterior of the church, inspecting the various points of interest, which were described by Mr. Parker.

Afterwards they drove to Childrey and Sparsholt, visiting each church, and then to the ancient "Blowing Stone" familiar to the readers of "Tom Brown's School Days." White Horse Hill was next ascended, and the ancient Roman camp known as Uffington Castle was inspected and a magnificent view obtained from the hill. Several of the party walked a mile further along the Ridgeway to "Wayland Smith's Cave," a well-known cromlech, and mentioned in Sir Water Scott's "Kenilworth."

Uffington Church was next visited, and the octagonal embattled tower and many points of interest in the church were examined.

**The Conservatoire** in Paris, or at least the part to which the public is admitted, will have to be rebuilt at the close of the present year, owing to its dangerous condition.



### The Association Sketch Book.

**SIR,**—In your notice of the second volume of the third series of the Architectural Association Sketch Book I think you do the editors an injustice. I plead guilty to the oversight of inserting Mr. Andrew Oliver's name amongst the contributors as the author, but we cannot claim to be so entirely innocent as you would make us believe. The Sketch Book does not publish any text with the illustrations, and the information has to be condensed within very small limits.

The original pencil drawings, which were very much rubbed, were given us without any information as to what they represented. All the owner knew about them was that they were bought at a sale. It is possible they may be the original drawings prepared by M. Jules Goury, and they certainly appeared like it, but there was no evidence forthcoming that they were so, and therefore the name could not be inserted. Jones and Goury's description of how the ground for the paintings was prepared was added as being of interest, but as I could not obtain positive information as to the subjects intended to be represented I was unable to give it, and to have inserted the whole of Jones and Goury's description would have been impossible without a sheet of letterpress, and to make it complete Marmol's remarks should have been added as to the centre panel being portraits of the ten successors of Mohammed II., who added to the buildings. In the fifteenth century the room was called the Hall of the Portraits (El Cuarto de los Retratos).

Although the Sketch Book was originally composed entirely of sketches by members of the Association, the committee do not see why they should confine themselves exclusively to members of the A. A. either for subscribers or contributors, and any suitable and interesting drawings are accepted. I do not understand on what grounds your review states these plates have no right to be included; certainly decoration is a subject which should receive the attention of one who may any day be called upon to design anything from drains and iron girders to faience and goldsmiths' work.—Yours faithfully,

May 31, 1897.

WILLIAM G. B. LEWIS.

### GENERAL.

**The Salon Exhibition**—the last to be held in the Palais de l'Industrie—will be closed on the 10th inst.

**The Debate** on the reports relating to the Works Department of the London County Council on Tuesday was not brought to a conclusion, and the further consideration of the subject will be resumed on the 28th inst.

**The Foundation-stone** of the new buildings of the Royal Ophthalmic Hospital was laid on Friday last by the Prince of Wales. The building is expected to cost 100,000*l.* The joint architects, Mr. K. D. Young and Mr. Bedells, and the builder, Mr. Grover, were presented to the Prince.

**The French Government** propose to purchase for 421,000 francs the collection of Greek coins of the late M. Waddington. Ten centuries—from the seventh century B.C. to the third century A.D.—nearly all the cities of Asia Minor, and many dynasties and satrapies are represented in this valuable collection, the result of the labours of half a century.

**Mr. Story** has nearly completed the bust of the late Lord Randolph Churchill which is to be placed on the main staircase of the House of Commons, as well as the statue which is to be placed in the chapel of Blenheim Palace.

**The City Council of Toronto** have declined at present to accept the offer made on behalf of various art societies of a scheme of mural decorations for the new city buildings. Artists, selected by the societies as competent to design and execute work of the character, had, at the expense of a great deal of thought and effort, elaborated a scheme of decoration which was intended to be illustrative of the history of the city and province.

**The Royal Institute of Architects of Ireland** have made arrangements with the Royal Institute of British Architects to exhibit during the present week the following prize drawings at the School of Art Galleries, Kildare Street, viz. Royal Institute of British Architects' Silver Medal, the Soane Medallion, the Pugin Studentship, the Owen Jones Studentship, the Aldwinckle Studentship, the Grissell Medal.

**The Royal Archaeological Institute** will hold its annual meeting this year at Dorchester in the beginning of August. Dr. Cox has accepted the position of president of the Architectural Section, and proposes to take as the subject of his address, "The Treatment of the Cathedral Churches of England during the Victorian Age."



# The Architect.

## THE WEEK.

A DECISION which was given in one of the Paris courts on Saturday last will cause some commotion among French artists. Hitherto it was the custom for frame-makers to consider the painters who ordered frames for portraits as agents. Payment was accordingly sought from the people who were represented on canvas. There was no liability incurred by the artists. The public apparently recognised the custom also. But a lady recently declined to pay 450 francs for framing a portrait of herself by M. WEISS. The frame-maker, regardless of precedent, applied to the artist for the money, and when he refused to settle the account an action was brought. The Tribunal would appear to be indifferent to custom which is not supported by documentary evidence, and a decision was given in favour of the frame-maker.

THE peculiar dislike of children which animated SWIFT is one of the weaknesses to which he confesses. He could not pardon Mrs. MASHAM for attending her children instead of intriguing for the benefit of SWIFT and his friends. He was therefore not likely to allow a little child to be placed on his knee, although the boy was to be the great-grandfather of an Irish M.P. But belief is very strong in Ireland, and we wonder Mr. J. G. SWIFT MACNEILL does not make a claim on behalf of a more remote ancestor who might have sat at Marino on the knee of King BRIAN BOROHME before he slaughtered the Danes. So long as belief is allowed to have supremacy we need not wonder at the archæological freaks which are common in Ireland and by which "The Old Tree House" suddenly is changed into Dean SWIFT's old house. "The Old Tree," it is well to remember, was no more than a lofty mark to indicate a cabin which served as a public house. There are many "castles" in Ireland that have a similar architectural appearance.

It is pardonable for the people of Dublin to associate the name of JONATHAN SWIFT with houses which probably he never entered. The Dean, although compelled against his inclination to live among Dublin citizens, never posed as a native. SWIFT's life abounds in mysteries, but his connection with Dublin is the most mysterious of all. He was born, some say, at No. 7 Hoey's Court, a very poor place. Sir WALTER SCOTT says of the house:—"The antiquity of its appearance seems to indicate the truth of the tradition." If every house that looks old in Dublin could be assumed to be SWIFT's birthplace, his biographies would be more puzzling than they are. The latest attempt is to exalt a house in a different part of the city—Lower Dorset Street—as if it were the residence of the Dean. SWIFT had a big official residence adjoining his cathedral; why should so penurious a man keep an additional house so far away that he could not reach it on foot in less than an hour? Mr. J. G. SWIFT MACNEILL, M.P., claims that the house was the town residence of the SWIFTS, of Swift's Heath, County Kildare, that is, of the Dean's family, and that they also held another house known as Marino. He next says:—"Mr. GODWIN SWIFT, a great-grandfather of mine, was fond of relating that when a very little boy he was brought by his father, the Mr. SWIFT of Swift's Heath of the day, into a drawing-room and placed on a gentleman's knee, and that his father asked him always to remember that he had been on the knee of a great man. He believed that the 'great man' was Dean SWIFT, and that the drawing-room was a drawing-room at Marino."

THE efforts which are made to levy exactions on railway companies by municipalities, public companies and individuals are generally amazing. After arrangements are made to satisfy legal claims there is generally some new

necessity discovered at the last moment which is declared to be the most important of all. The North-Eastern Railway Company are having a sad experience of the sort. We have already alluded to the endeavour which was made by the Humber Conservancy Commission to have most costly works carried out in the river as if they were made indispensable by the proposed docks. The Commission so far succeeded that the committee of the House of Commons proposed the introduction of a clause to the effect that if any remedial works are required in the river within a period of ten years after the completion of the docks, "The Humber Conservancy Commissioners may themselves cause the work to be done and restore the said river to its former condition, and may recover from the company the expense to which they may have been put by such dredging and restoration." A meeting of the directors of the North-Eastern Railway was held a few days ago, at which the following resolution was adopted:—"Resolved that, in view of the very changeable character of the river Humber and the alterations that are evidently going on in the channels, as proved by recent investigations, and having regard to the fact that the proposed works, when completed, are calculated to improve and not to injure the river, the directors cannot undertake any liability with regard to the future condition of the river, except as to the removal during the construction or the completion of the works of any deposit in the vicinity of the proposed river walls or embankments, or affecting the entrance to the Alexandra Dock, which may have been caused by the works of the company during the construction thereof; resolved also that the solicitor be instructed, in the event of the clause which the committee may insert in the pursuance of their intimation, imposing any greater liability than the above, to withdraw the portion of the Bill relating to the Hull Dock Works."

THE International Congress on Technical Education will be held at the rooms of the Society of Arts and the room of the London School of Economics from Tuesday to Friday next. Among the papers to be read will be the following:—"Technical Education in Architecture and the Building Trade," by Mr. W. R. LETHABY; "Technical Education in Relation to Lithography and Engraving," by Mr. R. W. BAXTER; "Technical Education in Connection with Process Engraving and Allied Industries," by Mr. W. BOUTALL; "Technical Education in Connection with the Gold and Silver Trades," by Mr. W. AUGUSTUS STEWARD; "Technical Education in Relation to the Manufacture of Glass," by Mr. H. J. POWELL.

THE directors of the Leeds Steel Works invited the members and practising associates of the Northern Architectural Association to visit their works on June 9, to view the manufacture of steel in its various processes, from the ore to the finished girder. A large party of architects accepted the invitation. The members of the Association travelled by the train leaving Newcastle at 10 A.M. *via* Sunderland and Stockton. The Leeds Steel Works received its present title and was registered as a limited company in 1888, but previously was known as the Airedale Iron and Steel Works. Mr. WALTER SCOTT, of Newcastle-on-Tyne, has purchased from time to time the property of the other partners, and he may now be practically termed owner of the works. The company have agents in all the principal cities of the kingdom, and forward goods throughout Great Britain, to the British Colonies, South America, India, Egypt, &c. Mr. W. S. VAUGHAN, of Newcastle, is one of the directors of the company. The works cover an area of 25 acres, the yearly output is 70,000 tons of steel, and the wage roll 70,000*l.* per annum. The stocking ground is commanded by a 10-ton travelling crane, which has a span of nearly 100 feet. The sheds and yards are intersected by railway lines, on which six locomotive engines and eight steam travelling cranes are continuously at work. The electric light is in full use throughout the night.



## THE ANCIENT CHOIR.

THE important letter of the Bishop of CHESTER is likely to revive the controversy about the most eligible position in an English church for the choir and organ. In the majority of cases, owing to the desire for visual effect as well as from a belief that an ancient practice is conserved, the chancel is employed to accommodate them, but it does not always follow that the singing is thereby as impressive as is desirable. We are told that "where there is a chancel arch, central lantern, or transepts, the sound becomes intercepted instead of passing into the body of the church; moreover, where the chancel is narrow, antiphonal singing cannot produce its proper effects." It is also said "that when the placing of the choir in the chancel has involved the removal of the organ also, it has usually resulted in cramping the organ within some confined space or 'chamber,' by which the tone has been damaged and its beautiful qualities and real efficiency impaired." Musicians who consider the successful display of their art as having more importance than either the picturesque or ritualistic needs, consider that the organ should be set up at the west end of a church and the choir arranged in galleries north and south of the nave or outside the chancel screen or in chancel aisles. If the choir must have places in the chancel, then the use of a chancel arch, which is an impediment to the transmission of sound, is to be avoided. Sir WALTER PARRATT, the organist, would have the organ erected in the west end and the choir disposed halfway up the nave on each side. He considers it would be preferable for musical purposes to employ the Greek cross plan in churches, and Sir JOHN STAINER was of the same opinion. Sir WALTER adds that "music is not the only thing which would gain by a fundamental change in our ideas of 'propriety' and 'respectability' in church plans." These are mysterious words, which we confess we are unable to understand, and we suppose most people who read them will probably prefer to be guided by Sir WALTER PARRATT when he confines himself to arrangements which relate to music.

If, as is said, "in many churches congregational singing is ruined by the present arrangement," for the support and controlling power of the choir are too remote to be of any help to the congregation, there may be a change. But it will probably be claimed that there are also a great many churches where the dignity of the chancel has the first place in the thoughts of clergy and people, and in those cases the present system will not be abandoned without regret. The desire which appears to be growing for chancels veiled by close screens, which would be an obstacle to sound as well as sight, may not be without influence in the case. Whatever is decided, all lovers of architecture are bound to hope that no sacrifice of chancel arches in old churches, erection of minstrel galleries or other works of transformation will be recommended. Music is worthy of all respect, but it will be hardly fair to sacrifice architecture to satisfy requirements which after all may not be enduring.

There is a close connection between ritual and building, for a church was planned to suit ceremonial offices. When revolutionary changes are proposed it is therefore advisable to consider what was the most ancient practice relating to the subject which is involved. We may then ask, Was the choir of a church always placed in the chancel? The answer would be in the affirmative so long as "chancel" was not supposed to signify the space immediately around the altar, and which in many places was generally the eastern end of a church. Apparently chancel is only the English form of the Latin *cancellus*, a screen, railing or other construction by means of which an enclosure can be formed; but that screen in the early churches did not subserve the same purposes as those which sometimes separated the sanctuary or presbyterium from the nave, and which are now being revived. The modern chancel screen divides the church from the part which, in a legal sense, does not belong to it; for while the parishioners are charged with the repair of the church, there is no responsibility on them for any neglect of the chancel. The ancient *cancellus* was a barrier only 3 or 4 feet high, which kept a congregation from intruding on the *chorus cantantium*, and a survival of it is still to be found occasionally on the Continent. The late J. H. PARKER writing on the subject said:—

In the south-west of France, as I have myself seen, and as I am informed in Spain also, the chorus (or choir) are usually

placed in the middle of the church, with as much space at the east end as at the west, and the congregation assemble on all sides of the choir, a large proportion being placed between the east end of the choir and the altar. The choir is railed off on all sides, and the altar has a separate railing in front of it. This custom is common in those provinces which were formerly English—Aquitaine and Gascony—and may probably have been introduced from thence into England. It is certain that in many churches in England the choir extended into the nave and was not confined to the eastern division of the building; it was surrounded by a screen separating it from the nave and aisles, and in some instances there seem evident marks of there having been a screen at the east end also. The choir extended only as far as the stalls, the space eastward of the choir being called the presbytery.

If the members of the choir were in English churches placed amidst the congregation, the arrangement would be therefore warranted by precedents, both native and foreign. At Quimperlé, in Brittany, according to PARKER, the choir is raised on a platform in the centre, and compared with it both the nave and the apse for the altar appear "comparatively small and insignificant." Some local custom must have dictated so prominent a position, and the associations have to be strong which can preserve an arrangement which is contrary to the usual practice in the country churches of France. The late ARTHUR ASHPITEL, the architect, found modern practice in Italy to be in favour of movable choirs, and there is much to be said in approval of them, for in a hot country the same spot in a building is not always equally favourable to the devotion of people who have to be close together, and moreover organs can be removed on wheels from place to place. One of his stories is worth repeating:—

I remember an instance where a friend who stood in the eastern limb of a large cross church alluded to it as the choir. "Oh! no, sir," said the sacristan, "this is not the choir, this is the tribune." "Where, then, is the choir?" asked the perplexed stranger. "Why, sir," said the sacristan, "at present it is in the third chapel on your right, but next week it will be in the chapel in the cloisters." At Santa Maria Novella at Florence, it was sometimes behind the high altar, and sometimes in the chapter-house or chapel *degli Spagnuoli*, in the Green Cloisters; at St. John Lateran, before the alterations, the *coro* was before the high altar, now in summer it is behind it, and in winter in a chapel leading out of the transept built for the purpose. At Santa Maria Maggiore the *coro* in summer is in the Sforza Chapel (a side chapel), in winter in a chapel to the right as you enter. At St. Peter's it is generally in the Clementine (also a side chapel) in winter, or in the sacristy. In fact, there is scarcely a church of any size that does not have its *coro d'estate* and *coro d'inverno*—its summer and winter choir.

The choirs serve a double purpose; they are used for the prescribed daily offices for the clergy, when no layman is allowed to be present, and for services in which clergy and laity join. Mr. ASHPITEL gives the following account of the practice in the Clementine Chapel:—

In general the breviary services are sung in the Clementine Chapel—a noble chapel on the left of the nave as you go up. This is filled with stalls and other seats, and has two organs facing each other. At one corner is a small private door leading to the sacristy, through which I was kindly permitted to pass when I pleased, except at the time when the choir was assembled, when a nod from the nearest priest, and the whisper of the word "*coro*," of course sent me back directly. We will suppose the tierce, *tertia*, or nine o'clock morning service, is over, the priests gone, and the metal gates open. It is an ordinary week-day, or *feria*. A little after ten the professional singers assemble, and take their seats in a species of orchestra. The people assemble and fill the chapel, and high mass is performed. When this is over the chapel remains accessible to everybody till noon, when the priests again assemble; the gates are closed, and the *sexta* are sung; and so on of the other services. On Sundays and festivals of higher character, instead of the high masses being sung in this chapel, they are invariably performed in the upper limb of the church, which we would call the choir, and which they call the tribune, the laity filling that portion of the building, and coming as near the altar as convenience will permit: a very great proportion of the high altars abroad have no rails. But on the great *funzioni*, or highest festivals, when the Pope himself says mass, it is at the altar under the dome, the great concourse of the laity filling the nave. In fact, I believe through the Continent the various portions of the church are used, *mutatis mutandis*, according to the number of people expected to attend, and in the best way convenience may dictate.

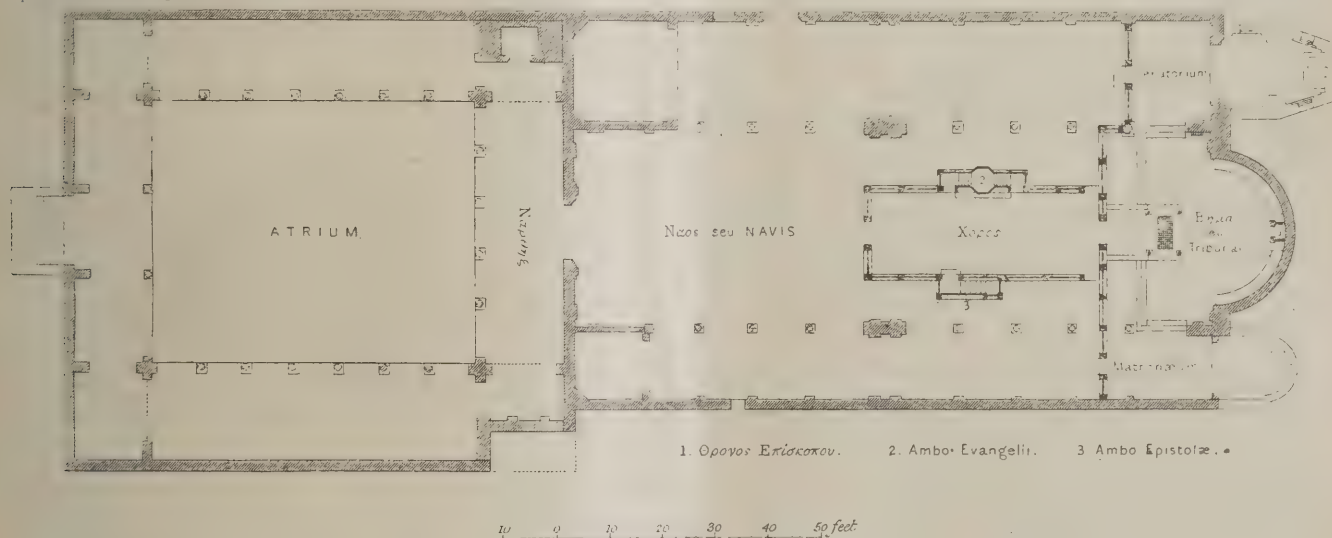
In great churches, like St. Peter's or Santa Maria in Florence, it is possible to have itinerant services, and the



choirmen follow the priest. But in ordinary village churches so many changes are not possible. In English churches "fixity of tenure" for the choir will also be declared as requisite. But, as we have said, the foreign examples suggest that a choir can have a place temporarily or permanently among a congregation, without any diminution of their efficiency as aids to the service of the day or their dignity as representatives of any special order of men.

How did the choir as a part of the Christian Church originate, and was any special office distinct from ordinary laymen assigned to those who formed the *chorus cantantium*? FERGUSSON says the introduction of the choir attached to the bema or presbytery was the last great change in development of the basilica into a church. He tells us how "round three sides of the choir the faithful were allowed to congregate, to hear the Gospels or Epistles read from the two pulpits or *ambones* which were built into its enclosure, one on either side, or to hear the services which were read or sung by the inferior clergy who occupied its precincts; the enclosure of the choir was kept low, so as not to hide the view of the raised presbytery, or to prevent the congregation from witnessing the more sacred mysteries of the faith which were there performed by the higher order of clergy." But FERGUSSON does not attempt to explain why the introduction of a choir was a necessary stage in the evolution of a Christian church, or why it should be assigned a place that was evidently abstracted from the naos or nave which belonged to the laity. The accompanying plan of

PLINY records that the Christians declared their only fault was in meeting before sunrise on certain occasions to sing hymns to CHRIST as to a god ("carmenque Christo quasi deo dicere secum invicem"). The whole night seems to have been occupied with psalms, lessons and prayers. The singing was most simple. In Egypt and Syria the custom was apparently more faithfully preserved than elsewhere, and several of the early hymns originated in the churches there. Men and women (*monazantes* and *parthene*) appear to have devoted themselves to vigils and singing. They formed guilds and confraternities, which were non-official. In the fourth century they were allowed admission to churches in Antioch in early mornings and in the evenings before and after the regular services. The Eastern custom extended to Italian cities, and through a part of Gaul. In fact, the institution of periodical watching was familiar in various cities of the Empire before it was introduced in Rome. The early services, which commenced at cock-crow, and those at night, were not presided over by the bishop, and were less formal than the ceremonies at which all members were bound to assist. What was more natural than to hold them in a part of the church which, while special to the society, was separate from the *presbyterium*, which the clergy were alone privileged to possess? Women as well as men could attend, and in consequence some irregularities followed. On that account VIGILANTIUS demanded the suppression of the services at night, and St. JEROME recommended one of his correspondents to



San Clemente, Rome, shows the position of the most perfect example of the ancient choir which has survived. The arrangement dates at least from the beginning of the fifth century. In some Mediæval Spanish churches we can also see choirs which encroach on the nave, and most disadvantageously to the general effect, for instead of a *cancellus* of 4 feet in height there are high walls which spoil the perspective view.

As the choir was not a part of the church from the beginning, and as it is not found in a vast number of buildings, we can only conclude it was not originally, nor is it now, an essential part of a church. There may be devotional services without singing or music. It is true that in Rome chanting had become so perfect an art that when BENEDICT BISCOP visited the city in the seventh century he solicited, besides a plan for his new monastery at Wearmouth, that one of the singers should be sent with him in order to train his monks to sing anthems and responses in a style that seemed to be derived from celestial choirs. But some centuries were needed to bring chanting to that state, and the Christians of the first or second century would be likely to be as much surprised as the Englishman at the harmony which had been attained. We might say that the choir was absent from primitive churches because the Roman authorities did not value music. Like so much which is accepted as characteristic of the Roman Church, the necessity was created for it and the supply furnished from without. Apparently the earliest occupants of the choir were the representatives of the faithful who, on the vigil of Easter, kept watch. Afterwards every Sabbath eve was celebrated in a similar way.

prevent her daughter from attending them without a guardian. Afterwards, on the creation of monastic orders, the *coro* became their part of the church, and the early confraternities were superseded. Mr. ASHPHTEL, who gave much attention to the subject, says:—

After the sixth or seventh century, a new rule or order was springing up—a body separated from the secular clergy grew into existence, and exercised the most important influence in all ecclesiastical matters. The Eremites, or dwellers in the wilderness of Egypt, under the rule of Antony or Pachomius, now extended themselves gradually over the whole Christian world in the form of various monastic bodies, and with their increase grew up new constitutions, new customs, the most important of which, and one that seems wholly to have been overlooked in this investigation, is the establishment of a custom among all bodies, where a "conventus" or assemblage of clergy could be found, that another entirely separate set of services distinct from those of the laity should be daily observed. The time at which their observation first began is very uncertain. The great Roman authority Carranza places it in that of Pope Damasus I. (371), but our learned Bingham and Joseph Meade consider it to have grown by degrees, and not to have been perfected till many years later. A service specially used by the monks in the morning and evening is noticed as early as the time of Cassian; but the regular observance of those called the canonical hours, or the breviary services sung by the monks at every third hour of the day and night, seems to have grown up so gradually it is impossible to fix its date. But at the same time with this change sprang up the difference in the choir of the churches, which difference in the building no doubt sprang from the rising idea that there were services peculiar to the clergy from which the laity ought to be excluded. The best authority probably is that of Durandus, who tells us that "in the Primitive Church the peribolus, or wall which encircles



the choir, was only raised elbow-high, and which is still observed in some churches, whence it came that the people seeing the choral clergy might thence take a good example. But in *this* time (he goes on to say) almost always a veil is hung up or a wall interposed between the clergy and the people, lest they should mutually look at each other."

What is said by DURANDUS about his own time will explain the cause of the seclusion of the Spanish choirs. As they were appropriated to the clergy alone, it was considered fitting there should be isolation. The monks were better organised than the members of the laity, whose pathetic psalm-singing, after the manner of Antioch, brought abundant tears from the passionate emperor THEODOSIUS, for instead of allowing themselves to be scattered among the general congregation, like the earlier occupants of the choir, the monks established churches of their own, where they could spend long hours at night as well as by day in repeating the strange melodies in which the spirit of Asia and Africa were expressed along with that of Europe. The proposal therefore to bring English choirs away from the neighbourhood of the altar and to settle them amidst the congregation is only a return to ancient ways, and we trust that if architectural alterations are needed, inspiration for them will be drawn from the low rails of San Clemente rather than from the Spanish enclosures.

## METHODS OF CHARGING FOR ELECTRICITY.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

IN considering the value of any commodity the question of supply and demand has to be taken into consideration in arriving at the true value of the article, and this principle is one which should be carried into every department of trade.

The best example of the effect of supply and demand affecting the price of services rendered or of a commodity is perhaps that of a seaside hotel. The cost of accommodation in the "season" is, so many people think, excessive, but it is not so when consideration is given to the fact that sufficient money has to be obtained in the two or three months' season to keep the proprietor and his family, pay the rent, rates and taxes, and the other incidental expenses for the whole year. If people would only patronise his house uniformly all the year round, several economies could be enforced. (1) A smaller house would suffice for the same turnover, and smaller rent, &c., also fewer servants. (2) A far greater number of people would share the expense between them, and so each would be charged less, and the cost of living would be quite moderate. This simple case is given fully, as it corresponds almost exactly with that of the supply of electricity to consumers. The important point which they have in common is that no storage is possible in either case. The number of rooms in a hotel must be proportional to the greatest number of visitors, and the amount of plant in an electricity supply station must be proportional to the largest number of lamps turned on at one time, no cheap form of storage having been invented in either case.

With the supply of gas and water the case is very different. Gasholders and water reservoirs are cheap compared with the value of the gas or water they store, but electric accumulators are not. In the former cases a small plant can work continuously, the inequalities in the demand being supplied from the storage. It follows that the only extra expense entailed in these cases is that of the larger mains and of the storage, both of which are small when compared with the expense of the large plant required to supply the maximum demand without storage, and the bad economy caused by irregular working. For these reasons water can be sold by the 1,000 gallons and gas by the 1,000 cubic feet, without reference to the time of day or the regularity of the demand, with approximately equal justice to the company and all consumers.

With electricity supply the matter is an entirely different one, and, as before mentioned, the case of the seaside hotel is a very useful illustration. The visitor in the season in the one case is the consumer who in the other has his lights on for the time of heavy load only, in fact, when almost everyone else has lights on, and as a consequence he should be charged extra. The consumer who uses light

in the daytime is like the winter visitor, who is charged very little, in fact, only just more than enough to cover the extra expense entailed.

This now shows us the justification for a charging system which charges a price proportional to the cost of supplying the particular units sold.

This inequality in the cost of supplying electrical energy was early recognised by HOPKINSON and KAPP, the former of whom worked out the cost and proved that the cost of supplying electricity cannot be correctly defined at so much per unit, unless the rate of supplying that unit be also stated, and further that the cost depends more upon the greatest rate at which the units are generated than on the number of units. As a result of his investigations he urged that the price charged should bear some comparison to the cost of supplying at the time it is demanded.

A system was arranged by Dr. HOPKINSON for Manchester to carry out the result of the above investigation, partially at any rate. The system is as follows. A charge of 1s. 4½d. (nearly) is made per quarter for every 8 candle-power lamp (30 watt) connected, and all the electricity used is charged at 1½d. per unit. The effect of this is obviously that the consumer who uses a few units per lamp connected per annum pays a high price per unit, and the one who uses his lamps a long time pays a very low price. This system, however, is not all that could be desired, as a consumer might have many lamps wired, but never have them all on at one time. He thus has to pay for more than he has demanded. This objection was removed in other towns by the invention of Mr. WRIGHT (electrical engineer to the Brighton Corporation) of the demand indicator. This demand indicator is a maximum thermometer which shows the greatest current that has been demanded since it was last examined.

At Hastings the Manchester system has been adopted, but instead of the charge being so much per lamp connected it is:—A charge of 1s. per 8 candle-power lamp *on at one time* per quarter is made, and the electricity is charged at 3d. per unit. (The maximum number of lamps on at one time being registered by a demand indicator, mentioned above.) The higher charge for current is to bring the revenue up to about 8d. per unit sold, whereas in Manchester it is 6d. per unit sold.

The system introduced by Mr. WRIGHT at Brighton is the one which has attracted the greatest attention of any, and as a result it has been the one most criticised. The system is based upon the analysis of the accounts of the station, which show that there is a loss on those consumers who have used their maximum demand for less average time than one and a half hours per day, the selling price being 7d. per unit, the actual running costs, *i.e.* the cost of generating extra units, being 8d. only, the rest 6½d. per unit being the standing charges such as interest on capital and the expense of keeping the station in readiness to supply the maximum demand. The WRIGHT system consists in charging 7d. per unit for the first hour and 1½d. per unit afterwards.

There are, then, three systems, all the outcome of the work of Dr. HOPKINSON, and all embodying two principles, viz. that the cost of supplying electricity depends upon the greatest rate at which the units are demanded, and that the price charged should bear some comparison with the cost of supplying at the time of demand.

As this paper is not written from the central station point of view, but that of the consumer, the analysis of central station costs will be as brief as possible, and will merely show that the principle is just.

The central station about which we have most information for this purpose is at Brighton, and this is a very flourishing station of large size, thus everything is in favour of the consumer. The following particulars are taken from Mr. WRIGHT's pamphlet relating to his system of charging.

Mr. WRIGHT, for the purpose of his analysis, states that the cost of supplying electricity is the revenue required to make the station self-supporting. He finds that a comparison of monthly and quarterly statements of total expenses shows how slightly these vary, and how much the receipts vary. He divided the expenses into "running" and "stand-by" charges. Running expenses include properly, coal, oil, water, engine stores and repairs caused by continued supply.



Stand-by costs:—All coal and oil to get up steam and in keeping boilers ready to supply the engines, in keeping the mains ready to supply electricity; all stores used in station, on mains; all wages debited to revenue account; repairs to mains and meters, buildings, and repairs to plant due to its being kept ready for work, rates and taxes, management expenses, insurance and all provisions for redemption of capital and interest on capital, and for creation of a depreciation and reserve fund. The only items not easily divided in the proper proportions are coal, stores and repairs. Mr. WRIGHT finds for the first two (coal and stores) that the average cost per unit is the difference of the total expenditures under these two heads in two periods divided by the difference of the two sales (in units); the two periods should be ones in which very different amounts of energy are supplied. The remaining point, repairs, can be best settled by dividing the total cost of this item since the station started by the number of units supplied, and this is the running cost under this head per unit.

Mr. J. W. GREENE in America has pointed out that the standing charges should be divided into three parts:—

1. Preliminary expenses,
2. Connection costs,
3. The costs proportional to the maximum load,

and Mr. Wright has found that the chief factor in determining the monthly expenditure in central stations is the maximum annual load the station must meet, and that after the first year or two it will be directly proportional to this load.

At Brighton the costs under these headings are:—

- |                  |                   |
|------------------|-------------------|
| 1. 6.3 per cent. | } 83.3 per cent., |
| 2. 11     "      |                   |
| 3. 66     "      |                   |

and running costs 16.3 per cent.

Mr. WRIGHT has found that the sum of these three expenses is proportional to the maximum annual demand. No. 1 or the pioneer expenses go on continuously owing to extensions of mains and machinery, those laid down being in excess of those required to cope with anticipated increase, thus the expense decreases per kilowatt; No. 2, or connection expenses, increase per kilowatt, as the large consumers become exhausted and the cost of a connection is the same for a small as a large one. No. 3 is by definition proportional. The decrease in No. 1 makes up for the increase in No. 2.

It has thus been shown on the authority of Mr. WRIGHT that the cost of supplying electricity can be divided into two parts:—(a) Standing; (b) running; that the stand-by charges are in a representative station proportional to the maximum annual demand, and that by definition the running expenses are those proportional to the units sold.

The ratio of (a) to (b) at Brighton is  $\frac{83.3}{16.3}$ .

Now, on these results, a theoretical system would be to charge a fixed sum per annum for each consumer proportional to his share of the demand on the day of maximum load, and a small price to cover the running costs and to give a little profit, say, 1½d. per unit, for all electricity supplied.

From the consumer's point of view, the Manchester system does not approach this, because whether a consumer uses his lamps in the day or night, winter or summer, or never uses all his lamps at once at any time, he has to pay his share proportional to the number of lamps he has, and not to the number of lamps he uses at one time. The Hastings system is the best of the three systems as regards the approach to the theoretical, as the latter objection, viz. that the consumer may not have used all his lamps at any time, yet is charged as if he had, is removed. The other objections remain.

The Brighton system is in many respects far from perfect. The consumer pays the full price until he has paid off his share (based on his maximum demand) of the standing charges, and he then has the rest of his supply at a reduced rate (1½d. per unit); thus the very bad consumer does not pay any more per unit than the one who just uses enough current to pay his share of the standing charges, and, in fact, the loss (before mentioned) on those consumers who use less than the least paying quantity for their maximum demand has to be paid by charging a price far

higher to those who do (1½d. per unit when the running costs are 8d. per unit only). For this reason the Hastings system is a better one, and more just, than the Brighton.

None of these three systems take into account the time at which the current is used, but charge proportionally to the number of lamps or the maximum demand only, and to the quantity of electricity used; in fact, the price is less as the consumer's load factor (the ratio of the actual consumption to the consumption if the maximum number of lights had been used for the whole time, day and night) is better.

(To be concluded.)

## THE POSITION OF CHOIR AND ORGAN IN CHURCHES.

IN a letter to the editor of the *Times* the Bishop of Chester writes:—The Upper House of the Convocation of York recently requested the President to appoint a committee to inquire into and report on the considerations which should determine the position of organs in churches. Since then, as mover of the resolution, it has been my privilege to receive proofs of the interest taken in the matter by organists and choirmasters of the highest authority, and, as the work of a committee is aided by public attention, I would ask leave to bring the subject before your readers. It obviously has interest not only for musicians but for architects and church building committees, for diocesan chancellors—who are constantly being asked to grant faculties for the removal of organs—and for the lovers of vocal and instrumental music through all denominations.

As is well known, the dominant fashion—"a perfect mania," "a fashionable folly," are terms used by two of my correspondents with regard to it—is to place organ and choir at the east end, even in small district churches, and to do this as a matter of course with little or no discrimination, forgetting that—to quote Sir John Stainer—"it is most difficult to lay down any general law as to the proper position of organs in churches, because so much must depend upon (a) the shape and ground plan of the church, (b) its size, (c) its acoustical properties, and (d) the character of its services."

That both the importance and the manysidedness of the question have been already recognised will be seen if I can be permitted to quote rather copiously from a valuable document, for the use of which I am indebted to Sir Walter Parratt's kindness. Some years ago he served on a committee, jointly nominated by the Royal Institute of British Architects and by the College of Organists, to consider musical requirements and arrangements in churches. Unfortunately, their report did not reach the final stage, and was therefore lost to the public; but I learn that there was substantial agreement upon the principles and recommendations contained in the draft report, from which the following extracts are taken. I cannot but think that, if this draft could be placed at the disposal of the York committee, their work would be much more than half done, and done under particularly advantageous conditions:—

After a careful review of the arrangements which are now usually made for the accommodation of the choir and organ, the committee desire to record the following observations:—

- (a) That the arrangements are generally defective.
- (b) That there is much misconception as to the best positions for the choir and organ in their relation to each other and the congregation.
- (c) That the space allowed for the modern organ is often insufficient.
- (d) That on musical grounds the old position at the west end for both organ and choir is, in general, the best.
- (e) That although for ritual purposes (following the ancient English cathedral and collegiate arrangements) a vested choir is placed in the chancel, yet that where there is a chancel arch, central lantern or transepts the sound becomes intercepted instead of passing into the body of the church; moreover, where the chancel is narrow, antiphonal singing cannot produce its proper effects.

(f) That when the placing of the choir in the chancel (according to recent custom) has involved the removal of the organ also, it has usually resulted in cramping the organ within some confined space or "chamber," by which the tone has been damaged, and its beautiful qualities and real efficiency impaired.

(g) That the arrangement alluded to above is not the most advantageous for the support and encouragement of congregational singing.

(h) That these defects are more or less the result of adapting new customs and requirements to old buildings, and are not always to be avoided.

(i) That, as a result of the general improvement in knowledge and taste, the increased facilities for the musical render-



ing of the services, and the more frequent bringing together of large bodies of singers and instrumentalists, the provision of better accommodation for them is a problem which must be considered.

#### *As to New Churches.*

The main object of this committee is to promote the improvement and development of the arrangements of new churches, and they have taken as their basis the musical requirements of a large town church; these requirements would necessarily be modified for small town or country churches.

There would appear to be but five positions in which the choir can be conveniently placed in a church:—

1. At the west end of the nave.

It is commonly admitted by musicians that the most effective position for the organ is at the west end; but this position is not always advisable if the choir be retained in the chancel.

2. In galleries facing each other in the nave.

The advantages claimed for seating the choir in galleries (similar to the ancient "minstrel galleries") on the north and south sides of the nave are as follows:—(a) The better support of congregational singing; and (b) the opportunities afforded for antiphonal effects. (All "galleries" are subject to special conditions.)

3. Immediately outside the chancel screen.

4. In the chancel aisles.

5. In the chancel.

With regard to these latter positions, it is advisable, in planning a new building, in order to obtain the openness and space requisite for the sound to reach all parts of the building, that a "chancel arch" should be avoided, and the choir thus placed under the same roof as the congregation. This will enable the clergy as well as the choir to be properly heard.

In churches exceeding 150 feet in internal length the plan of placing the main choir at the west end, and a "ritual choir" in the chancel, may be adopted.

#### *As to Existing Modern and Ancient Churches.*

In dealing with existing churches, whether ancient or modern, the principles set forth in the "Recommendations" should, as far as possible, be observed; but each case should be individually considered. In those places (for example) where there remain a western organ and gallery of interest, at a distance of not more than 50 feet from the choir seats in the chancel, it is desirable that each should be retained *in situ* and used; and where the distance is more than 50 feet a small additional eastern organ to support the choir is recommended.

#### *Recommendations.*

No. 8.—That the term "organ place" be adopted, because it is more comprehensive (including gallery, &c.), and because the term "organ chamber" is misleading, inasmuch as a chamber (or enclosed place) has been determined to be not suitable for an organ.

No. 13.—That the organ should never be placed between the choir and congregation.

No. 14.—That the sound of the organ should not have to pass over one-half of the choir to reach the other.

No. 15.—That when possible the organ should be equidistant from both halves of the choir.

No. 16.—That the choir be placed on raised floors or in low projecting galleries architecturally treated.

That Sir Walter Parratt is still of the same mind is shown in recent letters from which I am allowed to quote. Thus, he writes:—"Personally, I favour the west-end position for the organ, and I should place the choir halfway up the nave on each side. Many churches have narrow chancels from which neither organ nor voices can be heard, and the congregation finds itself without encouragement to sing and without support and control if it makes the attempt. I am, of course, well aware that considerations of space and ritual make the removal of the choir difficult and even distasteful to many people. But I am convinced that in many churches congregational singing is ruined by the present arrangement." It is noteworthy that both Sir John Stainer and Sir Walter Parratt look forward to a time when architects will be less conservative, and have the courage to adopt more suitable arrangements for musical purposes. They both think that "the experience of our modern wants shows the superiority of the Greek cross as a ground plan." Sir John remarks that "music is not the only thing which would gain by a fundamental change in our ideas of 'propriety' and 'respectability' in church plans."

I wish I could give extracts from other weighty and independent opinions, all much to the same effect. But I have already overtaxed your space, and the distinguished authorities whose testimony I have cited will be ample evidence that, in the interest of public worship, the matter calls urgently for attention.

The '91 Art Club will hold their annual exhibition of members' works at Clifford's Gallery, 21 Haymarket, during the latter part of the month.

#### ANCIENT EGYPTIAN GLASS.

THE skill of the Egyptians in the manufacture of glass and in the modes of staining it of various hues was so successful that they counterfeited with success the amethyst and other precious stones, and even arrived at an excellence which their successors were unable to retain, and which our European workmen, in spite of their improvements in other branches of this manufacture, are still unable to imitate; for not only do the colours of some Egyptian opaque glass offer the most varied devices on the exterior, distributed with the regularity of a studied design, but the same hue and the same device pass in right lines directly through the substance; so that in whatever part it is broken, or wherever a section may chance to be made of it, the same appearance, the same colours and the same device present themselves, without being found ever to deviate from the direction of a straight line, from the external surface to the interior. This quality of glass has been already noticed by the learned Winckelmann, who is decidedly of opinion that "the ancients carried the art of glass-making to a higher degree of perfection than ourselves, though it may appear a paradox to those who have not seen their works in this material." He describes two pieces of glass found at Rome a few years before he wrote which were of the quality above mentioned. "One of them," he says, "though not quite an inch in length and a third of an inch in breadth, exhibits, on a dark and variegated ground, a bird resembling a duck, in very bright and varied colours, rather in the manner of a Chinese painting than a copy of nature. The outlines are bold and decided, the colours beautiful and pure, and the effect very pleasing, in consequence of the artist having alternately introduced an opaque and a transparent glass. The most delicate pencil of a miniature painter could not have traced with greater sharpness the circle of the eyeball or the plumage of the neck and wings, at which part this specimen has been broken. But the most surprising thing is that the reverse exhibits the same bird, in which it is impossible to discover any difference in the smallest details; whence it may be concluded that the figure of the bird continues through its entire thickness. The picture has a granular appearance on both sides, and seems to have been formed of single pieces, like mosaic work, united with so much skill that the most powerful magnifying glass is unable to discover their junction. From the condition of this fragment it was at first difficult to form any idea of the process employed in its manufacture; and we should have remained entirely ignorant of it had not the fracture shown that filaments of the same colours as on the surface of the glass and throughout its whole diameter passed from one side to the other, whence it has been concluded that the picture was composed of different cylinders of coloured glass, which being subjected to a proper degree of heat, united by (partial) fusion. I cannot suppose they would have taken so much trouble and have been contented to make a picture only the sixth of an inch thick, while by employing longer filaments they might have produced one many inches in thickness, without occupying any additional time in the process; it is therefore probable this was cut from a larger or thicker piece, and the number of the pictures taken from the same depended on the length of the filaments and the consequent thickness of the original mass. The other specimen, also broken, and about the size of the preceding one, is made in the same manner. It exhibits ornaments of a green, yellow and white colour on a blue ground, which consist in volutes, strings of beads and flowers, ending in pyramidal points. All the details are perfectly distinct and unconfused, and yet so very minute that the keenest eye is unable to follow the delicate lines in which the volutes terminate; the ornaments, however, are all continued without interruption through the entire thickness of the piece. Sometimes, when the specimens were very thin, they applied and cemented them to a small slab of stone of their own size, which served as a support at the back, and by this means they were enabled to cut them much thinner, and consequently to increase their number.

#### THE ROYAL INFIRMARY, GLASGOW.

A CORRESPONDENT of the *Glasgow Herald* writes:—In regard to the proposal to remodel the front or other parts of the Royal Infirmary in commemoration of the Jubilee, no plan has yet been placed before the public. It may, therefore, be of some interest, and may even stimulate the flow of contributions to a laudable object, if we present, in however bare outline, a definite scheme, and consider the whole question in relation to its physical surroundings. The medical aspect of the case has been discussed at some length, although the proverbial difference has yet to be adjusted; but it is by one of the faculty that the first public recognition has been made of an architectural standpoint as regards the square, which, though it be not utilitarian, should not be overlooked. At the risk of exposing another profession to the charge of widely divergent opinions, we desire to take this architectural view, and first with regard to the infirmary itself.



Hospital planning is pure science. No question of artistic beauty or architectural tradition can be permitted to influence the disposition of the building to the detriment of its great purpose. Like other departments of science, it has no finality, because new methods of ventilation, of heating, of lighting, may entirely upset the bases of all arrangements or calculations hitherto. For such reasons the resolution passed at the doctors' meeting, that no more beds be put upon the site, is empirical, and unworthy of a body of scientific men. It is part of the purpose of this article to show that a much larger number of beds may be put upon the ground in the most economical way, while the salubrity of the site would be enhanced instead of impaired. It goes almost without saying that if any part of the infirmary be radically reconstructed a revolution must be wrought in its principles of lighting and heating and ventilation, and this may affect its whole design. To adopt any other system than the "plenum," or some modification thereof, would be a gross error in the situation occupied by the building. Apart from questions of graveyard emanations, and without entering into the question scientifically, the casual observer cannot fail to be conscious of the volumes of smoke which, especially in north or east winds, drift past the infirmary. In the plenum system, already employed in the Victoria Infirmary here, the air is introduced by mechanical appliances, and however smoke-laden or otherwise impure is artificially cleaned, and warmed if necessary, and then driven through the wards. It may also be treated antiseptically and disease germs killed as the foul air is drawn off, so that they cannot do damage in other wards. Windows are thus rendered entirely useless for purposes of ventilation, and the construction of separate and widely sundered pavilions of several storeys becomes an extravagant and a cumbersome method of arrangement. Instead, therefore, of super-imposed wards, lighted on both sides by windows, let the wards adjoin on one level, well raised above the ground and packed underneath, and be lighted from the roof by large glazed lanterns or dome lights, which would catch the sun when it shines at any hour of the day. By this method the wards are massed together on one level and the service rendered economical and immediate; while they are thoroughly warmed and effectively ventilated by the system already described. In this way we return to models like the "Ospedale del Ceppo," at Pistoja, of the sixteenth century, which, without mechanical ventilation, yet does good work. No question of cheerfulness of outlook from windows can enter into the matter, for the prospect in any direction (except to the square), and especially over the adjacent burial-ground to the farther Necropolis, can scarcely claim a salutary or enlivening influence on a hospital patient. All that can be said in favour of the site is that it is open, elevated and central, and it is these advantages precisely which make it suitable for an experiment that has not yet been attempted on a large scale, but which is unquestionably in the direct line of the utilitarian evolution of hospital planning. One-storey wards would accommodate a number nearly equal to half the present accommodation of the whole buildings. By the removal of the present surgical block to the east the whole space would be rendered available for these new medical wards, and the surgical cases displaced might occupy the existing front building. This would also improve the salubrity of the whole hospital, but is not essential to the plan, for the present eastern block might remain, and be disused only on its ground floor for wards. The administration buildings might be built of two storeys, and from the upper level might be made to afford from a gallery a bird's-eye view of the whole of the beds in the wards.

As to the front range of buildings under sentence of destruction, the position of those who care for our street architecture, and for our civic history in so far as it is written in stone, may be said to be:—Here is a dignified, unpretentious and scholarly, if not brilliant production, a work which tells its own tale, and is representative of an original phase of Renaissance due to the initiative of Robert Adam—a building carefully studied in its relation to the cathedral, and in full and quiet harmony therewith, though presenting the greatest possible contrast of style. If possible, it should be spared. Under any circumstances we are not likely to have a building of anything like equal dignity. If of one storey its restricted height, if of several floors the necessity for ample lighting will be sufficient of themselves to make the modern substitute a meaner thing. Of course, by great good fortune the man of the moment might turn up who, out of these unpromising materials, might create a joy for ever and a never-failing adornment of the cathedral square. But safety, as well as economy, lies in the conservative course, especially as the building, if ill adapted even for the surgical wards of an infirmary according to modern ideas, is not with certain alterations impossible as a medical school or out-patients' department, &c. And whether the front is destroyed or rebuilt in its present shape, one thing should be resolved upon, that the reconstructed building shall not advance one inch beyond its present line. Its alignment with the cathedral, though not exactly parallel, is perfect in its artistic effect; and if change is

to be made, the front should rather be set back, so that the north side of the cathedral be better displayed.

The cathedral of St. Mungo is rarely seen by visitors in its exterior aspect. The statement may need some qualification, but as a matter of fact few visitors do more than walk from the gate to the south porch which admits to the interior, and as they must return this way they rarely do more than cast a backward glance at the building from the highly unfortunate line of this approach. Many an English parish church stands up more grandly at its south-west angle than our own cathedral (Selby and St. Mary Redcliffe, for example), and yet few even of the English cathedrals have much greater nobility and power than our cathedral viewed from the south, the north-east, or any point on the Necropolis. This is, of course, due largely to the nature of the site in its downward slope from its west end. That our too hurried visitors may carry away some worthy impression of the exterior of the cathedral, the authorities should in the first place negotiate for an entrance off the Necropolis Road, opposite the south porch and alongside the superintendent's house. The present entrance has the advantage of being tolerably direct both from Mason Street and High Street, and, although not the most obvious, is not difficult to find. But the one proposed would be more direct to foot passengers from High Street, much more direct from John Knox Street (the best approach), and nearly as direct from Mason Street.

It would be interesting to know what percentage of visitors take the trouble to walk round the very confined precinct to view the cathedral on the north, or stray into the dismal burial-ground. To see the cathedral properly it is necessary to leave the precinct and go round to the corner of James Orr Street and Wishart Street, a long detour. What is wanted is a street, approached from Mason Street or High Street, affording easy communication with Wishart Street, and permitting of a ramble round the cathedral. It would encroach on the burial-ground, but it might be turned into a public *campo santo*, and might even be reserved for privileged persons with monuments of corresponding importance designed and executed with taste. Few existing monuments would be interfered with save that they might have to be turned round, and the part of the proposed street to the north side appears yet to be unappropriated. In this way the ground would not be alienated from its purpose, while a picturesque foreground would be formed to the north-east aspect of the cathedral. After half-past four at this time of year the sun shines full on this north side, for the cathedral points considerably to the north of east. In a simple, natural and inexpensive way we should then revive the beautiful Greek and Roman custom of the public street of tombs, which with the Greeks, as at Assos and Athens, was placed just without the western gates of the city, whither the citizens walked at sundown. An entrance to the Necropolis at the foot of James Orr Street would enable one to make a most interesting journey round the cathedral, taking in the Necropolis without too much expenditure of time or energy. The Institute of Architects are bestirring themselves to secure that visitors should see the interior of the crypt, and have invoked the aid of electricity to replace the natural light, of which the lower church has been deprived by its stained-glass windows. The idea is a bright one, and it is to be hoped that the Board of Works will see it in that light, and in conjunction with other public bodies interested will do what in it lies for the proper display both of the exterior and interior of the grandest architectural monument in Scotland.

#### EDINBURGH ARCHITECTURAL ASSOCIATION:

THE Association on Saturday last visited, by permission of the Rev. John M. Johnstone, Torphichen Church, the chief centre of the Knights of St. John in Scotland. Mr. Henry F. Kerr, who conducted the party, explained, in the course of his remarks, that the Hospital of the Knights was probably founded in 1153, when the order was introduced into Scotland. An old archway occupying a site under the westmost arch of the crossing was probably the chancel arch of the first church. The rest of the Mediæval remains were of late pointed work, consisting of north and south transepts, with at the crossing a tower, which must originally have been a bold feature with its cope house gathered with crow steps. The vaulting of the transepts and crossing was still standing, but in some places the vaulting-ribs were badly split and some of the vaulting-stones had fallen out. On the motion of Mr. Thomas Ross a vote of thanks was given to Mr. Kerr and the Rev. Mr. Johnstone.

Lord Kelvin will preside at a dinner on the 14th inst. which is to be given by members of the Whitehall Club to Mr. F. H. Webb, the retiring secretary of the Institution of Electrical Engineers.



## NOTES AND COMMENTS.

It is not easy to satisfy all classes of people in Paris. They expect much from the International Exhibition of 1900, but they will not make any sacrifice in order to facilitate the preparations. There must, for example, be Salon exhibitions and exhibitions of the rival societies in 1898 and 1899, although at present there is no building at the disposal of the Government or the Municipality in which so many paintings can be shown. The painters and sculptors would be losers by any suspension of the annual exhibitions, but the visitors would make more of an outcry. While it is agreed that in the summer of next year and of the following year Paris cannot be deprived of its exhibitions, the problem of discovering a spot where the temporary shelter can be set up is still unsolved. The garden of the Palais-Royal, which seemed a suitable site, has found more opponents than was anticipated. The Place du Carrousel, or rather the garden between the statue of GAMBETTA and the Pavillon Sully, is now under discussion, but objections against it arise on all sides. If the Government erected the buildings there might be less difficulty in approving of that site, but as the work will mainly be carried out by private enterprise it is anticipated that the speculators will not be over-scrupulous in their endeavours to recoup themselves for the large outlay. The Société des Artistes Françaises will contribute 12,000*l.* But that sum will only meet one-half the cost of the temporary buildings. The remainder of the money has been offered on the condition that the buildings can be used for exhibitions, fêtes and other enterprises during the ten months of the year which remain after the Salon closes. To have a sort of fair during several months in so important a part of Paris is almost enough to make the ghosts of the former tenants of the Louvre and the Tuileries arise against the degradation. The risk of fire is also to be considered. If the flames extended to the collections of the Louvre, it would be little consolation to know that the wooden buildings were erected to save Parisians from the inconvenience which might arise from the absence of a Salon during a few weeks. It is, of course, declared that, owing to the precautions, any likelihood of a conflagration may be set aside, but, considering how primitive are the means for coping with fires in Paris, the authorities before agreeing to the proposals will do well to insist on a temporary organisation being arranged, which shall have as much efficiency as is considered necessary by English experts. As to the Champ de Mars, a salon there would be a failure.

A FEW years ago a correspondent of *The Architect*, in describing the late M. ALPHAND, the director of municipal works in Paris, said of him:—"If the offices which are so efficiently held by Sir J. W. BAZALGETTE, Mr. VULLIAMY and Colonel HAYWOOD in London could be combined they would be far from corresponding with that of the Directeur des Travaux de Paris. What is done in London by Government bodies and public companies is as much under the control of M. ALPHAND as work like that of the engineering and architectural departments of the Corporation and the Metropolitan Board of Works. M. ALPHAND is also responsible for the supply of water to the city, for the condition of the Seine, for the survey of Paris, for the decoration of the public places, for upholding the amenity of the most beautiful of capitals. He has one department where constant observations are being made by a staff of chemists and meteorologists on the air and water of Paris, and where the movements of bacteria are watched as closely as those of the criminal classes by the Préfecture de Police, while in another department folio volumes are being prepared on the history and topography of old Paris." On M. ALPHAND's death it was felt that another man was not to be got readily who would be competent to grapple with such multifarious duties. Accordingly there was a new arrangement of the offices. But it was soon discovered that administration did not become more effective, and a return to the old system was advocated. But where was the chief to be found? The Municipal Council have considered the question, and their choice is at last one of their own officials, M. BOUVARD. He was one of M. ALPHAND's trusted assistants, and he succeeded to the most important of the divisions of the master's empire. His conduct during the visit of the rulers of Russia won him golden opinions from the Government

and the Municipal Council. M. BOUVARD did all that was required, and allowed the elected of the people to take the credit. Such a suppression of self deserved a reward, and it has been given. That, in addition to the ordinary duties of the office, the new directeur-général will have the supreme control of the works of the International Exhibition, need hardly be noted. Extra responsibility involving some millions of pounds is only a bagatelle to a man who has to bear extraordinary loads every day.

THE Court of Assistants of the Drapers' Company have passed a resolution to the effect that Mr. T. G. JACKSON, R.A., be requested to advise them as to the erection of a building suitable for the Radcliffe Library, Oxford, on the site which it is understood is available for it, and should it be found that such a building could be erected for the sum of 15,000*l.*, the Company will be happy to undertake the erection of it, of course in the first place submitting the architect's plans to the University authorities for approval. The existing library is too small, and in consequence much inconvenience is caused to members of the University and other scholars who desire to consult the books. On the 15th inst. the following decree will be proposed:—"That the cordial thanks of the University be returned to the Worshipful Company of Drapers for their munificence."

JEAN TIJOU was apparently one of the Frenchmen who were induced by Sir CHRISTOPHER WREN to emigrate to England. WALPOLE describes him as a "founder of iron balustrades," and he was employed at Hampton Court and St. Paul's. His "New Booke of Drawings" appeared in 1693, and a copy is now very expensive. It contains twenty plates. The style which they represent was in much favour in France, and the most remarkable examples of it are to be found in Nancy, which were produced by JEAN LAMOUR for King STANISLAUS. Strange to say, the screens and balconies look better in masses as there seen than single examples such as are found in England. The old principles of construction, which were revered by the Mediæval smiths, were not of much account to JEAN TIJOU or JEAN LAMOUR. Both were eager to display large leaves and other forms of vegetation in gold. They never wished to suggest that the ornament was a part of the construction, but rather that the gilded pieces were blown on the curved or contorted bars, or were attracted by them. In modern times we have made a nearer approach to Mediæval examples, and, however ornate, JEAN TIJOU's pieces are not much appreciated. But they will always be curious, as evidence of what was supposed to be dignified in art in the early part of the last century, as a record of the extravagance in form which was imposed on this country in spite of the national good sense. Mr. BATSFORD's reproduction of TIJOU's book will serve as well as the original, and is obtainable for a fraction of the price which is paid for the Dutch engravings.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—NORWICH: ELEVATION OF SOUTH TRANSEPT AND HALF OF TOWER, ETC.—SECTION OF NORTH TRANSEPT AND HALF OF TOWER, ETC.—INTERIOR, NORTH SIDE OF CLOISTER.—LATER DETAILS.

ON the geometrical elevation and section there are letters which refer to the following parts of the cathedral:—(a) Section of the north door; (b) chapel; (c) doorway to stairs; (d) doorway to north aisle; (e) pier at north-east angle of tower; (f) screen; (g) elevation and section of piers, arches, &c., on the south side of the nave; (h) south aisle; (i) east end of the cloister against the prior's entrance; (k) four windows of the east side of the cloister; (l, m, n) three divisions of the exterior of the west side of the south transept; (o) turret, with modern pinnacles to the same; (p) gallery over the south aisle, walled up; (q) arched trusses at the angle of the tower, on four of which the spire rests; (r) section of the roof of the north transept; (s) elevation of the east end over the altar. The principal measurements are given on the plate.

ROOM DECORATION

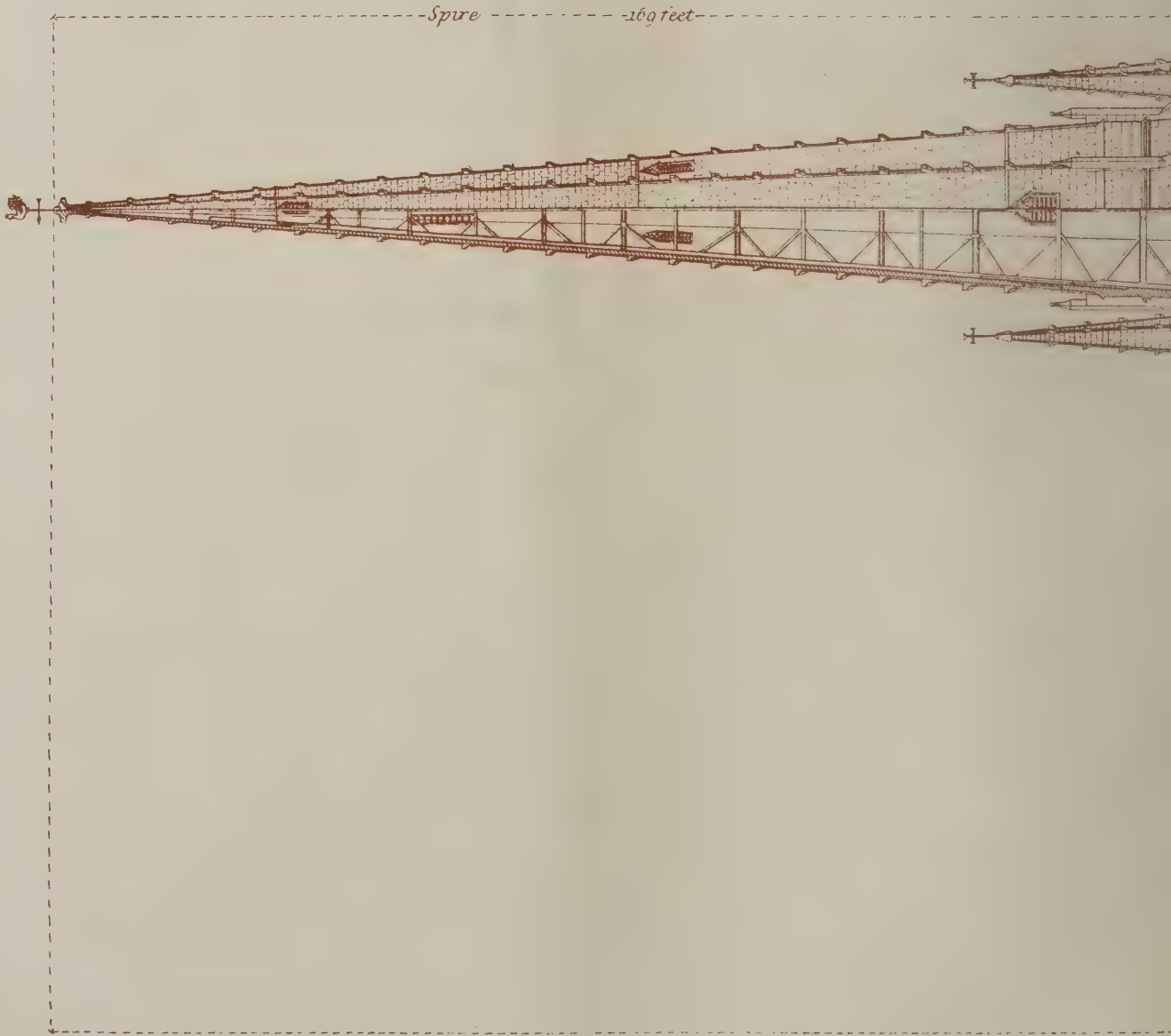
TEMPLE GARDENS.



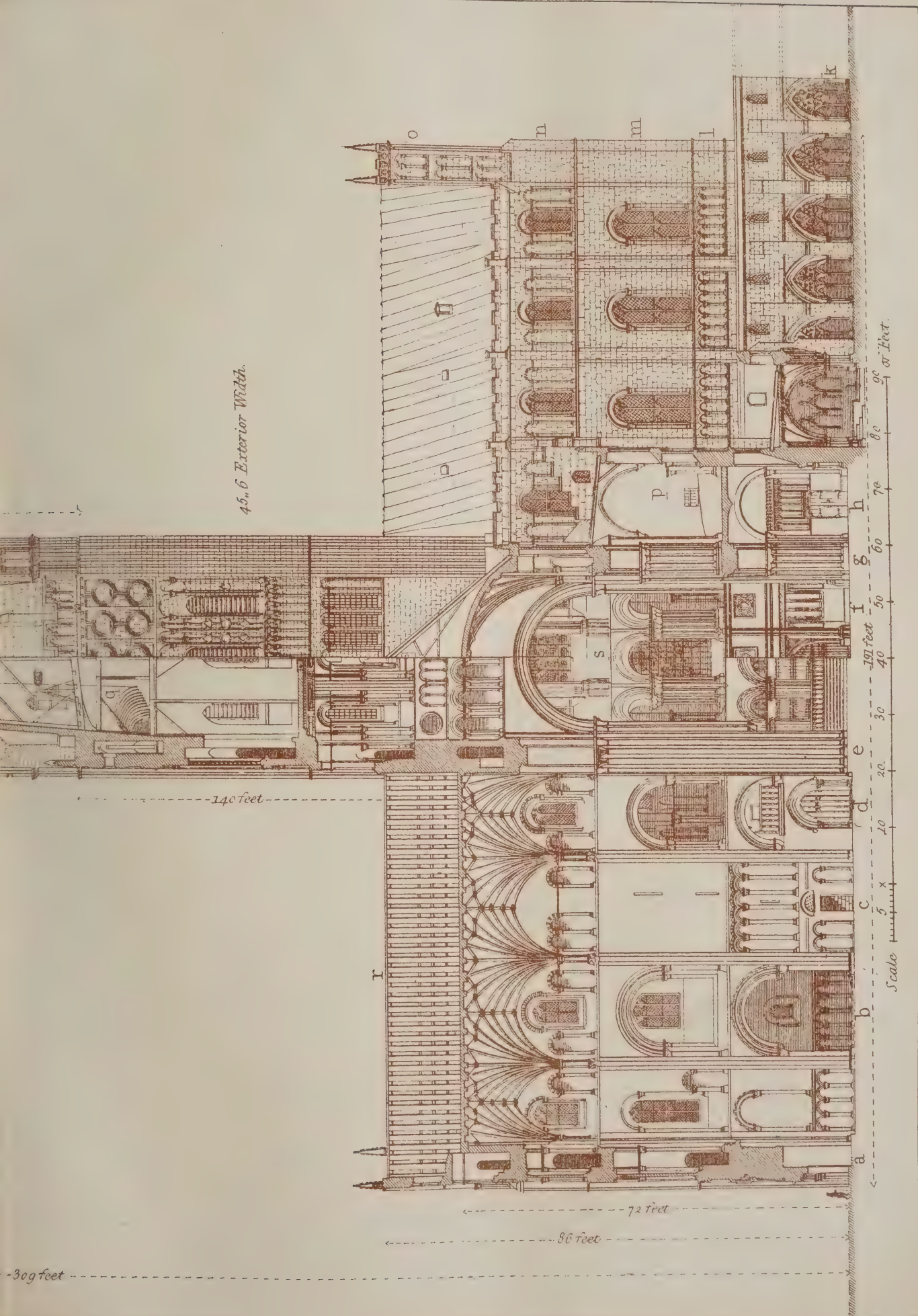




The Architect, June 11<sup>th</sup> 1897







INN. PHOTO SPRAGUE & CO. 2 & 5 EAST HARDING STREET FETTER LANE. E.C.

CATHEDRAL SERIES, No. 40.—NORWICH.  
ELEVATION OF SOUTH TRANSEPT AND HALF OF TOWER, &c.

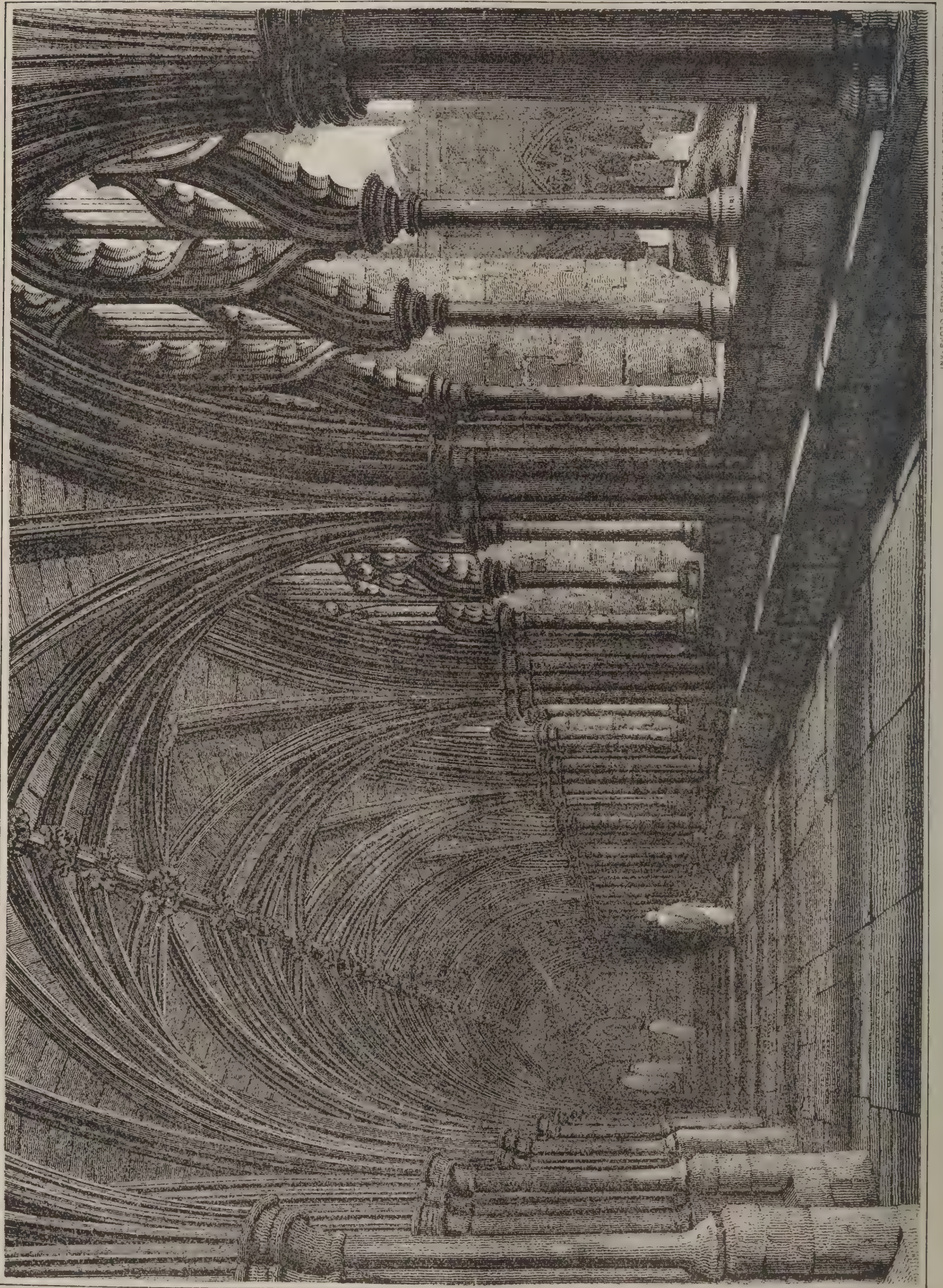










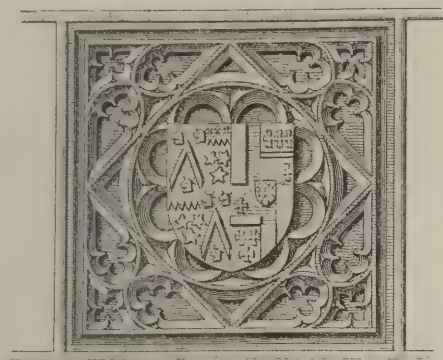


INT. PHOTO SPRAGUE & CO. 45 EAST HARDING STREET FETTER LANE E.C.

CATHEDRAL SERIES, No. 41.—NORWICH: INTERIOR, NORTH SIDE OF CLOISTER.

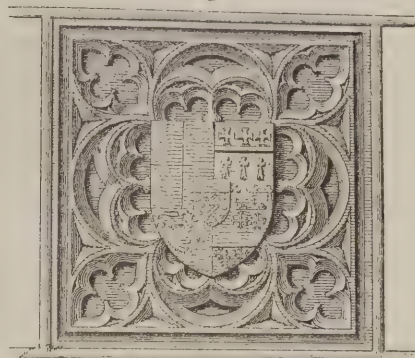


A



BOLEYN SHIELD.

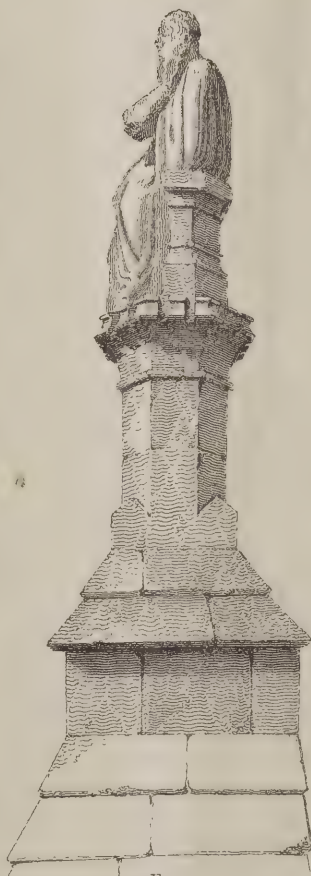
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BOLEYN SHIELD.

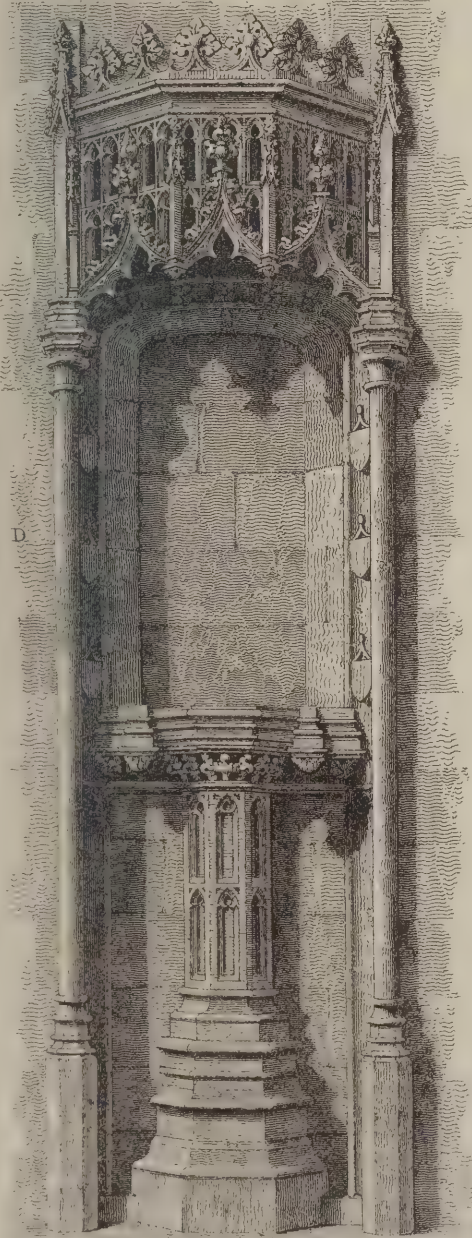


O.G. CANOPY

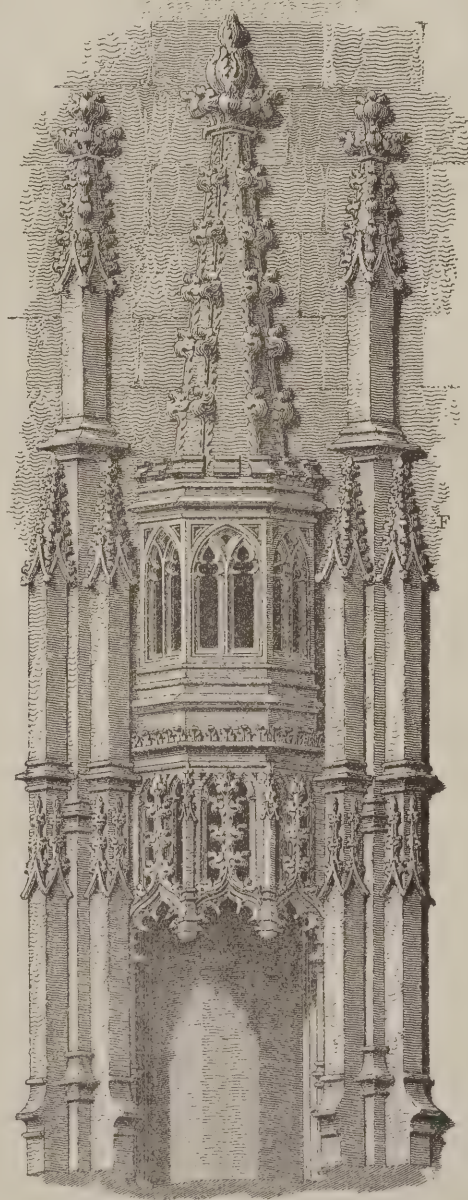


E

FINIAL OF BUTTRESS.



NICHE IN BEAUCHAMP CHAPEL.



CANOPY NEAR ALTAR.













EAST HARDING STREET FETTER LANE, E.C.

ROOM DECORATION.  
By C. T. G. FORMILLI.





ROOM DECORATION.  
By C. T. G. FORMILLI.







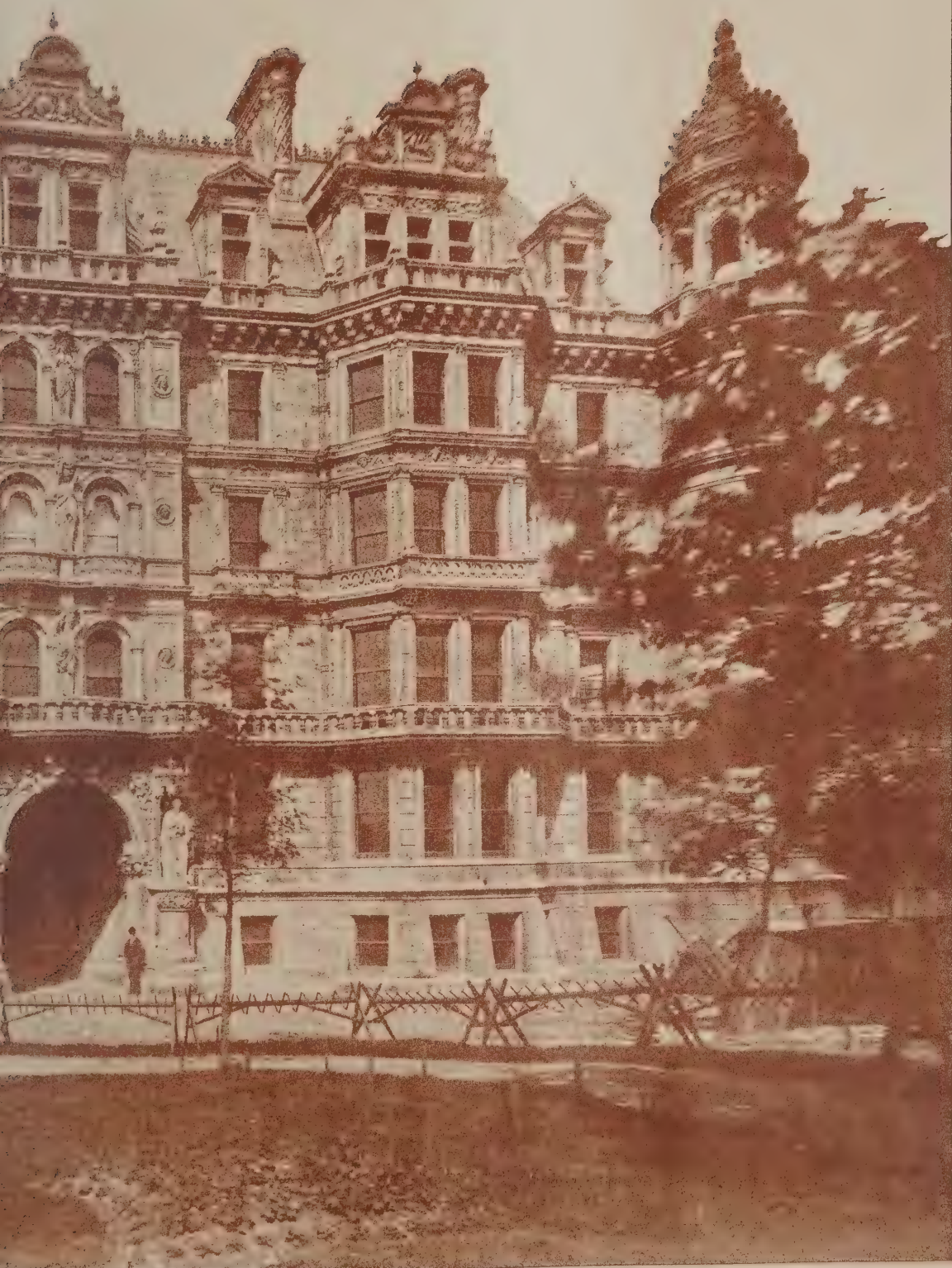






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## NORWICH CATHEDRAL.—V.

THE vaulting which is to be seen in Norwich Cathedral is not of the finest type, and does not display much acquaintance with geometry by the designers, or skill in stone-cutting by the masons. More excellent work is to be found within the cloisters, of which part we show an illustration. The vaulting of the cloister was studied by Professor Willis, and his conclusions were as follows:—

The cloister is the work of successive periods, but the intention of the successive architects was evidently to make their continuations assimilate with the beginning, in which they have so well succeeded that at the first glance the entire work appears to be of one design.

This expression of uniformity is principally due to the employment of single simple shafts with base and capital in lieu of mullions throughout the tracery, for the pattern of the latter varies and assumes in turn the peculiar fashions, Geometrical, Flowing and Perpendicular, that belong to the age in which each was erected. But the external arch which contains the tracery is of the same figure throughout.

I am informed by one of the canons residentiary, who has taken much pains in the investigation of matters relating to the structure of the cathedral, that the outer wall of the cloister is Norman, so that in all probability an early cloister (perhaps of wood) existed previously to the present one upon the same site, and was replaced piece by piece by the latter as funds or convenience permitted.

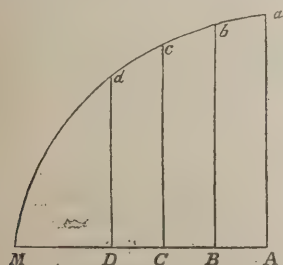
The vaulting throughout is of the same plan, namely, each severy is nearly a square, there are transverse, diagonal and wall ribs (the latter term also including the rib which lies next to the tracery) and one tierceron between each. The ridge ribs are horizontal. The curvature of the ribs, however, is different in the different periods, and it is to the variations in this respect that I wish, in the present article, to direct attention.

The oldest vaults are the central severies of the east walk, with which, according to W. de Worcestre, the work was commenced in 1297. The south walk appears to be the next, and the whole of its vaults have the same character, but differ from the former. The west walk, which is also uniform in character, is the next in order; and the middle compartments of the north walk are, like the tracery which accompanies them, of decidedly Perpendicular style, and correspond to the period (1430) at which, the same author tells us, the cloister was completed. With respect to the extreme compartments of the east and west walks, the character is far less decided. The account given by W. de Worcestre contains a history of the work, with the names of those who carried it on; but there are some difficulties in the application of these particulars, and he has only furnished the dates of the beginning and end of the work, as above quoted. I am inclined to think, from remaining appearances, that the vaults were in some parts left unfinished for a long time after the walls were completed, and that only the *tas de charge* was built, as we commonly find it even now in other buildings, for the curvatures of the ribs at the springing show traces of having been changed to accommodate the new fashions which had arisen when the ribs and vaults were added. For our present purpose, however, I shall select four examples, one out of the middle of each walk, the character of which is decided, and which will stand in order of time thus:—

(1) East, 1297. (2) South. (3) West. (4) North, 1430.

The dimensions and form of the ribs in these four compartments were accurately measured.

The curvatures were obtained in the following manner:—A rod 3 feet in length had a plumb-line suspended from its upper end. The lower end of this rod was placed upon the abacus and close to the springing of the rib whose curvature was to be



measured, as at M. The upper end was brought into contact with the same rib as at *a*, so that *dD* represents the position of the plumb-line. The horizontal distance *MD* (the versine of the arc *Ma*) was then measured, and thus the position of the point *d* of the arch determined. Evidently any number of points in the arch may be determined in the same manner by applying a series of rods of known lengths, as one of 4 feet from *M* to *c*, another of 5 feet from *M* to *b*, and so on. But if the rib consist of a single arc of a circle one such measurement is sufficient, provided the height of the *a* can be measured, which is easily done, especially where the ridges of the vault

are horizontal and the altitudes of all the ribs consequently alike, as in this Norwich cloister. For the height of the wall rib is easily obtained and serves for all. And since the spans of the ribs are all known from the plan, we have thus three points, *M*, *d*, *a*, given in a position for each rib, from which, when laid down to scale upon the drawing-board, the centre and radius of the arc can be found.

This method of measuring the curvatures has many advantages for travelling observations, for it requires merely a ladder to reach the impost and can be carried on without help. Also a slight deviation from the horizontal position of the measuring rod *MD* produces no appreciable error in the result. If on account of the distortion of the rib from settlement, which is always more or less to be expected in Middle Age work, the radius determined by this method should not be very accurate, it at least gives very precisely the middle plan of the spandrel from the very nature of the process. And besides, the point *d* is contained in the *tas de charge*, which being constructed of solid masonry, is not liable to suffer from settlement in a way to alter the curvature of the ribs, whereas any settlement of the shell of the vault changes the form of that portion of the ribs which lie above the solid masonry, so that we can only depend upon the *tas de charge* for giving us the original curvatures. But the spreading of the walls and piers by throwing the *tas de charge* out of the perpendicular will, of course, affect the accuracy of the versine *MD*. To get rid of this source of error I measured these versines at every one of the four corners of the severy in each of the examples and took the mean of the four that belonged to each rib. For the most part, however, I found but little difference. However, for accurate results, observations should also be made with rods of 2 and 4 feet. A rod greater than 5 feet cannot be managed in this way without assistance. Care must be taken that the plumb-line be suspended from that corner of the rod which is placed in contact with the rib.

The following table contains the spans of the wall and transverse arches, and the altitudes of their crowns respectively, also the versines (or distances *MD*) measured as above described and the radius of each rib determined by the drawing-board, upon which the points were laid down to a scale of 1 inch to the foot. The small figures which accompany the radii show the distance of each centre below the impost plane in inches and tenths.

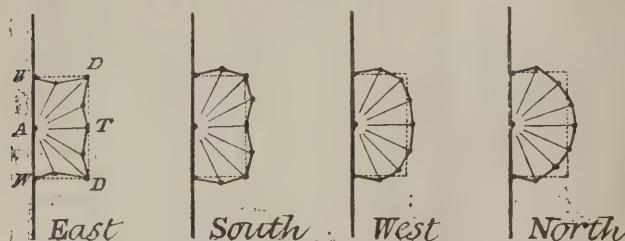
The principal object of this table is to give the form of the middle plan of the spandrel solid, and the accuracy of this result may be relied on. The radii are of course only determined approximately for want of a sufficient number of points in the ribs. One obvious source of error in this case is the assumption that the ridge rib was intended to be horizontal, for as one of the points through which the arc passes is laid down upon the assumption that the height of all the ribs in the severy are alike, it is plain that if this were not the case the error would affect the radius. However, the radii here given will produce vaults having as nearly as possible the same form of the spandrel solid as those from which the measurement was taken, which appears to me to be the most important point. In fact, at present the crowns of the vaults in the eastern walk have sunk about 3 inches, and thus disturbed the horizontality of the ridge; but the form of ridge so produced is so irregular and so different in the different compartments, that it is evidently the result either of bad workmanship or of settlement, and not of design. On the other hand, in the west walk the crowns of the vaults are slightly raised, and this I suppose to be intended to allow for the effect of a similar settlement, for it is not considerable enough to be intended to give a domical form. These circumstances have been duly allowed for in determining the radii. The transverse, tierceron and diagonal arches of the north walk are, however, four-centred, and I was unable for want of time to determine with proper accuracy the radii of their upper circles or the proportion of the two.

Norwich Cloister.	East Walk.	South Walk.	West Walk.	North Walk.
	ft. in.	ft. in.	ft. in.	ft. in.
Span of wall arch . . .	11 11'3	12 4'3	12 1'5	12 8'2
Span of transverse arch . .	12 4	12 1'4	11 11'5	12 6'7
Altitude of crown above impost	7 7	7 3	7 3'5	7 6
Versine of wall ribs . . .	7	6'4	7'3	7'5
transverse ribs . . .	7	7'4	8'4	8'1
tierceron ribs . . .	7'4	8'8	9'6	8'1
diagonal ribs . . .	1 0'4	11'7	11'2	8'1
Radius of wall ribs . . .	7 10 0	7 1'5 2'5 above	7 5 0	7 9 1'5
transverse ribs . . .	7 10 0	7 5 0	7 11 4'5	6 7 0
tierceron ribs . . .	7 10 0'2	7 11 6'5	8 2 8'5	6 7 0
diagonal ribs . . .	9 4 21	8 8 16'5	8 8 15	6 7 0

Fig. 2 shows the form of the middle plans of the spandrels in the four selected examples obtained from the curvature of the ribs. In the east walk, *ADAD* are the diagonal ribs, *AT* the transverse rib, *AWAW* the wall ribs and the intermediate lines the tiercerons. The dots at the extremities



of these lines show the points at which the fillets of the ribs pass through this middle plan, and it will be seen that in this case the points W D W form a rectangle or double square, and that T is on the side of this rectangle; but the tiercerons retire slightly within it. The appearance of this spandrel solid is that of a mass decidedly rectangular in its horizontal sections, but the angles of which are rendered more prominent by the retiring inwards of the tiercerons. In the second plan representing the south walk, no letters of reference are added, as it is in general system exactly like the preceding. In this vault the diagonal, wall and transverse ribs still form a square mass, but the tiercerons advance beyond this mass instead of retiring within it, thus giving an imperfectly polygonal character to the whole, or rather constituting a double polygon with unequal angles.



In the third plan for the west walk, the diagonal rib retires within the rectangular form, and the transverse advances beyond it, so as to give a completely polygonal figure to the mass in its horizontal sections, but yet to make a polygon with unequal angles. This is a very favourite section for vaults of this period. But in the north walk the ribs (with the exception of the wall rib) are semi four-centred arches, having lower circles of the same radius, and consequently the north plan (taken through these lower circles) is an equiangular polygon. But as the curvature of the wall rib is greater than that of the others, its position in this section is thrown nearer to the centre, and this, by causing the vaulting surface to meet the wall at an acute angle, relieves and detaches the entire spandrel from the wall in a very bold and striking manner. The same effect will be observed in the two previous examples south and west.

It thus appears that the form of the middle plan changes by gradual succession from a square to a polygon, and as the three first examples consist of ribs of a single arc, these changes of form are all brought about by varying and altering the radii and the positions of the centres of the respective ribs.

Similar forms to all these may be found in cotemporary vaults, but it rarely happens that they occur in a series and in a work of which the general uniformity of design is manifestly preserved, so that the changes may be regarded in the light of embellishments or as the modern improvements of their day. In this respect the Norwich cloister is exceedingly valuable, by enabling us to discover many of these improvements which it is more difficult to pick out from examples complete in the character of their own age.

A walk round the cloister will at once show, by bringing the various forms into direct comparison, how much influence the form of the spandrel exerts upon the character of the work; and upon considering the various methods by which the different radii and curvatures of ribs in a vault might have been determined, and the probable motives for the different forms they are found to have assumed, I cannot discover any that have a greater appearance of probability than that of giving a certain form to the spandrel solid; for the shape of this, as determined by its horizontal sections, is so obtrusive a characteristic of every vault, and the variations of it appear to succeed each other so regularly, that I cannot suppose them to be accidental. Besides, the motive thus supplied for changing and adjusting the curvatures is of so practical a character and produces such tangible results, that it is much more likely to have been the true one than any occult numerical or geometrical relations between the radii of the several ribs. How easy it is, for example, in looking at any given vault with a view to copy it, to observe that its diagonal rib is too prominent, and therefore requires its centre to be thrown higher up or its curvature increased in order to make its middle points retire inwards, and this is precisely what has happened in the successive compartments of Norwich cloister.

Analogous changes of form constitute in effect the materials for a history of architectural decoration in general. Whatever propriety or beauty a given form may possess, we find that by long-continued use and multiplication it falls upon the eye and requires change. The very characteristic by which it pleased the most, and which was nurtured and developed by every possible adjunct, will be in the next age softened down and subdued to make way for the prominence of some other, which was once in the same manner avoided or made subordinate. So in the series of spandrels we are now considering, the square section at first pleased the eye, and was rendered more prominent by the retirement of the tiercerons; but in the succeeding

specimens this effect is gradually softened down until we obtain an equiangular polygon. But there are also mechanical reasons, as well as those derived from beauty of form, that may account for the growing preference of the polygonal section, for in the latter forms (as also in the fan vaults) the horizontal sections constitute arches that oppose the rising of the haunches of the ribs, and thus the ribs mutually stiffen each other through the intervening surfaces. This is not the case in vaults of a square section, in which the transverse rib receives no such assistance from the diagonal. It would lead me, however, far beyond the proper limits of this paper were I to enter into mechanical considerations, which I have hitherto avoided.

I have said that the spandrel is detached from the wall by so managing the curvatures of the wall rib and first tierceron that the vaulting surface may meet the wall at an acute angle. The beauty and effect of this may be understood by looking at the opposite effect in the vault of the cathedral. This is a lierne vault of elaborate pattern, but of very rough workmanship. The curvature of the ribs is rude and broken, and displays so little management that I am tempted to believe the vault to have been wrought out by country masons with very little or no geometrical knowledge or system. The wall rib, instead of rising upon stilts and retiring, as in most clerestory vaults, for the purpose of making way for the window, is, on the contrary, an arch of a lower crown than the ridge of the vault and is very straight-sided and misshapen in form. The transverse ridge rib rises considerably in the middle, and is curved so as to form a real segmental arch, and the middle plan of the spandrel is nearly a semicircle. The effect of these arrangements is that the spandrel seems to adhere timidly to the wall instead of springing boldly across the space, as in the vaults of the cloister.

#### BRISTOL AND GLOUCESTERSHIRE ARCHÆOLOGICAL SOCIETY.

THE spring meeting of the Bristol and Gloucestershire Archæological Society took place on May 26, when there was an enjoyable trip to Birdlip, Brimpsfield, Elkstone, Cowley and Coberley. The pretty village of Birdlip was visited. In good time the George Inn was reached. The magnificent prospect from various points of the gardens of the inn—slightly spoiled by the prevailing haze—having been viewed by the company, they grouped themselves on the lawn to hear a description of the objects and places in the neighbourhood.

##### *What the Romans did.*

The Rev. W. Bazeley said the road in front of them was a branch of the great Roman road from Glevum to Cirencester, and the piece before them was one of the straightest bits of road in that part of England. The road had been but little altered on the whole. On the left was Crickley Hill, where there existed a camp, the earthworks of which were hidden from their view. He did not know whether it was a British or a Roman camp. Very likely it was British and was utilised by the Romans.

In 1879, the year when the Archæological Society visited that neighbourhood, a very interesting discovery was made. A man was working in a small quarry, when he found a number of stones set on their end, with flat stones on the top. It proved to be a tomb in which were three skeletons, with their feet towards the south. The two outermost were males and the other was a female. The lady had an interesting bronze bowl, beautifully chased, lying on her face and a smaller bronze bowl beside her. A fibula of silver, which had been gilded (very much like a safety pin), was also found, together with some rings of brass and beads, evidently part of a necklace. The necklace showed that she had been married. There was also a beautiful bronze mirror, lacquered on one side and chased with bugle pattern on the other. The remains were removed to the Gloucester Museum, which was closed now, but which, it was hoped, would be reopened later on. The remains belonged to a Roman-British period, probably after the Romans had gone. They were evidently Roman work, which the British learned from their conquerors.

In front of the company was the site of a Roman villa at Witcombe (which the members of the Society visited in 1879), and of the Roman baths and stables, where horses were bred and kept for the purpose of carrying out the Roman travelling and posting system. That system was exceedingly interesting and complete. Within an area of five miles there would probably be three posting stations and 120 horses ready for immediate use. By means such as these a Roman officer might journey 100 miles a day from one end of Britain to another. On the hills around were telegraph stations, where, by a series of signals, messages could be conveyed of the approach of a Roman officer, when horses would be got ready and brought to a given point for his use. As an example of the strength and fineness of the Roman roads, the speaker mentioned that when the Great Western Railway was made, and the road in the neighbourhood was crossed, so hard was it that it had to be



blown up with gunpowder, the workmen being unable to break it up with tools. He explained how the roads were made—of four separate strata—all laid with very great care, and under the supervision of a Roman official. Roads of such substantial and enduring character were necessary for the postal system, and for the rapid transit of troops when emergencies arose.

Mr. H. G. Madan spoke of the derivation of the name Birdlip. He said its true origin was uncertain, but an impression prevailed that it came from the Scandinavian Bythar Lipr, the name of a Viking, passed to butter lip, and thence to Birdlip. Mr. John Bellows was of opinion that the name Ermine Street came from the Cymric A'r Mynd.

#### *Brimpsfield Church.*

While the party partook of lunch rain fell, but happily it cleared off, and the weather was bright for the drive to Brimpsfield, where the party were received in the quaint and interesting church by the Rev. R. Denne (the rector), who gave a short account of the church. He said that, like most of the churches on the Cotswolds, this church had its origin in Norman times. Osbern Giffard made several gifts to the Abbey of St. Stephen at Fontenay, and amongst them was a piece of land at Brimpsfield, on which the monks of the abbey established a priory. Much of this Norman work exists in the church. The south doorway and the chancel arch are of a Norman date, and the nave and chancel stand on their early foundation. The north lancet window and the piscina under the window on the south side of the chancel are in the Early English style, and Perpendicular windows have been inserted on the south side. It is uncertain whether there ever was an east window, or whether it was omitted when the east wall was rebuilt. The tower of sixteenth-century work is placed at the east end of the nave at its junction with the chancel. It stands with its eastern wall partly over the chancel, and the other wall rests on blocks of masonry, which project east and west into the chancel and nave. These have a very singular appearance, and are difficult to understand, but they may be thus explained. The earliest part of the block is without doubt the Norman chancel arch, to which was added in the thirteenth century buttresses and half-piers projecting westward, and on these a bell turret rose, occupying the position of the present tower. It is assumed that this turret became dilapidated and dangerous, and that it was for this or some other cause removed, and then in the sixteenth century the present tower was erected, and to carry this more masonry was built on to the west and east sides of the old chancel arch, of Early English work, all of which can be traced. This masonry, therefore, is a mixture of Norman and Early English work, enclosed and backed up in Perpendicular, and the work of the tower is carried thereon.

The Rev. W. Barclay added some further explanation of the interesting church. It consists of a nave, a chancel and a low inserted tower, with its east wall resting on the original Norman arch of the chancel. It would seem that when the church was built, in the twelfth century, it had no tower, that a small bell-turret was inserted in the thirteenth century, resting on the chancel arch eastwards, and on two columns with circular capitals westwards, and that in the fifteenth century this turret was superseded by a larger tower, with narrow openings and arched buttresses on the north and south, and a plain pointed arch on the west. This tower was also supported by buttresses in the chancel and against the external walls. There is no east window—not an uncommon arrangement in small Gloucestershire churches—but the side walls are pierced by windows, to display the paintings which occupied the space above the high altar. The staircase to the rood-loft remains, of the same date as the tower. The pulpit is constructed of carved oak, with the date 1658. There is a Perpendicular font with delicate panelling. It is thought that Brimpsfield Church was part of a priory or cell belonging to the Benedictine Abbey of St. Stephen, Fontenay, Normandy, which was founded here by the Giffards; but it was probably a parish church from the first. In the churchyard are the remains of three coffin lids with floriated crosses, which no doubt covered the bodies of ecclesiastics. Brimpsfield Priory was confiscated by Henry V., and bestowed on the collegiate church of Windsor by Edward IV. The field on the north of the church is called the Priory Field, and the traces of foundations of buildings are clearly seen there in very dry weather. On the south-west of the church is a large space, surrounded by a deep moat, the site of Brimpsfield Castle, built by the Giffards soon after the Conquest, and demolished by order of Edward II. in 1321, when that sovereign was at Cirencester. In the following year John Giffard, lord of Brimpsfield, was drawn, hanged and quartered at Gloucester for high treason, and his estates were conferred on Hugh Despencer. They were held subsequently by John Maltravers, Maurice de Berkeley, the Earls of March, Katherine, Queen of Henry VIII., and the families of Bridges, Sandys and Pitt. Brimpsfield Park, now the Court farm, is mentioned by William of Worcester as lying along "Le fosse (Ermine Street) ultra Syssetre." On the roof of some cottages to the west of the church may be seen a turret or finial and an ornamental

chimney, which probably belonged to the castle or priory. The site of the castle appears to have been used as a quarry by the people of Brimpsfield for ages.

#### *Brimpsfield and its lords.*

The company passed from the church to the mound on the south side of the church, supposed to be the site of Brimpsfield Castle, where the Rev. W. Barclay gave an interesting account of the structure and those connected with it. The manor of Brimpsfield, which at the time of the survey, 1086, included Cranham, belonged in the time of Edward the Confessor to Duns, a Saxon thane, who held it of Earl Harold, the last Saxon king. It was taxed at nine hides, or about 2,000 acres. It was farmed with fifteen ploughs, three of which were used for the lord's land. There was a parish priest, and therefore also, no doubt, a parish church and two mills on the Frome, in the Cranham valley, yielding 12*l.* to the king. It was held in 1086 by Osbern Giffard, whom Mr. Ellis believes to have been a son of Walter Giffard, lord of Longueville, who fought at Hastings, and was made Earl of Buckingham by the Conqueror. Osbern Giffard also held the manors of Stoke Giffard and Rockhampton, and a hide in Oldbury-on-the-Hill. The Benedictine monks of St. Stephen's Abbey, Fontenay, Normandy, in 1086 held land given to them by him at Middleton, and either he or one of his successors gave them land at Brimpsfield on which they constructed a priory or cell. The parish church became attached to this priory, and also the advowson of the living. The *sobriquet* of "Gifard," which seems to have been given first to Walter de Longueville, meant in old Norman-French a person with fat cheeks and double chin, and hence a cook, because that employment has a tendency to develop such exaggeration of human features. The pedigree of the Brimpsfield Giffards is made very perplexing by the fact that at least four Helias Giffards held the manor in succession. Osbern was dead in 1096, as Helias Giffard I. in that year gave part of his wood, called Buckholt, to St. Peter's Abbey, Gloucester, and William II. confirmed the gift. In 1121 Helyas Giffard, who is believed to be the same Helyas, his wife Ala, and son Helias, gave Buckholt to the same monastery. Helias Giffard II., who married Bertha, sister of Walter de Clifford, and acquired with her great possessions, gave to St. Peter's the church of St. Mary, Boyton, and the church of St. George, Orcheston, in Wilts, and the chapel of St. Andrew, Winterborne, in Dorset. He was present at the chapter-house of St. Peter's Abbey when the Archbishop of York and the Abbot of Gloucester, on December 15, 1157, settled a long-standing dispute between them relating to Standish and other manors. About the year 1165, when his wife Bertha was yet alive, he gave Cranham to the abbey, and entered the monastery as a shorn monk. Helias Giffard III., son of Helias and Bertha, paid a fine on taking possession of the manor in 1165-66. In 1165, with the consent of his mother, he gave Abbot Hammeline eight libræ of land in Ullingswick, Herefordshire, in exchange for Cranham. Later on the monks of St. Peter's gave up all claim to the churches of Orcheston and Winterborne on his confirming their right in Boyton Church. In 1180 he made a grant of wool out of Buckholt to the brethren of St. Sepulchre's Leper Hospital at Gloucester. He died in 1190, leaving his son Thomas or his grandson Helias his heir. His wife was called Maud. In 1201-2 Helias Giffard IV. was a minor in the custody of William, Earl Marshal. He was the son of Thomas and the grandson of Helias Giffard III. In 1210 he was with King John in Ireland. In 1214 the Barons, under Robert FitzWalter, rose in rebellion against John, and compelled him in the following year to sign the Great Charter at Runnymede. Helias sided with the barons, and took up arms with them. In 1216 he and his brother Osbert were excommunicated by the Pope for rebellion against John, and imprisoned. Brimpsfield Castle was seized by the king. In 1216 John died at Newark, and Helias giving his allegiance to the young King Henry III., who was crowned in Gloucester in that year, his lands were restored to him. In 1221 the Abbot of Gloucester complained that Helias Giffard had erected a scaffold, and was hanging his own men at Brimpsfield, to the detriment of the abbot. In 1225-29 Helias confirmed a grant by his brother Osbert to the Hospital of St. Bartholomew, Gloucester, of land called Hullitemed, in Brimpsfield, for the health of his soul and the health of the souls of his three wives—Isabella, Alice and Ysend. About 1230 he granted to his kinsman, Nicholas Caleway, land called Grofruge, in Brimpsfield, and Caleway gave it to St. Bartholomew's. Helias died in 1248-49, leaving his son John his heir. John Giffard, the next lord of Brimpsfield, is described by the chronicler Rishanger as a soldier of great courage and no less integrity. The history of Brimpsfield Castle becomes now very interesting, locally and nationally. It was probably built soon after the Conquest, on the site of a Saxon fortress. It is said to have had a massive central tower and four smaller towers at the angles. All that remains to mark its site is a deep mound with outer banks, surrounding an area of several acres. During the reign of Henry III. the Welsh, under their brave princes, Llewelyn



ap Jorwerth and Llewelyn ap Griffith, made frequent attempts to throw off their allegiance to the British Crown and to regain their liberty. Henry III. made several expeditions into Wales, with varying success. John Giffard took part in these in 1246, 1247 and 1248. In 1261 he was made governor of St. Briavel's Castle, at that time a post of great danger and responsibility on the Welsh marches. In 1263 Simon de Montfort, the great patriot Earl of Leicester, rose at the head of the barons to drive the hated foreigners, who filled well nigh every office, from the realm. John Giffard and the Earl of Gloucester joined De Montfort, and these three became the leading spirits of the movement. Robert of Gloucester, a monk of St. Peter's Abbey, is the principal authority for this period of English history, and his chronicle, from its many references to Gloucester and the neighbourhood, is exceedingly interesting to the local historian. It is evident that he was an eye-witness of the stirring events which he describes as taking place in the years 1263, 1264 and 1265. Henry III. had made a French knight, Sir Maci de Basile, sheriff of Gloucestershire and constable of Gloucester Castle, whilst the barons had given the shrievalty to Sir William Traci, a Gloucestershire knight. On Sir William attempting to hold his court Sir Maci came down upon him with an armed force, dragged him through the mire and imprisoned him in the castle. Whereupon Sir Roger de Clifford and his kinsman, Sir John Giffard, besieged and took Gloucester Castle, and led Sir Maci a prisoner into the Welsh marches. Then Sir John raided Sir Maci's manor of Sherston and drove all the live stock to Brimpsfield Castle. Sir Roger de Clifford, returning to the royal party, gave Gloucester Castle into their hands, and there was constant warfare between Gloucester and Brimpsfield. The Constable of Gloucester held a hundred court at Quedgeley, and summoned Sir John as a rebel before him. Sir John came with an armed force and slew some and dispersed the rest of the Constable's men. In February 1263-64 Sir John Giffard and Sir John de Balun came to the gates of Gloucester riding on woolpacks and covered with Welsh mantles, as if they were merchants, but when they were admitted they threw aside their cloaks, leaped from their horses and stood before the astonished porters armed from head to foot. The porters threw down their keys in alarm and fled, and the knights admitted Sir Simon de Montfort, Sir Henry, his son and many more. So the city was taken, but the castle remained in the hands of the king's party. Then came Prince Edward on Ash Wednesday and assailed the west gate, but was driven back. Turning to the Castle-mead and seeing one of the Abbot's vessels sailing to Tewkesbury, he seized it, and crossed in it to the castle. There were daily contests between the two forces till the Bishop of Worcester and the Abbot of Gloucester mediated between them and obtained a truce. The Barons' party withdrew from Gloucester on condition that Prince Edward should do no injury to the burgesses, but as soon as his foes were gone he broke the truce, imprisoned the principal citizens and hanged the unfortunate porters who admitted Giffard and De Balun. Then soon after was fought the battle of Lewes, in which Sir John Giffard was taken prisoner at the first onset, but the Barons won the day, and the king and the prince were captured. Those who escaped took refuge in Bristol Castle. A quarrel between Sir Simon de Montfort on the one side and the Earl of Gloucester and Sir John Giffard on the other arose concerning the ransom of Richard King of the Romans and other prisoners taken at Lewes, and the latter joined the king's party. After Easter, Sir Simon de Montfort, accompanied by his prisoners Henry III. and Prince Edward, marching to Hereford, remained several days at Gloucester. The Earl of Gloucester encamped in the forest that then extended from Iron Acton to the suburbs of Gloucester, whilst Sir John Giffard kindled a fire on a hill called Erdland, probably High Broadridge, where the single ash tree, like a mighty ship in full sail, now forms such a striking landmark, to assure the prince that friends were nigh at hand if he could effect his escape. From thence Montfort marched to Hereford, and there Prince Edward succeeded in eluding his captors and joining De Clare and Giffard. Gloucester was taken and all the bridges and shipping destroyed, with a view to preventing Montfort crossing the Severn. On April 2, however, he crossed below Worcester, and the battle of Evesham, so fatal to the cause of English liberty, was fought and won by the prince and his supporters. De Montfort was slain, and hundreds of his friends and allies perished with him. The castle of Brimpsfield had been held by way of security for the fidelity of Giffard to the king, but it was now restored to him, and he was pardoned for his rebellion. But Sir John, brave as he was in the tented field, was as yet a bachelor. He was not to remain so long. In 1270 Maud Longespee, widow of the son of the Earl of Salisbury, made complaint to the king that Sir John Giffard had carried her off by force from the manor of Kaneford, and was detaining her at his castle of Brimpsfield. Giffard, nothing daunted, pleaded that the lady was willing, though coy; and the king forgave him on condition that he paid him 300 marks for marrying without royal consent. Maud made the best of the situation, and they lived happily together till her death. Sir John married

twice again—Alice Maltravers, and then, in 1285, Margaret Neville, by whom he had a son, John Giffard, who succeeded him. In 1283 Sir John founded a cell or college at Oxford—Gloucester Hall, now Worcester College—as a residence for the young Benedictine students from Gloucester, Winchcombe, Malmesbury and other abbeys and priories of that order. This, he said, he did for the health of his soul, and for the health of his wife's soul, Maud Longespee. Giffard took an active part in the Welsh campaigns, which laid the Principality at the feet of Edward I. In 1285 Giffard bought the manor of Side from Simon Caleway, his kinsman, and settled it on his third wife, Margaret Neville. He died a peaceful death at his manor of Boyton in Wilts in 1298-99, and was buried at the abbey church of Malmesbury, leaving his son John, a boy of thirteen, a ward. John Giffard II., with his brother Edmund, visited the dying Abbot of Gloucester, John Gamages, in 1306, just as he (John Giffard) came of age. In 1316 he granted the privilege of free pasture in Buckholt to St. Peter's Abbey. He joined with Thomas, Earl of Lancaster, and so indeed did almost all the Gloucestershire nobility and gentry, in his struggle with the Despensers, and, like his leader, he was taken prisoner at the Battle of Boroughbridge in 1322. Lancaster was executed at Pontefract. Giffard was brought to Gloucester, tried and condemned as a traitor, drawn on a hurdle outside the town gates, hanged on a gallows and his body cut in quarters. In the previous year when Edward II. was at Cirencester on his march to the north, incensed because Giffard had waylaid and rifled some Royal carriages which were proceeding into Wales by the Ermin Street, he ordered Brimpsfield Castle to be destroyed, and so thoroughly was his order obeyed that in 1327 it was described as utterly ruined, and so Leland found it when he visited Gloucestershire in 1540. It was never rebuilt. Of course on the death of John Giffard his manors were confiscated by the Crown. Edward II. gave them to the younger Despencer, and, on his attainder, they were conferred on John Maltravers as a reward for murdering the king at Berkeley Castle. On his death they were granted to Maurice, Lord Berkeley, for his life, then to Lionel, Duke of Clarence, the third son of Edward III. By the marriage of his daughter and heiress they passed to the Earls of March and reverted to the Crown in the reign of Henry VIII., who gave Brimpsfield to Queen Katherine of Aragon. In the reign of Edward VI. it was granted to Sir John Bridges, afterwards Lord Chandos. In the reign of Elizabeth it was sold to the Sandys of Misarden, who again sold it to Dr. John Gilbert, archbishop of York, and it passed with his daughter in marriage to Lord Mount-Edgumbe. He sold it to the Pitts. It is now the property of Mr. Wait.

#### *Elkstone Church.*

Leaving Brimpsfield, the party drove along the wonderful old Roman road to Elkstone—a delightful journey, accomplished in beautifully bright and clear weather. When the church of St. John the Baptist had been reached,

The Rev. W. Bazeley described the structure, and pointed out its main features. He said:—It is a very curious church of Norman origin, and with a large portion of original work well preserved. The original plan is preserved—the nave without aisles, the chancel in two separate divisions and both vaulted, western tower and south porch. The walls of the nave and chancel and the south doorway are Norman; the tower is Perpendicular, and some later windows have been inserted. The original corbel table remains outside the nave, presenting heads, &c., and on the south are a greater variety of figures, such as winged horses, greyhounds, stags, centaurs, ox heads, an oblong chevroned figure, beakheads, &c. There is a billeted string-course and a flat buttress on the north. The masonry on the south has some zigzag work built into it. At the north-east of the nave is a small projection for the stairs, lighted by slits, leading to the chamber above the groining of the chancel, and perhaps to the rood-loft. The south porch is later and has a pointed doorway, but within it is a remarkably fine Norman doorway late in the style; the door-head is flat and shouldered. The tympanum represents the figure of our Lord, with Alpha and Omega, and a building in the background; on each side are ranged the Evangelistic symbols (or rather the ox, eagle, lion and a holy lamb), also scrolls and other figures. Above appears a hand as in the heavens, pointing to our Lord. The arch has two fine courses of moulding, one with rich beaded chevrons; one has a cylinder over which are curious animal figures and beakheads; in one instance a grotesque figure with extended hands is holding the beaks of the two adjacent figures. There are two orders of shafts: the outer having capitals of a kind of embattled pattern; the others have sculptured heads and serpents intermixed. The hood is beaded. There are some curious features about this doorway difficult to read. The chancel has walls loftier than those of the nave, but the roof is rather lower; both roofs are covered externally with stone tiles. In the nave the windows are insertions, chiefly Decorated, but one Perpendicular of two lights. On the south near the porch is a trefoil-headed lancet.



On the north of the chancel is a flat buttress and part of the original cornice, but intercepted. On this side is one small original window, and one inserted Perpendicular at the north-east. On the south are two single lancets, slightly pointed, and a later added buttress. Inserted in the masonry is a stone with interesting arches. The east end has two tiers of windows—the upper, of lancet form, lighting the chamber formed between the vaulting and the rafters; the lower, a small but very elegant Norman window, is enriched both within and without by a surrounding ornamentation externally of battlement. Above it externally is a billeted string-course, and below two buttresses of small projection. The nave has a good open roof, with collars and trefoiled timbers on brackets, bearing shields charged with arms and emblems. It is in good condition. The chancel, which externally has no indication of being divided, internally presents two divisions—a sanctuary and an ante-choir, both vaulted. The arch from the nave to the first portion is in form circular, the soffit plain; the hood facing west has balls or pellets, and rests on corbels representing animals like crocodiles, but not exactly similar. The ante-choir has the groining ruder than the sanctuary; the ribs very plain and simply crossing. Its north window is Norman, the south pointed, and on the north is the door leading to the upper chamber with flattened trefoil head. The second arch to the eastern portion is a low semicircular one, somewhat misshapen, whether originally or from having given way is uncertain. Its soffit is plain and carried on shafts with longitudinal mouldings—with one course of chevrons and a billeted hood. The sanctuary has strong ribs in the groining upon corbels, with a central boss, forming a kind of cusp, with heads, teeth, &c. The east window is set deep in the wall, and presents interesting ornamentation all around it, with bold chevrons containing lozenge-shaped flowers. The south-east window has in its east jamb a trefoil-headed niche and a piscina in the cill. There is some new coloured glass in the chancel window, and the ante-choir is used for the church choir. The pulpit is of fair woodwork, A.D. 1604, upon a stone base of earlier work. The font is Perpendicular, the bowl octagonal, panelled with quatrefoils, containing scrolls, with panelled stem. The tower is a very good Perpendicular one, opening to the nave by a tall pointed arch upon plain capitals, below which appear sculptured grapes in hollow mouldings. It has internally some good stone groining; the ribs are carried on shafts, which have on the capitals figures of angels bearing shields. The west window is a good one of four lights, with shafts having octagonal caps; externally it has the hood on corbels with angel figures, and against the central mullion is a large mutilated niche with canopy and the remains of a statue. The west doorway has a Tudor arch in a square. The buttresses on the north sides have grotesque figures, each of a fat man playing on a musical instrument—one a guitar, one blowing a horn. The battlements are good; there are no pinnacles, but gargoyles, buttresses at the angles and good base mouldings. The belfry windows are of two lights, with stilted shafts, the masonry being very excellent. The church and churchyard are in excellent condition.

#### *Cowley Manor.*

The stay at Elkstone was much too short for the party to sufficiently inspect the almost endless curiosities of the church, but time pressed, and the brakes were re-entered and the company drove to Cowley Manor, where they were cordially received by Mr. and Mrs. Horlick, who provided tea, after which the party walked about the delightful park, inspected its picturesque features, and went through the mansion, charmingly furnished, and with painted ceilings and rich mural adornments, which are being redecked by skilled artists. The manor of Cowley, formerly belonging to the Abbey of Pershore, was conferred by Henry VIII. on his new See of Westminster. It was held by the Bridges family in the commencement of the seventeenth century, and sold by them to Henry Brett, who built the manor-house in 1674. It was improved and richly decorated by Mr. Hutchinson some thirty years ago. The church of St. Mary the Virgin, adjoining the house, is all of Early English or thirteenth-century date, except the tower and porch, which are Perpendicular. The church is divided into two equal portions by a rood-screen, the stairs to which exist on the north side. A piscina, with a triangular-headed opening on the south side, shows there was an altar in front of the rood. The pulpit is Perpendicular. The piscina in the sanctuary on the south side is trefoil-headed with a shelf for the cruets. On the north side is a Decorated tomb, with the effigy of a priest wearing a chasuble, amice, alb, stole and maniple. Over the south porch is a niche for the statue of St. Mary.

#### *Coberley Church.*

The Rev. W. Bazeley having thanked Mr. and Mrs. Horlick for their kindness, the vehicles were entered again, and the party drove to Coberley, where they were received at the church by the rector (the Rev. C. H. Wilson), who pointed out the

chief features of the edifice. The church of St. Giles (formerly St. Cuthbert), Coberley, consisted before its restoration of a nave, chancel, south chapel, west tower and south porch. The whole of the church, except the tower and porch, which were Perpendicular additions, was fourteenth century or Decorated. As at Cowley, there was no chancel arch; the rood-screen was the only division of the choir from the nave. Within the altar rails, north and south of the high altar, were two recumbent effigies. These are now in the south chapel. These effigies probably represent Thomas de Berkeley, who fought at Crecy, and his first wife, whose name is unknown. These were placed originally in the sanctuary, because Thomas de Berkeley rebuilt the church and founded a chantry for the service of St. Mary, about the year 1340. There is also a smaller recumbent effigy of a young girl in hood and gown, with a buckled belt around her waist and a lion at her feet. It probably represents a daughter of Sir Thomas Berkeley. There is also a curious half-figure of a knight in mail holding a heart. This has also been removed from the sanctuary to the south chantry chapel. A fifth effigy represents a youth in the dress of a civilian, a tunic, long gown, supertunic and a hood. This is probably a member of the Berkeley family, who died at the latter end of the fourteenth century. Between the two Decorated windows on the south side of this chapel is a low side window, the use of which is unknown. It is not a leper window, for no one looking through it from outside could see the celebrant either at the high altar or the chantry altar. A high wall on the south and east of the church, with two Renaissance doorways, is all that remains of the manor-house of Cubberley, where dwelt the Berkeleys, the Bridges, Sir Thomas Pope, Earl of Down, who more than once entertained there Charles I., and the Castlemans. An engraving of the house and church, as they appeared at the commencement of the eighteenth century, is given in Atkyns's "Gloucestershire." Charles II. spent a night in Cubberley Rectory on his journey from Boscobel to Abbot's Leigh, after the Battle of Worcester. The rector showed in the chancel floor the memorial-stone of the past rectors of Coberley, all of whom appear to have reached a very ripe age, the eldest being Lewis Jones, who died on July 29, 1651, aged 105.

#### *The Berkeleys.*

The Rev. W. Bazeley gave a brief account of the Berkeleys, and pointed out that there were two families. The Berkeleys had a castle at Dursley and a smaller one at Berkeley, the hundred of which they held at the time of Domesday Book, and for several generations. But in the time of the civil war between Matilda and Stephen they were dispossessed. Henry II., before he became king, promised the hundred of Berkeley to Fitzhardinge, who was then a kind of mayor of Bristol. The Berkeleys of Berkeley Castle were lineal descendants of Fitzhardinge, who came into the estate at the time of Henry II.; but the old family was not ruined, because an arrangement was come to by which the son of one family should marry a daughter of the other, or *vice versa*, and the two families became united in this way. Dursley remained with the old family branch. The Thomas de Berkeley who fought in the French wars with Edward III. was one of the most celebrated warriors of that time, and was no doubt joined by many skilled archers of Gloucestershire, who helped to turn the battle to the side of the English. The reason why there were so many yew trees in the churchyards of Gloucestershire was to provide the villagers with the material with which to make their bows and arrows. The second branch of the family were the founders of the family of Chandos, and at one time there lived at Coberley the richest and grandest people in the West of England. Sir Giles de Berkeley left his body to be buried in the chancel of Malvern Priory and his heart to be buried in the chancel of St. Giles, Coberley. King Charles II., during his flight from Boscobel, stayed at Coberley and slept at the rectory, whence he passed in disguise through the county to Abbot's Leigh, near Bristol. He ultimately reached a southern port and escaped to France. The notion that May 29 was celebrated as oak-apple day because the king concealed himself in an oak tree on that day was not correct, but because when he was restored that was the date of his restoration. He hid in an oak tree three or four months later in the year than May. Having pointed out the doorway, the only part of the manor-house of Coberley, Mr. Bazeley, addressing the company, expressed his thanks, on their behalf, to Mr. and Mrs. Horlick for their kind reception and entertainment, and mentioned that Mr. Crewdson, of Side, had invited the party to luncheon, but he had declined. The reasons were because he thought it unfair, considering that he had been but a short time in the county, that he should be put to the expense and trouble attendant thereon, and because too much time would be occupied thereby. Mr. Bazeley also expressed his thanks to Mr. Currie for the assistance he had rendered.

It was nearly half-past seven when the company joined their respective vehicles and were quickly driven to the railway stations to catch trains or to their various destinations direct.



The trip proved one of the most enjoyable and instructive in the annals of the Society. The report is taken from the *Bristol Times and Mirror*.

### MODERN VAULT CONSTRUCTION.

THE ordinary portable burglar-proof safe is the type of the burglar-proof vault. Vaults indeed are distinguished chiefly by their size; a vault is a safe big enough to walk into, with other minor differences that we shall hereafter note.

Ordinary portable safes are of various sizes up to about 6 feet width of front and 7 feet height. The depth inside in the clear, even of large safes, must not exceed the reach of a man's arm, which means about 3 feet depth outside, owing to the thickness of the walls and doors and the space required for the mechanism.

Vaults proper, such as are large enough to walk into, are usually 8 feet high inside and as large as required on the floor—seldom less than 8 feet square, and seldom needed more than 8 by 16 feet for the use of banks.

Safe-deposit vaults are often built of great size, 40 feet square or more; the height, however, does not exceed 8 or 8½ feet.

With the portable safe we have not much to do at present, as it is only when the safe has grown to the dignity of a vault in size that especial provision need be made for it by the architect.

In arranging a place for the vault, whether of a bank, safe-deposit company, or other concern needing one, the first consideration is to place it clear of contact with the building on all sides. A space wide enough for convenient passage at least must be left all around the vault; a similar space between the top of the vault and the ceiling of the room in which it stands; while the space in the room below the vault must also be open for continual inspection. Often an open grating in the floor surrounds the vault, making it possible for a patrol to watch the whole circuit in two storeys at once. When this is done the bars of the grating must run in the direction of the path of the patrol to permit an easy view.

This matter of the isolation of the vault, although often neglected, is a fundamental requirement for safety.

The next thing to be looked out for, trivial as it may seem, is the swing of the entrance door. In the first place, the throw of a vault door is very much greater than the width of the clear entrance. If the inside entrance door is to be 2 feet 6 inches wide, clear of the bolt work, we must add to this about 3 inches for the bolt work, as much again for the opposite rabbetted jamb, and again another foot for the splayed, rabbetted jambs of the outside door. Add to this several inches more for the working of the mechanism of the hinges, and we have 4 feet 6 or 8 as a minimum throw of the outer door to be provided for. Again, it is quite usual to place the floor of the vault a foot or so below that of the room in which it stands. This is done so as to bring the highest point of the rabbetted sill low enough to allow a movable platform to be placed over it, terminating in an easy slope inside the vault. This is done to do away with the annoying and dangerous stumbling-block that would otherwise be formed by the rabbetted sills of outer and inner doors. It is one of the standing difficulties in the use of vaults, so much so that a movable sill, which lies down flat, out of the way, has been invented and may be used. But, when this is not used, the lower edge of the outer door will swing below the level of the floor of the room, and provision must be made for it.

Finally, all vaults must stand on a foundation of their own; not on beams, however strong. Beams are sure to bend a little, and the slightest bending will throw the swing of the great doors out of true, so that it will be impossible to open and close them. Besides, the tremor of a floor would tend to disturb the mechanism of the time-locks. Moreover, to stand a vault on a floor makes the integrity of the vault depend upon the stability of the building; a fire, or earthquake, or explosion, or unaccountable fall of the building would carry with it the vault, which might be penetrated in the crash. So it may be laid down that a foundation of its own a vault must have, preferably of brick arches. We shall again allude to foundations after we have spoken of the construction of the vault itself.

In planning a safe-deposit vault much more careful provision is required than for any other kind. The arrangement of the interior depends upon the placing of the banks of small safes with which the vault is to be filled. These safes are of a regular depth, usually 2 feet, whatever may be the size of the door in the face of the stack. The passages between the stacks should not be less in width than 3 feet, nor greater in length for a *cul de sac* than 10 feet. This for two reasons, partly for ventilation, as the air is apt to stagnate in long blind passages, partly to avoid undue interference and jostling among the depositors.

The placing of the entrance and exit is determined by the general plan of the offices, and upon this, in turn, depends the laying out of the passages and banks of safes inside.

Every safe-deposit vault must have two entrances, each complete, with vestibule and outer and inner doors, as will be hereafter explained. The most economical form of vault is about 8 feet wide, with a door at each end, and banks of safes on each side. Up to 20 or 25 feet in length, this will do very well.

Beyond this some form of square or oblong vault, with transverse secondary passages branching from the main passage must be used, as the single straight passage begins to pass reasonable length.

Two entrances are essential for safe-deposit vaults on account of the ever-present possibility of an accidental lock-out caused by defect or stoppage of the time-locks. With banks a lock-out is disagreeable enough, but for a safe-deposit company, with hundreds of concerns wanting to get at their deposits, such an occurrence would be fatal. Two entrances render the chance of an accident to both at the same time infinitesimal.

Indeed, it would always be well, were it not for the cost, to provide bank vaults and all kinds of vaults with two entrances. On account of the cost, however, this is rarely done. Various expedients are resorted to with the same end. I have designed two vaults alongside each other with a hole in the partition wall, usually covered by a steel-plate cover, secured by bolt work and locks, but serving to give access to either safe from the other in case of a lock-out. A similar design I have made in two storeys, with a hole in the floor between, similarly made secure.

Another continual care of safe-deposit officers is the ventilation of the vault. The unavoidably contracted space, with many people frequenting it, and only two doors giving admission to the outer air, is sure to make trouble.

The best thing to do, although costly, is to make one or more holes in the ceiling of the vault, with covers fitted precisely as the doors are fitted that can be lifted by screw or other power while the vault is in use, and closed at night and bolted inside.

Such an opening, enclosed in a sheet-metal trunk, may be connected with a Blackman-wheel air-current, and the interior of the vault supplied with abundance of fresh air.

The use of electric lights has simplified the question of vault ventilation, which in the days of gas light was an almost insoluble problem.

For both safes and vaults there is one predominant method of construction; there are, besides this, half a dozen other methods more or less in use.

The usual way is to build up the required thickness of the walls with plates of steel screwed together. These plates vary from half an inch to 2 inches in thickness. Half-inch plates are commonly used, with an inch plate on the outside, because such a construction is much cheaper than the same thickness of walls built up with inch plates throughout. Inch plates are stronger and better construction, but half-inch are very good and quite usual.

The plates are not generally all of the same material. Steel, indeed, they all are, but the alternate plates are usually of chrome steel.

Nor are these chrome steel plates simple; they are in themselves compound, each plate being built up of five plates, rolled together hot, welded into one mass, the central and interior layers being of ordinary homogeneous Bessemer steel, the intervening two layers, making five layers in all, of chrome steel proper.

Chrome steel has a small proportion of chromium added, which gives to it an excessive hardness against attack by the drill—nothing but diamond drills and plenty of time to use them will cut it. By the use of the blow-pipe, however, the temper may be drawn, and it is then drilled with as much ease as other soft steel. It is rolled in layers, as described, because with extreme hardness there is an accompanying lack of tenacity which the layers of ordinary steel are intended to supply.

The plates that are not chrome steel are of the usual mild steel, which is so fast supplanting iron, being both better and cheaper, rarely as those qualities are found together.

The plates are fastened together by screw bolts screwed in from the inside. These are not long enough to penetrate the outside plate; they give no indication of their position. The bolts that secure each succeeding plate are carefully laid out so that no two bolts occur at the same point.

The whole vault is built up in the shop of untempered plates screwed together just as it will be in the bank, safe-deposit office or other institution for which it is destined. It is then taken apart; the plates are tempered and afterwards straightened before they are taken to the place where the vault is to be built.

The walls of vaults vary in thickness. Three inches is a good thickness, four inches ample, and the thickest built, so far, is six inches thick.

\* From a paper by Mr. John Beverley Robinson, architect, in the *Architectural Record*.



All vaults of any pretension at all are provided with a double set of doors at the entrance—with what is called a vestibule. The vestibules may be deep enough to contain the whole of the inner door when open, or may be only deep enough to accommodate the knobs and levers of the inner door and the bolt work on the inside of the outer door when both doors are shut. In the former case it is possible to make the opening of the outer doorway no larger than that of the inner—in the latter case the outer doorway must have additional width enough for the inner door to stand out at right angles.

The clear width required for the inner doorway is not less than 2 feet 6 inches nor more than 2 feet 10 inches. Both outer and inner doors are by preference single doors, because such can be made stronger than double doors; often, though, for convenience the inner doors are made double, one opening into a pocket on each side of the vestibule.

Both outer and inner doors fit into their jambs with rabbets and grooves. Each steel plate of which the door is composed sets back from that outside of it, and if more than half an inch thick is itself rabbetted in its thickness in half-inch steps. Besides these rabbets there are used in each door usually two groove irons, as they are called, really angle irons; for thick doors three are used, but rarely less than two, for in addition to the rabbets, and as far more efficient, the grooves are depended upon to exclude explosives. For still more perfect protection the edges of the angle irons are corrugated, and in the bottom of the opposed groove is placed a strip of rubber or asbestos packing upon which the sharp edges of the corrugations press tightly and form an air-tight joint. This closeness of joint is especially meant to keep out nitro-glycerine, which is used in liquid form in the attack.

Two things are needed for the attack—force and time. The force must be such as can be used quickly. Drills are all very well, but wedges, driven by a copper-headed sledge, which makes but little noise, start the edge of a plate more quickly. Into the minutest crevice a little nitro-glycerine penetrates, drawn into incredibly small space by capillary force. The explosion tears away more or less of the plate, leaving the next joint exposed for the wedge.

When the circumstances prevent the use of explosives the drill and the hydraulic ram are resorted to, but for speed and force combined explosives are preferred.

The noise of the explosion, muffled by the walls of the building in which it occurs, to outside ears seems to passers who may happen to notice it like some distant report, or often attracts no notice at all. For this reason it is often possible to use explosives where it would seem to be impossible without immediate discovery.

Nitro-glycerine is the agent most feared nowadays. It will penetrate any joint, and at least relax it with its tremendous shock, giving space for the introduction of a heavier charge. Although dangerous to make and difficult to buy, it is easily obtained from ordinary commercial dynamite, which is nothing more than nitro-glycerine held in absorption by infusorial earth or other absorbent. The liquid nitro-glycerine is obtained by the simple process of dissolving it out with 95 per cent. alcohol, and then precipitating the nitro-glycerine by the addition of water.

In order that doors constructed as has been said with rabbets and grooves may be opened and closed, something more than ordinary hinges is clearly required. Something it must be that will move the whole door parallel to itself a distance equal to the depth of the grooves and rabbets, in most cases, that is to say, half an inch. To do this several kinds of crane-hinges, as they are called, have been devised, which accomplish their purpose admirably. Not a trifling matter this either, to wield at the end of a rotating arm, to suspend upon it in a position where it can easily be moved backwards and forwards, and yet is so firmly immovable otherwise as to fit with accuracy into its complicated seat, a weight not less than 4 tons, often 6, and sometimes as much as 10.

Although the weight of the heaviest vault is trifling compared with the weights that architects are accustomed to deal with in building, yet certain precautions are necessary in providing foundations for them. The vestibules especially must be upon an immovable base, for the slightest sag or settlement means a distortion of door-jambs, and the impossibility of closing the doors. The bottom of the vault, although amply strong enough to sustain itself over ordinary spans, say up to 10 feet, is apt to sag slightly in reaching its point of resistance, and is better supported by rolled beams placed 3 to 4 feet apart. These must be adequately supported by columns, piers or walls, for the vault must not rest upon the earth directly, as such a situation invites attack by tunnelling from a distance, which can be carried out with perfect security, as observation is in such an arrangement impossible.

Therefore all vaults are on some kind of open foundations, usually extending through a basement, and supporting the vault level with the floor above. Sometimes these foundations are in the form of a brick vault, less secure than the steel vault above, but sufficient for the storage of silver, paintings and valuable

books. In this case the brick vault has a door like that of the steel vault, less ponderous perhaps, but substantially the same thing.

But if used for this purpose the foundation should be as open as possible, the walls perforated with arches everywhere. Brick walls are much to be preferred to iron columns, as less likely to be destroyed by fire.

Columns, if used, should be securely covered with fireproof material, as also should any iron columns that support the floor of the vault.

For supporting the floor brick vaulted arches, dispensing with iron altogether, are as much to be preferred as brick walls are to iron columns.

The ceiling of the vault up to 8 or 10 feet span will sustain itself. For wider spans some interior support must be provided. This is often furnished in safe-deposit vaults, which are the largest vaults in use, by the banks of small safes with which the vault is occupied.

These, however, are not usually put in all at once when the vault is built, but gradually as the business requires; because often the character of the business requires a change in the style of safe used, or new inventions must be included to make the safes rentable.

Until the banks of safes are put in it is usual to support the ceiling of the vault by small cast columns or pieces of wrought-pipe. The ceiling is jacked up the half or three-quarters of an inch necessary, and when it comes down it holds the column firmly in place.

When the ceiling must be carried without columns over a clear span the steel beams necessary to carry it are placed outside, above the ceiling to be carried, and the outer shell is attached by conical eyebolts and suitable hangers to the beam. It would be as well or better to put the beams inside were it not for the valuable space they would occupy.

Vaults are usually made only 8 feet high in the clear, because of the great cost of every added inch, and beams inside would cut this down, both for use and looks, very materially.

The steel walls of the vault itself afford sufficient support for the suspended ceiling without special provision in addition.

Thus built and upon such foundations stand some vaults, good ones at that, without defence against fire at all, being in buildings called fireproof, and certainly unflammable in their constructive parts.

It is better, however, in all cases to provide some kind of fire-resisting jacketing. Of this, two kinds are commonly used. Nothing is better for fireproofing than a brick wall. It should be hollow, if possible, with two 8-inch walls or an outside 8-inch and inside 4-inch at least. The ceiling must be covered with at least four courses of brickwork.

All should be laid in good cement mortar, although lime mortar gauged with plaster of Paris might be even better than cement. In a combustible building, at least, this covering of the ceiling should be in form of brick arches, laid between iron beams placed on the top of the vault, with the usual tie-rods, and made as strong as possible, to resist crushing by a falling wall if fire should occur.

The great objection to brick walls is the space that they occupy. Two 8-inch walls with a 4-inch space will be 20 inches, and this carried around a vault of 50 feet circuit covers about 83 square feet—a considerable space where space is most valuable. So sometimes the fireproofing is done with a covering of concrete—cinders, plaster and cement, mixed and filled in between the outside of the vault—and a quarter or three-eighths inch plate of soft steel held to the shell of the vault by anchors at frequent intervals.

## TESSERÆ.

### Decline of Art in Egypt.

AT the period of the Persian invasion, Egypt was looked upon as the great school of science, and the repository of all kinds of learning; but the arts had fallen from the degree of excellence to which they attained under the Augustan age of the eighteenth dynasty, and, though luxury and private wealth increased, taste in sculpture and architecture had long since been on the decline, and minute and highly finished details were substituted for the simple and dignified forms of an earlier period. The arts, however, continued to flourish under the succeeding dynasties, and in the reigns of Psamaticus and Amasis the encouragement given to architecture, sculpture and painting seemed to promise an improvement, if not the revival, of taste, and arrested for a time their downfall; but an unexpected event was destined to bring about their sudden decadence, and the Persian conquest dealt a blow from which they vainly strove to recover in the succeeding reigns of the Macedonian dynasty, for not only were the finest monuments destroyed or mutilated, statues, works of art and all the wealth of the country carried off to Persia, but the artists themselves were compelled to leave their homes to follow the conquerors to their capital, and to commemorate the victories obtained over Egypt



by the authors of their own captivity and misfortunes. Thus deprived of the finest models, humbled by the lengthened occupation of the country, and losing the only persons capable of directing taste or encouraging art, Egypt, already beginning to sink, vainly endeavoured to struggle with the overwhelming current of events; and, while Persia was benefited, Egyptian art received its deathblow from the invasion of Cambyses. The Egyptians had long been renowned for mathematical science, but it was not till the power and wealth of the country were at their zenith that full scope was given for its display in the grand style of public monuments; a fact sufficiently indicated by their increase of scale and vastness of size at that period, the buildings of olden time being generally of much smaller dimensions than those of the advanced age of the eighteenth dynasty. This is particularly true of the temples and the colossal statues erected at the latter epoch, which far exceed in their scale, and the size of the blocks themselves, the ordinary monuments of the earlier era, as may be observed in the increased proportions of the grand hall of Karnac, added by Rameses the Great, and the dimensions of the sitting colossi of Amunoph in the plain of Thebes; or that of Rameses at the Memnonium, which weighed about 886 tons, and was brought overland from the quarries at the cataracts of Syene, a distance of more than 120 miles.

### De Louthembourg and the English Stage.

De Louthembourg, decidedly the prince of scene-painters, had contributed largely to the improvement of the stage. Garrick, whose judgment was equal to his liberality, engaged him as principal painter for his theatre, at a salary of 500*l.*, a much larger sum than had been afforded to any of his predecessors. It was from this epoch we may date the superior decorations of dramatic exhibitions; for before the arrival of this ingenious artist, not only little attention had been bestowed on the scenic department, but even the costume of the stage had been a matter of minor consideration. Indeed, the anachronisms of dress which were tolerated at the principal theatres, if reintroduced in this more enlightened age would, without the necessity of exaggeration, be viewed by the more illiterate among the playgoers as complete burlesque. Hogarth had already given his friend Garrick some satirical hints upon the subject in the plates of his "Analysis of Beauty." But it was left for De Louthembourg to urge, and finally complete, the desired reformation.

### William Hogarth.

As an inventor Hogarth is by far the greatest of the British school, although in aim and object, colour, surface and all the requisites of a great painter, infinitely below Reynolds. It would be useless to detail the perfections of a man so admired all over the earth, and who will only cease to be a delight with its existence. It is astonishing how hereditary is the hatred of academies. The painters, in revenge for Hogarth's opposition, swore that he was no painter, and swear so to this hour. The absurdity of this criticism can be proved by the *Mariage à la Mode*, whilst the picture of the husband and wife after a rout is as beautifully touched as any in that class of art can be. He has not the clearness of Teniers nor the sharpness of Wilkie, his touch is blunt and his colour deficient in richness, but you feel not the want whilst looking at him; and, although his expression is often caricature, yet in the above picture it is perfection. Hogarth, unfortunately, believed himself infallible, but his wretched beauty of Drury Lane for *Pharaoh's Daughter* at the Foundling, his miserable *Sigismunda* and his was serious *Felix*, we hope, convinced him of his *forte*. If he *Paul before* in these pictures, which we very much doubt, he deserved a strait waistcoat and a low diet as the only treatment for his hallucination.



### Wimbledon Tendering.

SIR,—We shall be glad if you will allow us space for drawing attention to the following facts, for although it may be considered a private matter so far as it concerns ourselves, yet as it involves an excess in the expenditure of the rates to the amount of 70*l.*, you may deem it something more. Some few weeks since the Wimbledon Urban District Council advertised for tenders for the erection of an underground convenience to be constructed in the Broadway. Plans and specification were to be seen at the Council offices. Having inspected the same, we determined to send in our tender, and upon asking for the usual copy of the specification and bill of quantities, we were informed that the latter must be got out by ourselves, and that the former could only be seen in the office. Not deterred at this, we went fully into the details and took out the quantities,

with the result that we sent our tender in by the appointed time, May 17, our price being 545*l.*, which sum included the builder's usual profit and the surveyor's fixed amount of 25*l.* to be expended for Doulton's and other special appliances which the Council had determined upon. Seeing by the report in the local papers that two tenders had been received, and that it was decided to invite tenders from other firms, we waited upon Mr. Cooper to ask for some explanation, and if the tenders sent in had been opened, and learnt from him that the tenders had been opened and that he had written to one other firm only, a London firm, both the tenders received being local. In the reports of the Council meeting of June 2 will be found the amounts of three tenders as follows:—

Jennings, London . . . . .	£615 0 0
Burgess, Wimbledon . . . . .	614 0 0
Dashwood, Wimbledon . . . . .	545 0 0

the highest being accepted, subject to approval of proposed fittings. The above facts suggest two questions, and possibly a third. Why were the local firms *limited* to certain special fittings and tiles, and after their prices were known the London firm allowed to choose what they would use, subject to the surveyor's approval? Why spend 615*l.* in London when 545*l.* to a local firm would have given the town the very best structure it is possible to build, for it was such we estimated for and intended to give for our own credit's sake, and some of the prominent residents of the district, for whom we have the pleasure of working, are ready to testify to our ability to carry out our contracts? Having been ratepayers in Wimbledon since 1882, when we erected our horticultural and building works, we think you will feel with us that we have been treated as bad as the rates, which are to be wasted to the amount of 70*l.*—Yours faithfully,

ARTHUR DASHWOOD & SONS, LIMITED.

June 8, 1897.

### GENERAL.

**M. Falguère** has obtained the commission for the statue of M. Pasteur which is to be erected in Paris and which will cost over 10,000*l.*

**The Slade** Professor of Fine Art in Oxford will deliver the remaining lectures in this term upon the "Sphere of Paduan Influence" as follows:—Friday, June 11, "Carlo Crivelli;" Saturday, June 12, "Alvise Vivarini;" Thursday, June 24, and Friday, June 25, "Paduan Influence in Lombardy—Vincenzo Foppa and his Pupils." The lectures will be given in the lecture-room of the Ashmolean Museum (University Galleries), at 4 P.M. each day.

**Mr. A. C. Gow, R.A.**, has been commissioned to paint the picture illustrative of Her Majesty's visit to the City on the 22nd inst., of which Mr. Henry Clarke, L.C.C., is the donor. When completed it will be deposited in the Guildhall Art Gallery. The point which has been determined upon for the picture is the Queen's arrival at St. Paul's Cathedral, followed, as Her Majesty will be, by the mounted princes and by the Lord Mayor, the background being occupied by the edifice itself and by the assembled clergy.

**Mr. T. P. Martin**, architect, Swansea, died on Sunday last.

**Mr. F. J. Warden-Stevens, A.M.I.E.E., &c.**, of Westminster, as we announced in a previous issue, had been appointed consulting engineer to the Poplar Guardians, in connection with the electric lighting. He has since been requested to prepare a complete scheme for steam supply and storage, supply and storage of water, and motive power arrangements.

**The Ground** in North Bridge Street, Edinburgh, which is available for building sites owing to the construction of the new bridge, is to be sold in one lot by auction, the reserve price being 200,000*l.*

**Lauderdale House**, in Aldersgate Street, is about to be taken down, in order to provide a site for the new works to be erected by Mr. H. C. Stephens, M.P.

**The Ancient** and royal castle of Tamworth, the property of the Marquis Townshend, was offered for sale on Tuesday at Tamworth town hall. The town clerk, on behalf of the Corporation, began the bidding at 1,000*l.* Other bids were made, and the town clerk eventually bid 3,000*l.*, at which figure the property was declared to be bought by the Corporation.

**Mr. Thackeray Turner** says that the Society for the Protection of Ancient Buildings are considering the work at Canterbury Cathedral, and, however much the public may appreciate work done under Sir A. Blomfield's influence, "it is questionable whether they are willing to lose original Mediaeval work to make way for it. Upon entering the chapter-house, everything which meets the eye gives the impression of newness, with the exception of the existing flooring, which is made up of monumental slabs and plain red tiles, and this we understand is to be entirely replaced by a stone pavement. As one of our informants said, 'It is entirely like entering a brand new building.'"



# The Architect.

## THE WEEK.

THE memorial of Lord LEIGHTON in St. Paul's is to be in the form of an altar-tomb supported by emblematic figures. Mr. THOMAS BROCK, R.A., will be the sculptor. The design has been approved by the Prince of WALES, the president of the committee and the members. The work will cost 2,500*l*. The subscriptions amount to 2,400*l*., and an appeal is made to the friends and admirers of the late President of the Royal Academy for the small sum which is still required. When Lord LEIGHTON died it was anticipated that a liberal amount of money would be forthcoming as an expression of the grief which was generally felt at the loss of a general favourite and of an artist whose aims were not restricted to the obtaining of large sums for his works. But there was practically no response to the proposal to purchase the President's house at Kensington, and the subscriptions for a monument are not remarkable. The results are a comment on the real value of public favour.

It is, we suppose, no more than natural that, out of loyalty, efforts should be made to demonstrate the progress of England during the reign of HER MAJESTY by contrasting the year 1897 with 1837. A comparison of that kind cannot always be true in the case of the fine arts. Under the most auspicious conditions great artists cannot be created. They are born, not made. On the other hand, they often appear at times when they seem to be out of place, for their contemporaries cannot understand them. Numerous as were the shortcomings of the people in 1837, if judged by the standard of the present year, it cannot be denied that artists who would have honoured any era then lived in England. It was the year when TURNER exhibited that view of Venice for which a few weeks ago over seven thousand pounds were paid. Among his other works then seen were the *Parting of Hero and Leander* and *Apollo and Daphne*. EDWIN LANDSEER was represented in the Royal Academy by several of his most popular works—the *Shepherd's Chief Mourner*, the *Return from Hawking*, the *Return from Deerstalking*; WILKIE by his *Cotter's Saturday Night*, MACLISE by his *Bohemian Gipsies*, LESLIE by his *Perdita*, ETTY by his *Sirens*, and J. F. LEWIS by his *Spy and Zumalacarre*. Some of those pictures are now national property, and they are evidence that the painters' art was not at a low level.

THE Institute of British Architects was not in 1837 entitled to prefix the word "Royal" to the name, but Lord MELBOURNE, as Prime Minister, was able to inform Lord DE GREY, the president, that HER MAJESTY had graciously consented to become patroness of the Institute. Sir ROBERT PEEL was elected an honorary fellow. The honorary secretary was then T. L. DONALDSON, who was busy with projects. One was a universal system of architectural notation. He showed how out of twelve writers on Greek architecture five had distinct methods of notation; of those on Roman architecture, two only had given dimensions in feet and inches, and both used different modes; and among the several writers on Gothic architecture the systems adopted were as numerous as the writers. He proposed that the feet and inches be separated by two strokes, as in our monetary system, and that the parts of an inch should be expressed decimally by a dot; that the symbols should be those used by astronomers—the small circle for the feet, as the primary quantity, the simple stroke, or acute accent, for the inches, and the double stroke for the tenths, thus: 1'; 2', 5". No confusion could arise from the employment of the astronomical symbols, as temples, and even cities, are never measured by degrees of miles; and it was recommended that the scale should always be placed at the bottom of a plate, and the different divisions carefully marked thereon. It would appear that the first example of a fitch beam was shown at one of the meetings during the year. It was said to be the invention of Mr. JOHN MARTIN, and consisted

merely of a thin plate of wrought-iron, which passed through the rollers, screwed tightly between two three-quarter deals; and several experiments were made on a small scale to show what great strength was gained by the arrangement.

THE prizemen of the Royal Academy in 1837 did not fulfil the expectations that were founded on them; for instance, the gold medals were awarded to E. B. MORRIS for the best original painting, and to JOHN A. GIFFORD for the best original design in architecture. The silver medals were gained by J. HAYES for the best copy in the Painting School, SAMUEL TAYLOR for a copy in the Painting School, T. H. HARLAND for the best drawing from the life, THOMAS BURTON for a drawing from the life, W. SNOOK for an architectural drawing, A. J. ASHTON for the same, J. RIVERS for a model from life, W. CARPENTER for a drawing from the antique, H. LE JEUNE for the same, NELSON O'NEAL for the same, G. NELSON for a model from the antique. Among so many successful students Mr. LE JEUNE alone attained the rank of associate. Mr. ASHTON, we believe, practised as an architect, but the remainder have left nothing which will preserve their names from oblivion.

FREEZING is occasionally employed in the north of Europe as an auxiliary in the carrying-out of foundations. The first application was in the Siberian mines. In order to reach the gold-bearing rock, which is in many places beneath strata of gravel and sand containing watery seams, the natural cold of the winter season is turned to account. The ground is kept clear of snow, so as to permit the cold to penetrate as deeply as possible, after which the surface is thawed by fires until a shallow layer of earth can be removed. The freezing is then allowed to proceed and the thawing operation repeated, and this is continued as long as the cold weather lasts. In this way, through the long Siberian winters, open excavations are made to the gold-bearing rocks, the depth attained being from 25 to 75 feet, according to the duration of the cold season. Artificial cold for purposes of excavation was used first by POETSCH in 1883. By his process of the circulation of cold brine through a series of buried pipes, the most difficult quicksand may be made hard enough to be excavated like rock. It was used in sinking the shaft at the Courrières mines. Among the applications of the freezing-process are the sinking of the shafts for the cylinders of the hydraulic elevator for the canal lift at Les Fontinettes, and the construction of a tunnel at Stockholm. The latter work was executed entirely by the introduction of cold air into the working-chamber at the head of the tunnel, the cold preventing the infiltration of water until the béton lining was built and the work of excavating and lining being carried on at temperatures ranging between 0 deg. and 25 deg. F.

THE statistics furnished by Mr. T. W. RUSSELL, M.P., at the dinner given by the British Institute of Public Health on Wednesday were remarkable. Whilst in the twenty-four years preceding 1873 the local authorities in this country spent 11,000,000*l*. upon sanitation, for the twenty-four years following that date the expenditure was 72,000,000*l*. When examined in detail the figures were equally interesting. In 1872, for example, 103 loans were sanctioned to public authorities for sewerage, water supply purposes, &c., the total amount being 445,000*l*. In 1896 the loans had risen to 596, and the amount to 2,830,000*l*. In 1872 all that any local authority in England and Wales spent on infectious hospitals amounted to 3,970*l*. Twenty-four years later 132,000*l*. was so spent. The amount expended in 1872 by public authorities in the disposal of house refuse was 700*l*. In 1896 the expenditure amounted to 120,000*l*. In 1872 fifty local authorities adopted sewage schemes, but in 1896 the number rose to 300, and the expenditure showed an increase from 310,000*l*. to 1,484,000*l*. In that year, too, no less a sum than 3,000,000*l*. had been expended under the Housing of the Working Classes Act of 1890. Although so much has been done further expenditure is needed, but apparently the improvement in public health keeps pace with the outlay.



## ST. PAUL'S CATHEDRAL.

WHEN studying the history of the cathedrals, abbeys and the greater Mediæval churches of England, it is often difficult to decide how far the bishops and other clerics who are recorded as the architects of the buildings corresponded with the men who now practise the art. At all times a bishop's office was onerous, and as far as can be made out an abbot's or a prior's was as little of a sinecure. If they faithfully discharged the duties laid on them their hours must have been fully occupied. On the other hand, architectural practice could not ever be considered a pastime. To build a cathedral or church which abounded in constructive difficulties—for in Mediæval days it was almost necessary to arrange the masonry in such a way as to amaze the uninitiated and to surprise experts by novelty—was not a hobby to be taken up in moments of relaxation. Apparently there must be a sacrifice of one office to another, or a compromise which would hardly befitt the holder of an ecclesiastical dignity. There is nothing to show that JOHN ALCOCK of Ely, RICHARD BEAUCHAMP of Salisbury, ROGER GROSTETE and HUGH DE GRENOBLE of Lincoln, WALTER SKIRLAW of Durham, WILLIAM WAYNFLETE and WILLIAM WYKEHAM of Winchester, GUNDULPH of Rochester, or OSMUND of Sarum were negligent as bishops. Tradition is also silent about the monks of Ely being free from discipline whilst ALAN DE WALSINGHAM was calculating the thrusts of the central lantern—a problem as onerous as that of the cantilevers of the Forth Bridge in our days. Prior BIRD ruled in Bath during the time the noble abbey was in course of erection, and the novel feats of vaulting and over-elaborate carving in the Chapel of HENRY VII. went on while WILLIAM BOLTON, the master of works, presided in St. Bartholomew's, Smithfield. It is not easy to obtain coadjutors in high ecclesiastical offices; and would it not be then safe to conclude that the architectural works were entrusted to deputies? When we see RICHARD DE GAINSBRO' represented in the Lincoln cloister holding a rule and compasses, we must conclude he was known to his contemporaries as a designer; and when we learn that HENRY the monk, who is credited with Evesham Abbey, was called "latomus," we assume he was a practical builder who was able to draw plans as well as cut stone. But for the majority of the ecclesiastics we have not even such evidence of connection with architecture as is afforded by a symbol or a nickname, and it would not be unreasonable to suppose they were administrators rather than architects of the modern type. The Mediævalists may have been superior to us, but they did not possess means to facilitate the acquirement of skill in design or a comprehension of the science of construction. To them as to us, architecture was full of mysteries which could only be revealed by long and patient labour.

It is remarkable that when, after a long period, it was necessary to erect a new cathedral, or, in other words, only two centuries ago, there should be almost as much uncertainty about the position of the architect as if he had lived in the thirteenth century. The inscription in St. Paul's Cathedral tells the visitor that if he wishes to discover the tomb of the builder of the church he has only to look around—"Lector, si monumentum requiris, circumspice." And HORACE WALPOLE says:—"A variety of knowledge proclaims the universality, a multiplicity of works the abundance, St. Paul's the greatness of Sir CHRISTOPHER'S mind. Our noblest temple, our largest palace, our most sumptuous hospital are all works of the same hand." All that is admirable rhetoric and it conquers the imagination. But the fact remains that we cannot say whether WREN drew one of the numerous mouldings in the cathedral or designed one leaf of the ornament. There must have been an organisation for designing and drawing over which he presided, otherwise the building could not be completed. WREN resembled one of the military commanders of that age who directed campaigns, but whose swords were only signs of authority. The modern architect, on the contrary, must imitate the ancient leaders who had to use their own hands if they expected to be victorious. Every stone in his building should be familiar to him, for he has endeavoured to realise it on paper. WREN was deprived of the training which makes a hand with a pencil in it more expressive than the tongue. Two years before his death he prepared a list of his essays, but prior to 1661, when he received the



Photographed by Bolas &amp; Co.

THE CROSS OF ST. PAUL'S.

Let my path  
Lead to that younger Pile, whose sky-like dome  
Hath typified by reach of daring art  
Infinity's embrace; whose guardian crest,  
The silent Cross, among the stars shall spread  
As now, when She hath also seen her breast  
Filled with mementos, satiate with its part  
Of grateful England's overflowing Dead.

WORDSWORTH

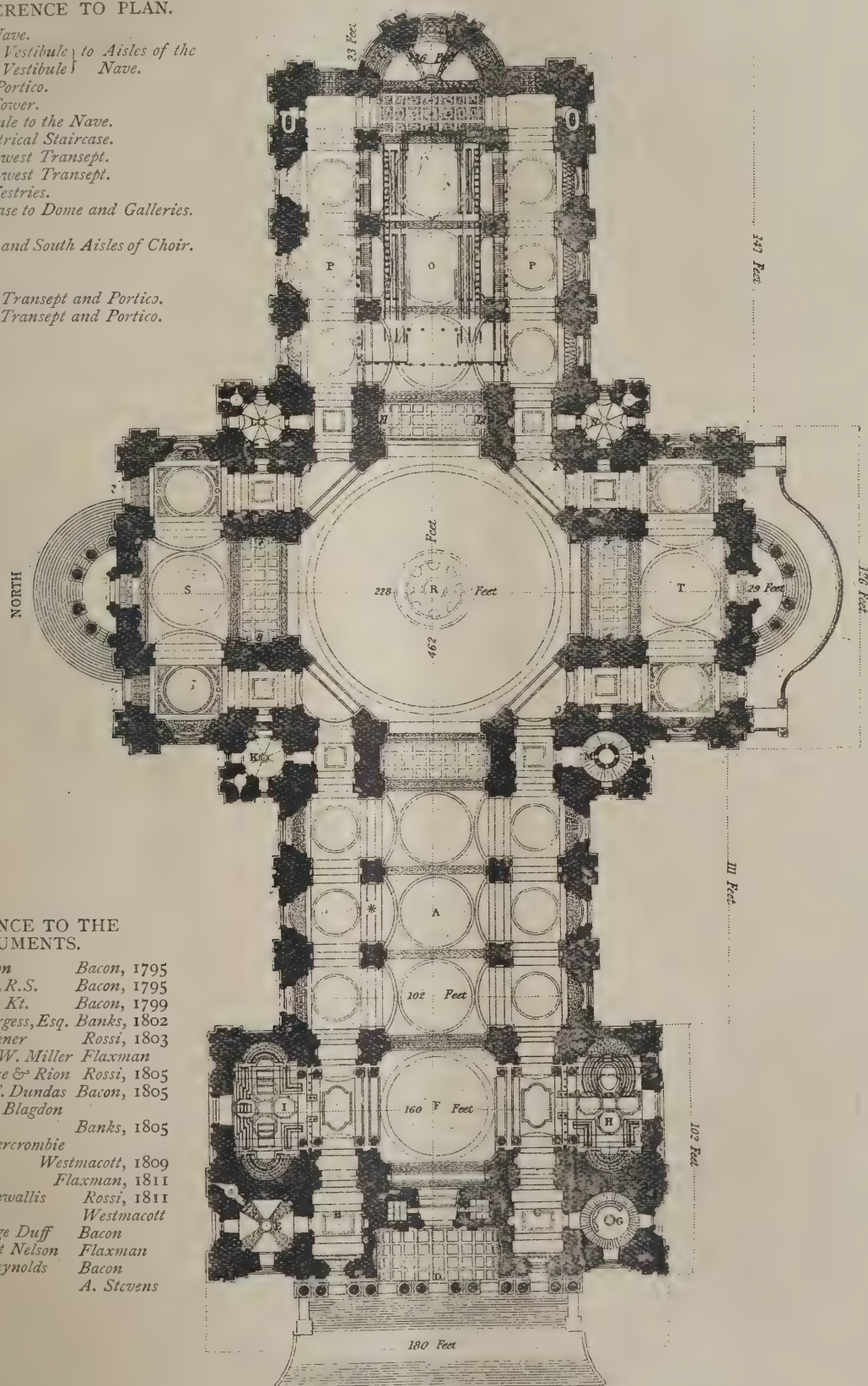


appointment of Deputy-Surveyor-General, we cannot trace one among them that required other illustrations than those of a geometrician. He was a man of science, occupied with mathematical, astronomical and microscopic investiga-

backyard before my eyes broke into roses and lilies." The Dean's poetic inspirations may have appeared a sort of eruption, but architecture does not come so easily, and is not a sign of disease.

## REFERENCE TO PLAN.

- A The Nave.
- B North Vestibule } to Aisles of the
- C South Vestibule } Nave.
- D West Portico.
- E Bell Tower.
- F Vestibule to the Nave.
- G Geometrical Staircase.
- H South-west Transept.
- I North-west Transept.
- K L N Vestries.
- M Staircase to Dome and Galleries.
- O Choir.
- P North and South Aisles of Choir.
- Q Altar.
- R Dome.
- S North Transept and Portico.
- T South Transept and Portico.



## REFERENCE TO THE MONUMENTS.

- |                           |                  |
|---------------------------|------------------|
| 1 Samuel Johnson          | Bacon, 1795      |
| 2 J. Howard, F.R.S.       | Bacon, 1795      |
| 3 Sir W. Jones, Kt.       | Bacon, 1799      |
| 4 R. Rundle Burgess, Esq. | Banks, 1802      |
| 5 Captain Faulkner        | Rossi, 1803      |
| 6 Captains Mosse & Rion   | Rossi, 1805      |
| 7 Major-Gen. T. Dundas    | Bacon, 1805      |
| 8 Captain G. Blagdon      | Westcott         |
| 9 Sir Ralph Abercrombie   | Banks, 1805      |
|                           | Westmacott, 1809 |
| 10 Earl Howe              | Flaxman, 1811    |
| 11 Marquis Cornwallis     | Rossi, 1811      |
| Captain Cook              | Westmacott       |
| 12 Captain George Duff    | Bacon            |
| Lord Viscount Nelson      | Flaxman          |
| 13 Sir Joshua Reynolds    | Bacon            |
| * Wellington              | A. Stevens       |

tions. But building in those days was supposed to be an affair of science. Art was a sort of impromptu. WREN, says the poetic Dean MILMAN, "suddenly broke out as an architect," and he did not perceive his figurative language was as absurd as if he said, "A holly tree in the deanery

WREN could not say, with the late GEORGE STREET, that of the thousands of drawings required there was not one which did not present more or less of his handiwork. Nevertheless, he was the builder, the creator, of the cathedral. An architect has to deal with stubborn mate-



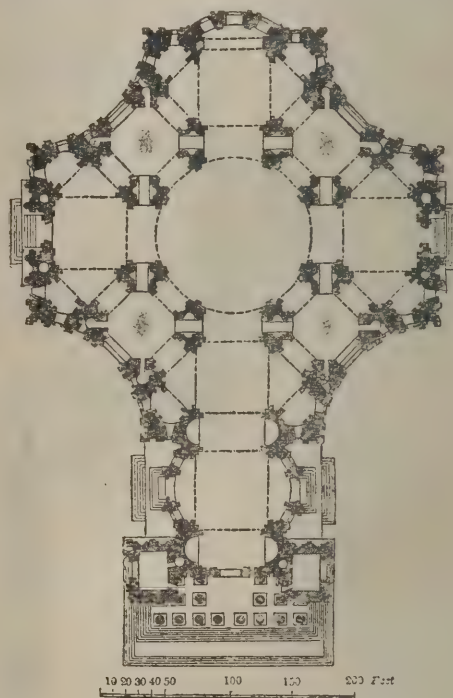
rials, but WREN could say they were flexible if compared with the obduracy of men who are indifferent to consequences so long as they obtain a momentary victory. WREN was as upright as any perpendicular line, and on that account, in an age partly feudal and partly corrupt, he made enemies. The proud Duke of SOMERSET treated him as a menial; the masons and hodmen, who were deprived by WREN of the luxury of cursing and swearing, looked on him as more a tyrant than the Grand Turk, and sought to ruin him by mutinies. So little confidence was placed in him by the Commissioners of St. Paul's they insisted on retaining half his allowance, as if he were likely to be negligent, and eventually an effort was made to deprive him in his old days of the money he had earned. As we have said, it is not possible to determine WREN's share in the production of the designs for St. Paul's, but we know enough of the contests in which he was engaged to make the building appear as a memorial of a brave and honest man, who was inspired by a sense of duty and believed he was aiding religion. He was near his end when he said, "If I glory, it is in the singular mercy of GOD, who has enabled me to begin and finish my great work so conformable to the ancient model." MICHEL ANGELO could not express himself with more sublime humbleness before Heaven and antiquity.

In ordinary cases an architect's difficulties begin with the preparation of the site. WREN was less fortunate, for there was many a struggle before he could arrange for a new St. Paul's. Two years after his appointment as Deputy-Surveyor he was ordered to prepare plans for the restoration of the old cathedral. He followed INIGO JONES in proposing that the additions should be in the style of the time—that is, Italian—and the lofty Gothic spire was to be superseded by a dome. The opposition of the clergy was not to be overcome, but WREN, relying on the power of CHARLES II., anticipated that his project would be realised. He therefore visited France in order to study the style, and it may be in order to engage assistants. It was at the period when BERNINI was receiving almost royal honours in Paris, although his plans for the Louvre were impracticable. WREN returned to London with "all France on paper." Before he could obtain a final decision on the restoration of St. Paul's the fire of 1666 left the building in ruin. He was eager to demolish the parts which remained, but unwillingly he submitted to the desire of a majority of the Cathedral Commissioners, and prepared plans for a restoration. It was not until 1668 that WREN's project for a new building was considered to be deserving of adoption. On July 20, after a council at which the king presided, he was directed to "take down the walls and clear the ground to the foundation in such manner as shall be judged sufficient to make room for a new choir, of a fair and decent fabric, near or upon the old foundations."

WREN employed powder as an agent in removing parts of the walls, but as one of the stones was impelled some distance and frightened a few women, it was decided to take a lesson from the ancients and employ a sort of battering ram. The following account of it appears in the "Parentalia":—"He took a strong mast of about 40 feet long, arming the bigger end with a great spike of iron fortified with bars along the mast and ferrels; this mast in two places was hung up by one ring with strong tackle, and so suspended level to a triangle prop, such as they weigh great guns with; thirty men, fifteen on a side, vibrated this machine to and again, and beat in one place against the wall the whole day. They believed it was to little purpose, not discerning any immediate effect. He bid them not despair, but proceed another day; on the second day the wall was perceived to tremble at the top, and in a few hours it fell."

The ground must have suggested that chaos was come again. Surveying instruments apparently could not be obtained, and from the size of the heaps of blackened stone it was impossible to lay out the lines of the foundations from a small plan. WREN was therefore compelled to erect a platform corresponding in area with the part to be excavated, and on it to represent a plan of the foundations of full size. Having determined the points, corresponding points were fixed by plummets amidst the hillocks underneath. WREN's skill as a mathematician in this part of the undertaking was invaluable. He must

have allowed himself more or less latitude in fixing the lines. There was then no approved plan of the new building, and WREN found it necessary to be prepared with a variety of projects for the cathedral. What was most urgent was the clearing of the ground. When that was accomplished the excavations began. As often happens, firm ground was found at a little depth. But in the part which was likely to support one of the piers of the dome a pit was revealed, from which the clay was taken by Roman potters and brickmakers. It extended from 40 to 50 feet beneath the soil, and was filled with potsherds. WREN then concluded that if he wished to have a secure foundation he must carry up the work from as great a depth, or, in other words, from a level corresponding with the bed of the Thames. When he was advised to employ piling he answered, "Piles may last for ever when always in water, but if they are driven into sand and kept between wet and dry they will rot. *I desire to build for eternity.*" WREN therefore opened pits or wells 18 feet square, which were excavated until a bed of sand and shells was reached, and afterwards filled with masonry or brickwork. He next sought for the best stone, and after inquiries decided on the adoption of Portland stone, which had been selected by INIGO JONES for the Corinthian portico which was added to Old St. Paul's.



WREN'S GREEK CROSS PLAN.

While the preliminary operations were advancing towards completion owing to WREN's foresight, the plan to be employed was still in abeyance. It was not until May 14, 1675, or nine years after the fire, that the Council were able to arrive at a decision. WREN, as we have said, was prepared with plans that could be adapted readily to meet the views of any party that gained supremacy, but he shrewdly concluded the choice would be either for a building according to the plan of a Greek cross, or one on the later Italian plan, as is the existing building. His own preference was for the former. WREN did not believe in processions, and did not care for a nave or aisles that were long drawn out. There was, he considered, a central point in an English church where a pulpit was placed, and the congregation should be enabled to approach it without difficulty. It is generally believed that the Duke of YORK, afterwards JAMES II., was the principal opponent of that design, for he was anxious to have a cathedral which would serve in case there was a return to the old ritual after he arrived at the throne. It is possible that JAMES as well as CHARLES were inspired by a different motive. In those days royalty was accompanied on occasions of State by a train of courtiers. They could not be massed in a crowd. Degrees of precedence had to be expressed, and a processional order was inevitable. Ordinary citizens could be allowed to hasten



to the best place for hearing a sermon, but it was not to be expected that a king of England would visit the cathedral of his capital with such expedition. In the old cathedrals the monarch and his court were enabled to approach their seats with becoming dignity. In the later churches of France and Italy there was also provision for ceremony, and, indeed, to royalty the Greek cross plan must have signified a retrenchment of those ceremonies which were identified with the kingly office. It was not to please the priests of a future and most uncertain time, but rather to gratify his own desire for display, that the Duke of YORK was inimical to WREN'S pet plan. The architect was moved to tears by the opposition, and it is to be regretted he was not allowed to have his way. The model which was prepared suggests a more excellent building than the present cathedral, and it must also be allowed that the number of royal processions through the nave has been too few to compensate for the sacrifice of so noble an architectural design as WREN had prepared. In the services the original plan has asserted its advantage, for it is under the dome and in the adjoining parts that large congregations are now to be found. Although WREN could not work at the new building with all his strength, yet, as MACAULAY says, "No man born on our side of the Alps has imitated with so much success the magnificence of the palace-like churches of Italy; even the superb LOUIS has left to posterity no work which can bear comparison with St. Paul's."

(To be continued.)

## METHODS OF CHARGING FOR ELECTRICITY.

By F. J. WARDEN-STEVENS, A.M.I.E.E.

(Concluded from last week.)

NOW it is evident that if a consumer uses his lamps for any purpose at, say, midday, or at any time when the maximum load is not on, he is not demanding plant for himself, but is merely using (to the benefit of the company or corporation) that plant which the consumers at a time of maximum load have demanded, but which is not in use in the daytime. Thus it is clear that he should not have to pay for this. Under either of these systems, however, he does.

If all the consumers used their light at the same time, *i.e.* if the sum of the maximum demands read on the meters were equal to the highest load at the station, the maximum demand system at Hastings would be perfectly just, and it may be taken that in proportion as the sum of the maximum demands read on the meters exceeds that noted at the station, the systems discussed become unjust. Mr. HORDERN, assistant manager of the Westminster Electric Supply Corporation, has shown that for his district the sum of the maximum demands would exceed the maximum load on the stations to such an extent as to render either of these systems ridiculously unjust; in fact, more so than the simple one of charging a fixed sum per unit.

The theoretically just system referred to would not be really just, as a consumer who, as a rule, used his maximum demand at a convenient time—*i.e.* when very few lights were on—might possibly switch on his lights at the moment of heaviest load during the year, and would consequently have to pay his share of the standing charges for the whole year; or again, the worst consumer might omit to turn on his lights, and would escape without any standing charges, and only pay the  $1\frac{1}{4}$ d. per unit. It is obvious that any of these systems are unjust in one way or another, and, on the whole, it may be said that the Hastings system is the most equitable of this class yet devised.

As before mentioned, this article is from the consumer's point of view, and so the effect of these systems on the central station is of little importance, except so far as they concern the consumer. It has been proved by experience that the Hastings and Brighton systems have, wherever used, greatly improved the load-factor, *i.e.* increased the time of heavy load on the station. The effect of those systems is to cheapen the use of electricity for all purposes where the light is required for long hours, and so encourage the paying consumer. The result is that the bad consumer is dissatisfied, and the good one encouraged greatly—the

very best arrangement possible, for the bad consumer not only is a loss to the supply company, but to his fellow consumers, as the loss caused by him has to be made up by his neighbours if the undertaking is to pay. Everybody would be better off if consumers who do not use their maximum demand at times of full load for  $1\frac{1}{2}$  hours a day were disconnected from the mains. The results, then, of the Hastings and Brighton systems are that, because the load-factor is improved, the economy of the station is increased and the capital used to better advantage; the price of electricity is far less to everyone than with a bad load-factor.

It must not be imagined that the systems described are the only ones which achieve the above object. GIBBERT KAPP, at about the same time as HOPKINSON, developed the subject on different lines. He did not go into the question in the same way, but arrived at a result which is, on the whole, more simple and more to the point. It was seen that the load on an electric-light station was practically of only three or four hours' duration. Therefore, from a question of *policy* and not of *justice*, Mr. KAPP and others said, "We will charge half-price for power, and in some cases light, taken between, say, 8 P.M. and dusk the next day. This will encourage people to use electric motors and other apparatus for commercial purposes, and so enable us to keep the machinery running more fully loaded and to increase our profits." In fact, it was the principle on which the seaside hotel proprietor works. The proprietor does not go into the questions of perfect justice, but the price of his commodity is regulated by expediency, or, in other words, the law of supply and demand; or, in still stronger words, he extorts as much as he can persuade people to pay. It is difficult to persuade consumers to turn on their lamps when they do not want them, but it is easy to encourage those good customers who want power or light when other people do not, and so increase the average quality of the consumer, or the load-factor, and incidentally the profits. The chief concern, however, from the consumer's point of view, is that of paying a just amount for services rendered; and as will be seen from a study of the results of the two methods, justice and expediency come to the same thing, *viz.* that the man who uses his light or power in the daytime or for many hours gets a reduction.

There are many arrangements existent by which the meter is made to register less in the daytime. One arrangement, that used to some extent in St. Pancras, consists in having two meters, one of which indicates at 6d. per unit and the other at 3d. The current consumed on the premises is passed through the 3d. meter in the day and the 6d. meter in the evening; the change over is, in some cases, done by a clock contact, and in others by separate thin meter wires going from the station, which actuate a switch. In other cases, one meter is used and shunted by a similar clock service, so that only a portion of the current passes through it in the time of light load. The system in use at Norwich is as follows:—Special meter wires are used, which are connected to an apparatus by which the coils of an ammeter are shunted. The current is switched on these wires automatically at intervals, thus causing the ammeter to return to zero. When the current is switched off the meter wires, the ammeter again moves an amount proportional to the current, and in doing so moves by means of a pawl a wheel connected to the counter and dials. The result is that the dials are moved forward periodically by an amount proportional to the current, and thus they show the units delivered. The current is switched on twice as often after an hour before sunset every evening till the load goes off the station, and the meter thus registers twice as fast in the evening as in the day.

At Bristol the Kapp system is, or was, used, and the meter caused to read slower in the day by resistance being switched into the shunt circuit.

There is no doubt that if the difficulties of clocks, &c., can be surmounted at a reasonable cost and the working made reliable, that these methods are far more satisfactory than the maximum demand systems, and they really are the same thing only more just, because at the time of maximum demand the price charged is much higher than at others, and this tallies with the results of the costs of working, the standing charges being to a great extent caused by this maximum demand.



There are yet several other systems of charging, one introduced by Mr. PINK, late burgh engineer at Ayr. This consisted in allowing discounts on business premises which varied with the time of closing. Those which closed early were allowed no, or very little, discount, and those closing later were allowed a larger one on their bills. Such a system is, of course, out of the question in a residential district or in a large town, owing to the difficulties of insuring that the declared time of closing is adhered to and of determining the time of closing for private houses.

A system somewhat similar to the above has been devised by the author for Queenstown (co. Cork), where there are many reasons which make a contract system desirable. It has been arranged that the contract price is such that the cost per unit (calculated on the basis of a 30-watt lamp burning from dusk till the declared closing time) is less as the time of burning increases. The system provides that the cost per candle-power lamp and per unit is as follows:—

Time of Closing.	Hours per Annum.	Contract Price.	Equivalent Price per Unit.
6 P.M. . . . .	226	8s. per annum	14.2d.
7 " " " " . . .	430	10s. " "	9.3d.
8 " " " " . . .	730	12s. " "	6.55d.
9 " " " " . . .	1,090	14s. " "	5.15d.
10 " " " " . . .	1,455	16s. " "	4.4d.
11 " " " " . . .	1,820	18s. " "	3.95d.
12 " " " " . . .	2,185	20s. " "	3.6d.

All houses which light at dusk and close before 6 P.M. will be charged as if they closed at 6 P.M.

In any case where difficulties arise as to determining time of closing, or where a day load is required, or where the consumer has broken his part of the contract persistently, a meter will be fixed, and a two-price system will be used, as at St. Pancras, 7d. in the evening and 3½d. for the rest of the time.

For the sake of clearness the basis on which the various systems are worked out are restated:—

Brighton System.—7d. per unit first hour, 1½d. per unit after.

Manchester System.—1s. 4½d. per 8 candle-power lamp connected per quarter and 1½d. per unit sold.

Hastings System.—1s. per 8 candle-power lamp demanded in each quarter and 3d. per unit after.

Two Price (Norwich).—7d. per unit between dusk and 8 P.M. (7 P.M. Sundays), and 3½d. per unit all the rest of time.

Discount on Closing Time.—Shops closing at 8 P.M. 5 per cent. discount; 9 P.M. 19.5 per cent. discount; 10 P.M. 22.5 per cent. discount; 11 P.M. 35 per cent. discount of the bill (7d. per unit).

Contract Discounts.—As above described.

To conclude, it has been shown that a uniform charge per unit is not fair when applied to central-station supply, and that a system should be devised which would vary the charge in some manner similar to the variation in the cost of supplying the units sold, and, in fact, charge on the constant-profit system, not constant price. The consumer who uses his lights many hours a day is more profitable than those who do not. At Brighton it costs two and a half times as much per unit to supply a consumer who uses his lights one hour a day on an average as it does to supply one who uses his lights on the average three hours a day. The Hastings system is the more equitable of the maximum-demand systems, and on the whole the two-price system is the most satisfactory in the author's opinion.

My thanks are due to Mr. FENNELL for the willing assistance given in the preparation of this article.

#### A ROYAL PAGEANT IN 1558.

THE following account, somewhat modernised in language, of "The Passage of our Most Dread Sovereign Ladye Queen Elizabeth through the Citye of London to Westminster the day before her Coronation, Anno 1558," may not be without interest at the present time, when the City is about to be the scene of another royal progress:—

"On Thursday, the 12th of January, 1558-59, Her Majesty removed by water from her palace at Westminster to the Tower, attended by the city barges, trimmed with targets and banners of their mysteries.

"On Saturday the 14th she took her passage through London, leaving the Tower at two o'clock.

"Near Fenchurch Street was erected a scaffold, richly furnished, whereon stood a 'noise,' or band of instruments, and a child in costly apparel, who welcomed the Queen with a poetical address. At the upper end of Gracechurch Church, before the sign of the Eagle, the city had erected a gorgeous and sumptuous arch, occupying the whole width of the street. It was battlemented, and had three portals, over the centre of which were raised three platforms, rising in three degrees or steps. Upon the lowest, in one royal seat, were placed children representing King Henry VII. and Elizabeth, his wife; the former surrounded with a red rose and the latter with a white one, but having their hands united, each with a ring of matrimony to be perceived on the finger. Out of these two roses sprung two branches, gathering into one, which was directed to the second stage, where sat King Henry VIII., with Queen Anne by his side, from whom again grew a branch to the utmost stage, where Queen Elizabeth herself was personified. The Queen here, as throughout, made every effort to appreciate the exertions made in her honour. She even desired her chariot, which passed too far, to return, and personally required to have the matter open to her. When this was done, she thanked the city, praised the beauty of the work, and promised that she would do her whole endeavour for the constant preservation of concord, as the pageant did import.

"The second pageant, at the nether end of Cornhill, was inscribed 'The seate of worthe governance.' This, like the former, was a gateway, with three open arches; and over the centre was a child, representing the Queen, placed in a seat which seemed to have no other support but that of four personages, representing the virtues, Pure Religion, Love of Subjects, Wisdom and Justice, each of which trod under foot their contrary vices—Superstition and Ignorance, Rebellion and Insolency, Folly and Vainglory, Adulation and Bribery. Above all were the royal arms.

"The Great Conduit in Cheap was beautiful with pictures and sentences.

"At Soper Lane End was another pageant of three open gates, above the centre of which, on three stages, sat eight children. The eight beatitudes applied to our Sovereign Lady, Queen Elizabeth.

"The standard in Cheap was dressed, and near it was posted a noise of trumpets.

"The Queen had scarcely passed the cross when she espied the pageant erected at the little Conduit, and immediately required to know what it might signify. It was told her grace that there was placed Time. 'Time,' quoth she, 'and Time hath brought me hither.' The attendants then proceeded to describe the whole matter, but at the beginning, where she understood that the Bible in English was delivered to her by Truth, she thanked the city for that gift, and saying that she would oftentimes read over that book, commanded Sir John Perrot, one of the knights who sustained her canopy, to go on before and receive the book. Being told, however, that it was to be delivered down by a silken lace, she desired him to stop, and so passed forward until she arrived at the spot where the aldermen stood. There the Recorder presented the Queen with a thousand marks of gold, contained in a purse of crimson satin richly wrought with gold and accompanied by a suitable address. Her Majesty took the purse with both hands and replied so 'marvellous pithilie' as to excite the admiration of all the bystanders.

"I thank my lord mayor, his brethren and you all. And whereas your request is that I should continue your good lady and queen, be ye assured that I will be as good unto you as ever queen was to her people. No will in me shall lack, neither do I trust shall there lack any power. And persuade yourselves that for the safety and quietness of you all I will not spare, if need be, to spend my blood. God thank you all.'

"Which answer," says the record, "of so noble-hearted a princess, if it moved an extraordinary shout and rejoicing, it is not to be marvelled at, since both the heartiness thereof was wonderful and the words so jointy knit.

"We now arrive at the pageant where the Bible was presented. It was on a square erection, standing directly before the little Conduit with battlements, and on it were represented two hills or mountains, that on the north cragged, barren and stony, with a withered tree, under which sat one in a homely apparel and in a mourning attire, with a tablet over his head, inscribed with his name in Latin and English, '*Ruinosa Republica*'—'A decayed Commonwealth.' The other hill was fair, fresh and beautiful, the ground thereof full of flowers, and having a flourishing tree, under which stood upright, '*Republica bene instituta*'—'A flourishing commonwealth.' Each tree was also hung with appropriate sentences. Between the hills was a hollow place or cave, out of which, a little before the Queen's coming, issued Time, an old man with wings and a scythe in his hand, leading a personage of less stature than himself, clad in white silk, whose name set over head was '*Temporis filia*'—'The Daughter of Time,' and on her breast '*Veritas*'—'Truth.' In her hand she held a book inscribed '*Verbum Veritatis*'—'The Word of Truth.' A child in front



delivered the poetical explanations, during which Truth let down the Bible from the hill, and Sir John Perrot, receiving it, kissed it, held it up with both hands and laid it upon her breast.

"In St. Paul's Churchyard a child of the school (Christ's Hospital) pronounced a Latin oration, and then delivered to Her Majesty a copy fairly written on paper, having first kissed it; it was received 'most gently.'

"Ludgate was finely trimmed and furnished with music. At the Conduit at Fleet Street was the fifth and last pageant. It was a stage embattled with four towers. A throne raised on steps was overshadowed by a large tree, having leaves and the fruit of the date—a palm tree. In the throne sat a queen in Parliamentary robes, named in a tablet over her head, 'Deborah, the judge and restorer of the house of Israel.' A child was ready to speak, and in order that she might better hear him, the Queen required silence, and commanded her chariot to be moved nearer.

"At St. Dunstan's Church the children of Christ's Hospital stood with their governors, and one of them delivered a Latin oration.

"The final exhibition was at Temple Bar, which was 'finely dressed,' with the two giants, Gotmagot the Albion, and Conneus the Briton, who held between them a poetical recapitulation of the pageantries both in Latin and English. On the south side were singing children, one of whom, richly attired as a poet, gave the Queen farewell in the name of the whole city."

### THE SIDDONS MEMORIAL.

ON Monday the statue of Sarah Siddons, the tragic actress, was unveiled on Paddington Green by Sir Henry Irving. The figure was inspired by Reynolds's great painting of *Mrs. Siddons as the Tragic Muse*, belonging to the Duke of Westminster, of which we published an illustration last year, but it is no mechanical copy. The sculptor was M. Chavalliaud, who worked under Messrs. Farmer & Brindley, of Westminster.

Sir Henry Irving, before unveiling the statue, spoke as follows:—It is a great pride to me to unveil this statue and to congratulate the inhabitants of Paddington on the possession of so admirable a memorial of a famous Englishwoman. London is rich in statues, chiefly of people whom nature did not expressly design to be immortalised in that particular way. Few men or women look well in marble or bronze, but to-day you see one of the ideal models of the sculptor's art—a great actress whose personal majesty is eloquent even in the silence of stone. It was said of Sarah Siddons by Hazlitt that "she was not less than a goddess or a prophetess inspired by the gods. Power was seated on her brow, passion radiated from her breast as from a shrine; she was tragedy personified." I think you can catch the spirit of that panegyric from the impressive figure, so admirably designed and executed by M. Chavalliaud, which is set up in your midst to-day. By the acclamation of her contemporaries Mrs. Siddons was hailed as the incarnation of the sublime in the expression of dramatic passion. I have lately read that this ideal of the sublime is a mere supposition, belonging to a world of art and emotion which has definitely passed away. It will pass away when the creations of Shakespeare become obsolete, when the highest poetry ceases to influence the soul of mankind—conditions which make the fulfilment of such a prophecy unspeakably remote. Methods of execution in art may vary from age to age; but in this monument you have a standard of conception which has made the name of Siddons imperishable. To some characters in Shakespeare, such as Lady Macbeth and Volumnia, she gave a tradition which has not been effaced. Moreover, in honouring her memory you are paying a lasting tribute to a quality which is the perpetual stimulus to ambition in every walk of life. To every young man who looks upon this statue I would say, "This is not only the image of a great actress, it is the image of indomitable energy and perseverance. When she came to London first she was a conspicuous failure. She went back to the hard school of the provincial theatre and matured her powers by unflagging industry. This is no memorial of casual and irresponsible genius, but a triumphant witness to the merits of those comrades-in-arms of all true endeavour—application and a stout heart." Another noteworthy point of this monument is that it is the first statue of a player that has been erected in London. I am not suggesting this as a precedent for the further embellishment of advantageous sites, but in itself—and one cannot help dwelling upon it—it is a considerable portent. There are statues of Shakespeare, and the dramatic profession does not forget that Shakespeare was an actor, and that but for his connection with the stage it is improbable that he would have enriched our dramatic literature. However, if it is for Shakespeare the poet, not for Shakespeare the actor, that we have raised trophies for triumphal show, we have before us to-day a striking proof of that public spirit which has sacrificed an ancient social

prejudice in homage to a great actress, which needs no better evidence than the generous gift of the site by the Vestry of Paddington, together with their handsome provision of the base of the statue. This is a monument of enlightened tolerance which would have surprised most people in Sarah Siddons's lifetime. It shows, moreover, that the work and influence of the actor are not quite ephemeral. Mrs. Siddons died a very few years before our gracious Sovereign came to the throne, and amongst the evidences of that spread of ideas which has distinguished Her Majesty's long and glorious reign, I think we may claim this permanent recognition of the genius of a woman who shed lustre upon her generation and stood pre-eminent amongst the race of great English actors.

When the cheers following upon Sir Henry's concluding words had died away he turned to the statue in front of which he had stood whilst addressing the gathering, and, pulling a cord attached to the striped cloth which covered the monument, revealed to the gaze of the onlookers M. Chavalliaud's finely executed figure of the illustrious actress. The statue, which stands on a pedestal of Portland stone, has been wrought of gleaming white Carrara marble, and represents Mrs. Siddons reclining in a characteristic and dignified attitude on a chair of Grecian shape, her right hand clasping a dagger and her left supporting her chin. By all present the work was acclaimed a striking embodiment, and worthy to serve as a permanent memorial of the player of whom, in dedicating her features to posterity, Sir Joshua Reynolds remarked that by inscribing his name on the hem of her garment his fame would be preserved for all time.

The Dean of Hereford, in moving a resolution of thanks to the donors and subscribers, remarked that he was closely related by marriage to the illustrious Kemble family, his wife's mother being Fanny Kemble, who was niece of Mrs. Siddons. It was from Hereford that the Kembles sprang, and well might that city be proud of having produced such a family, and also such a man as David Garrick. After alluding to the failure of Mrs. Siddons and her ultimate success, the Dean said that the stage might be used for great moral good, as it might be degraded to evil. Therefore, they were thankful that the Kembles in the past, and Sir Henry Irving in the present, had laboured to make the stage not a mere source of amusement, but a source of intellectual education.

### EDINBURGH ARCHITECTURAL ASSOCIATION.

THE annual excursion to Linlithgow will be made to-morrow, Saturday, June 19, when the party will visit the palace, in which building is work of the fifteenth, sixteenth and seventeenth centuries, and probably it is the finest example of Domestic architecture remaining in Scotland. It is built in the form of a square with a central courtyard. All the apartments communicate with each other and with various staircase towers. On the south side the entrance to the palace and the royal chapel are situated. On the east side is the great hall, a most magnificent structure, and also another entrance of great richness of decoration. The west side is occupied with what were probably family apartments, and on the north side there are various banqueting halls, an oratory, kitchens, &c. St. Michael's Church adjoins the palace, and consists of a nave and choir, with north and south aisles, eight bays in length, a western tower and an eastern apse. The north and south chapels may be regarded as transepts. The fine southern porch has a priest's room over it lighted by a beautiful oriel. After luncheon the members of the Association will inspect Bonhard House, situated about two miles north from Linlithgow, a building of the L plan, with a staircase turret in the re-entering angle. Some of the rooms have ornamental ceilings, with panelled walls and handsome fireplaces. The house was built by the Cornwalls, a well-known Linlithgow family, and their arms, with the date 1591, are beautifully cut on a dove-cote at Bonhard. They will also view Kinneil House, an ancient possession of the Hamiltons, consisting of an oblong keep, 56 feet 6 inches by 31 feet 6 inches, to which wings have been added, and also a block of buildings to the north-east, which may at one time have been a separate house. The keep walls are 6 feet thick and the ground floor is vaulted. Frequent alterations render it difficult to assign the date of this structure. The attached building was originally L-shaped and combined with the keep into one building in the reign of Charles II.

The Tapestry Map of Warwickshire and adjacent counties, dated 1588, belonging to the York Museum, which was exhibited at the Royal Geographical Society some time ago, has been carefully cleaned and repaired, and will be on view at the School of Needlework, 17 Sloane Street, from June 24 to July 10.



## NOTES AND COMMENTS.

IRELAND is rich in examples of prehistoric monuments. According to Mr. BORLASE there are 234 dolmens in the province of Munster, 248 in Connaught, 227 in Ulster and 71 in Leinster, or in all 780. There are also 50 chambered tumuli and 68 monuments of other varieties. No less than 40 of the chambered tumuli are in Leinster, the rest of the island containing only 10. A capstone or table stone of a dolmen in Kermanstown, Carlow, is calculated to weigh 100 tons, while one at Howth, near Dublin, weighs 70 tons. Mr. BORLASE offers the following explanation of the means of transit adopted by the men who raised the memorials:—"The very existence of these megalithic structures appears to me to be an indication—if, indeed, such were needed to demonstrate the fact—that Ireland was once a well-timbered country. It must have been by the power of mighty leverage that these stones were lifted into place, and such leverage could only be obtained with felled timber. The trees once felled, with the aid of chisels of stone or bronze, and the application of fire, and points for purchase being obtained beneath the rock, four or five trunks heavily weighted at the opposite extremity could, with the aid of the united action of a fairly large body of men, be brought to bear at once in lifting the stone little by little. As the work of elevation went on, stones would be inserted to prevent the mass from falling back. The pillar-stones destined to support it would then be fixed on the ground beneath its edge, the small trigging stones gradually removed, and the mass allowed to sink on to the summits of the uprights." The builders, according to Mr. BORLASE, were the predecessors of the Celtic tribes. They were cannibals, and in that propensity resembled, it is believed, the builders of the Egyptian pyramids.

THE advantage of presenting a museum to a town is suggested by the experience of the people of Kilmarnock. One of the townsfolk agreed to erect a building on the site of the temporary museum in Elmbank at a cost of 8,000/. That gift made an almost unique collection of corals belonging to Mr. JAMES THOMSON, F.G.S., available for the town. Dr. HUNTER-SELKIRK has now presented the contents of his museum at Braidwood. Kilmarnock has consequently acquired about 30,000 old coins, 117 old bibles, illuminated manuscripts, numerous relics of the Covenanters, rare specimens of Wedgwood ware, old watches, snuff-boxes, pottery, &c. The geological specimens are illustrative of local peculiarities, and will be invaluable to students of the science. In most places the filling up of a museum is a slow operation, but at Kilmarnock the cases can be filled as soon as they are completed. It may also be assumed that many other collectors will be disposed to enrich the building.

In Kent there will soon be a commemoration of the thirteenth centenary of the landing of St. AUGUSTINE at Ebbs Fleet. In Iona another ecclesiastical event of the same date is now being celebrated. St. COLUMBA having accomplished his task passed away as the Roman monk arrived. There must have been a wide difference in the appreciation of architecture between the two. St. AUGUSTINE was familiar with the great buildings of antiquity, and no doubt endeavoured to secure churches that would be worthy of their purpose according to his standard. St. COLUMBA could hardly have known of a building of stone and mortar. His first foundation was a cave-chapel at Loch Coalisport. Then, having obtained permission from the Picts to settle in Iona, he founded a monastery. Messrs. MACGIBBON and ROSS, in their "Ecclesiastical Architecture of Scotland," describe it as in the ordinary style adopted in Ireland. According to ADAMNAN, the biographer of the saint, the buildings were constructed of wattles and turf, and the roofs covered with thatch. There was a special cell for the abbot, a larger hut for a refectory and another for strangers; the whole was enclosed with a high wall or rampart. About a century afterwards, when the monastery had to be improved, oak boards were used instead of wattles, and the roof was covered with thatch. The ceremonies of commemoration were held in the ruins of the church of St. Mary, which was the cathedral of Iona, an early thirteenth-century building, the

chancel and one of the side aisles having been roofed for the occasion. The use of the building was also allowed by the Duke of ARGYLL to the Roman Catholics for their services on the occasion. According to Dr. STORY, St. COLUMBA was "the founder of the Scottish nation, for had the Dalriadan kingdom fallen into unworthy hands at the time when COLUMBA named the energetic and able AIDAN as its king, and had its delivery from Irish vassalage not been achieved through his persuasion, one or other of two things would have happened, either of them fatal to Scottish independence and the development of a pacific nationality in which Pict, Scot, Briton and Saxon should form harmonious elements—Scotland still feudatory to Ireland would have become a mere appendage to that island, or, divided between hostile tribes of Picts and Scots, it would have fallen a prey to the Saxon aggressors from the east and south."

WE mentioned lately that the Médaille d'honneur for architecture in this year's Salon was not awarded because the chairman refused to count the votes which were given for M. MARCEL, the favourite, as a member of a firm of architects. The voters protested and the question was submitted to the adjudication of the committee. The voting on the former occasion was annulled. There was a new attempt and, as was desired, M. MARCEL was successful and accordingly was awarded the coveted distinction.

THE subscriptions to the monument of PASTEUR have reached 297,000 frs., or nearly 12,000/. But the money has come from all parts of Europe as well as from France, and the general recognition of PASTEUR's services to humanity is as creditable to his memory as any memorial in stone. It was the intention of the committee to have entrusted the work to M. PAUL DUBOIS, but that sculptor was afraid the task would interfere with his duties as director of the Ecole des Beaux-Arts, and declined to accept the commission. At his request it was confided to M. FALGUIÈRE.

THE gigantic trees of California have often been described, and one variety is made the subject of remarks by the British Consul-General in San Francisco in his last report. Redwood is the *Sequoia sempervirens*, the great tree of the coast belt of California. It attains a height of 250 feet or more, and, it is said, a girth of 60 feet. The Consul-General has measured some trees 45 feet in circumference between 4 feet and 5 feet from the ground, but these were not in the finest groves. The wood is said to stand any climate, from the dry heat of Australia or the interior of California to the dampest place, without being affected, after it has been thoroughly seasoned. The chief objection to its use is the difficulty of seasoning it. A board 6 inches thick will not thoroughly season in the warmest part of California under about two or two and a half years. This, of course, adds to the cost. Much of the wood is adapted for internal use and decorative purposes, such as doors, panelling of rooms and ceilings, dadoes, mantelpieces and over-mantels, &c., and once properly seasoned it never shrinks or cracks. Another advantage is that boards of great width can be obtained entirely free from knots. In colour the wood ranges from light to dark reddish brown. The varieties of graining are great. Some, especially the "curly" and the "burl," are very beautiful. The "curly" has a wavy pattern. The "burl," in its markings, is something like Thuya wood, but with larger markings, English oak "burr," and the finest knot walnut. This wood, however, except the "burl," is soft and liable to be marked by blows. When properly prepared it takes polish and varnish well. Certain articles of furniture, such as tables, are made from the "burl." The timber has been of late shipped to the United Kingdom, the annual shipment from San Francisco being about 7,000,000 feet or 8,000,000 feet. But much of what has been sent to England has been of a very inferior quality.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—ST. PAUL'S: WEST FRONT.—CHOIR, LOOKING EAST.—NAVE, LOOKING WEST.—SOUTH AISLE OF NAVE, LOOKING WEST.



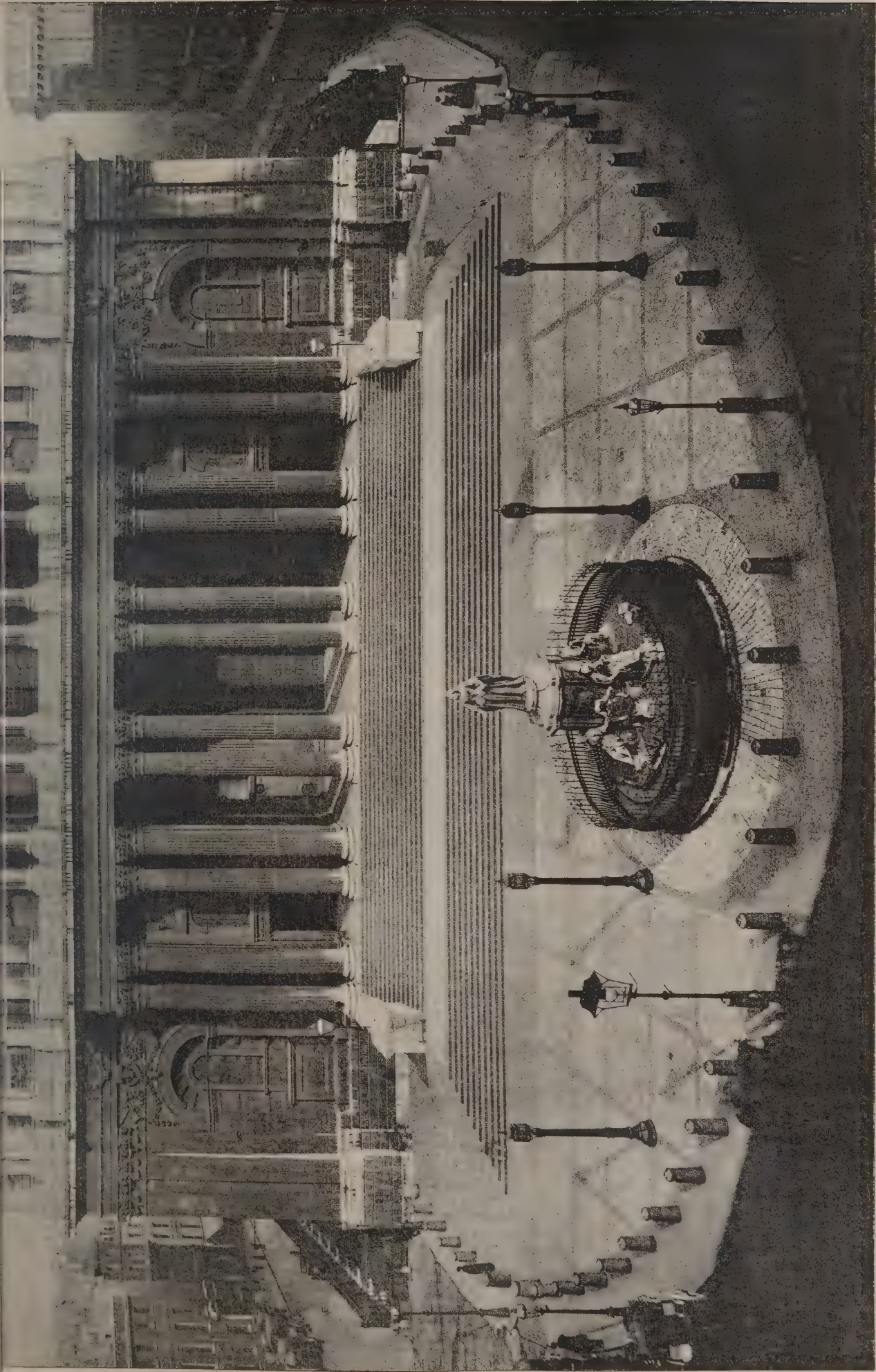




The Architect, June 18<sup>th</sup> 1897







FROM A PHOTOGRAPH BY F. W. EDWARDS, PECKHAM

CATHEDRAL SERIES, No. 43.—ST. PAUL'S: WEST FRONT.

INK-PHOTO, SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.



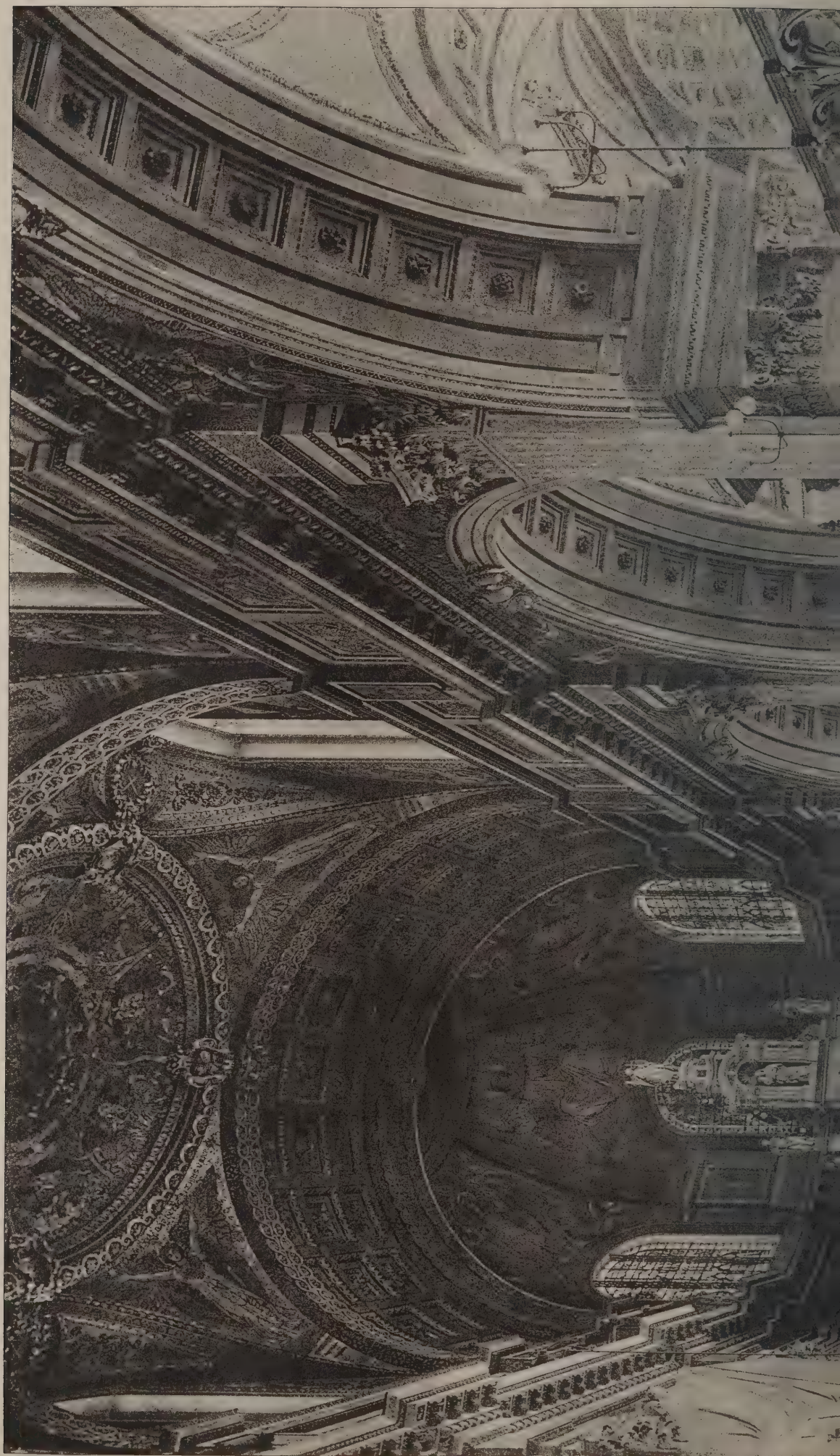




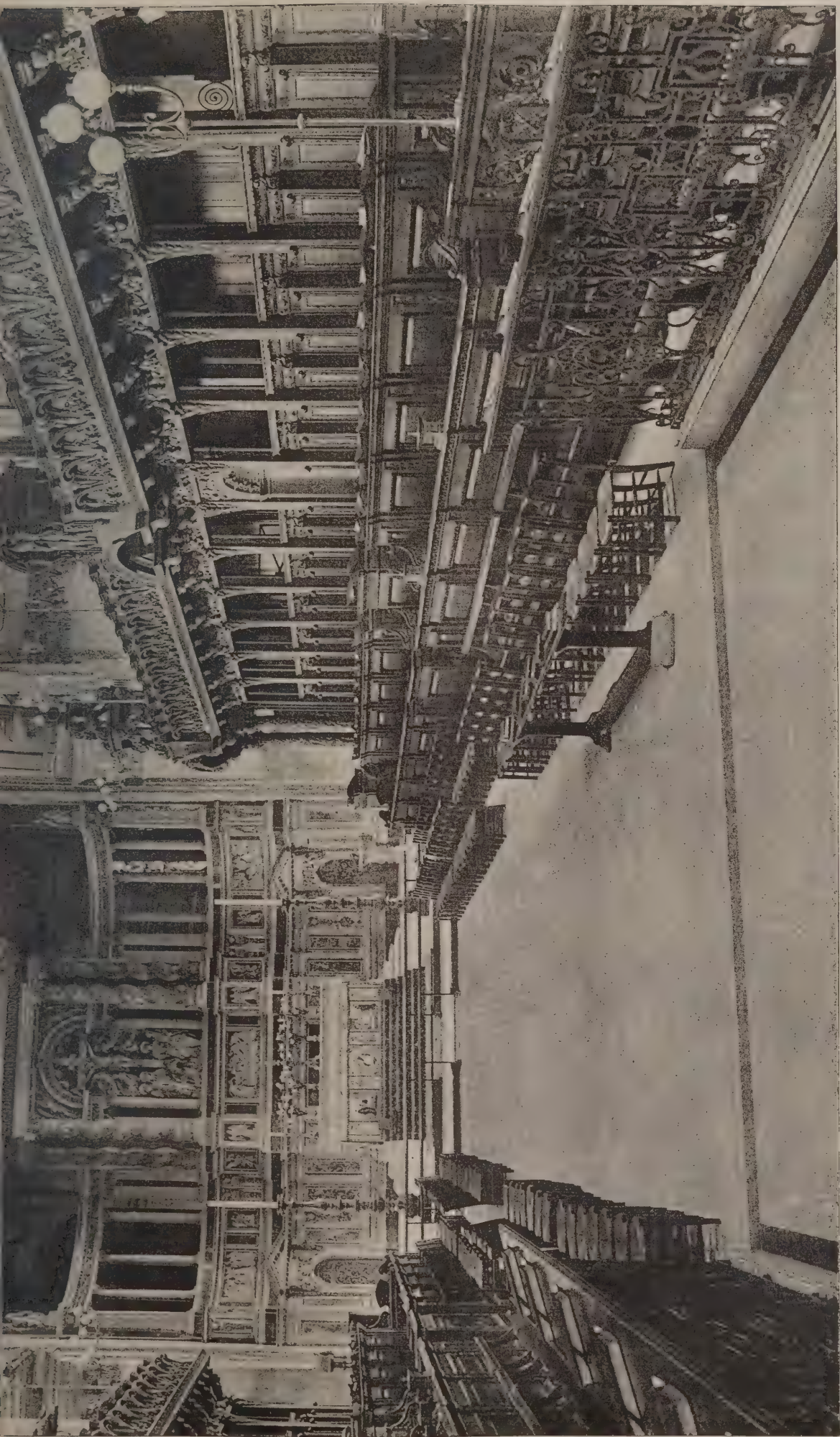




The Architect, June 18<sup>th</sup> 1897







PHOTOGRAPHED BY S. B. BOLAS & CO. 11, LUDGATE HILL, E.C.

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CATHEDRAL SERIES, No. 44.—ST. PAUL'S: CHOIR, LOOKING EAST.



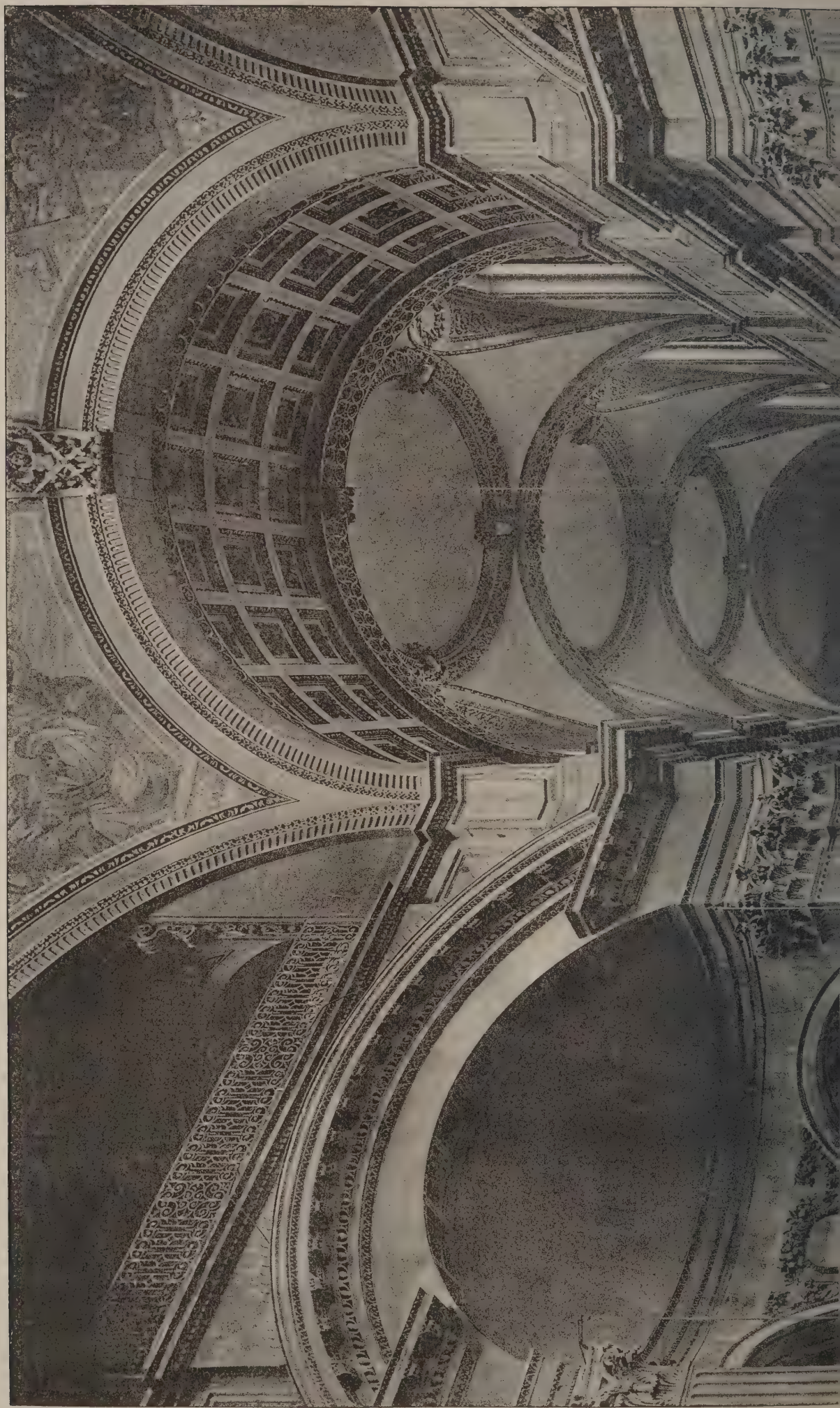




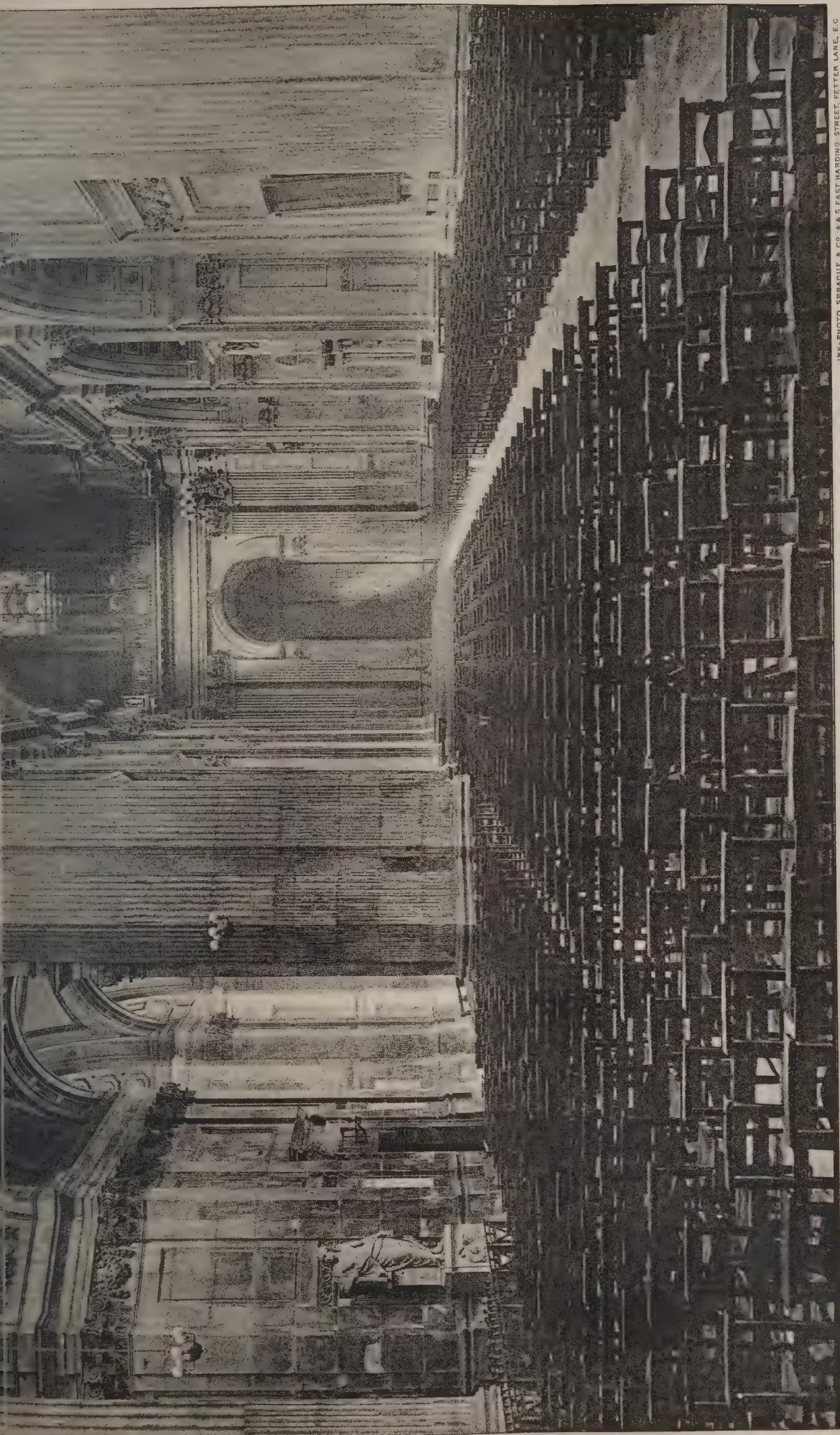




The Architect, June 18<sup>th</sup> 1897







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CATHEDRAL SERIES, No. 45.—ST. PAUL'S: NAVE, LOOKING WEST.



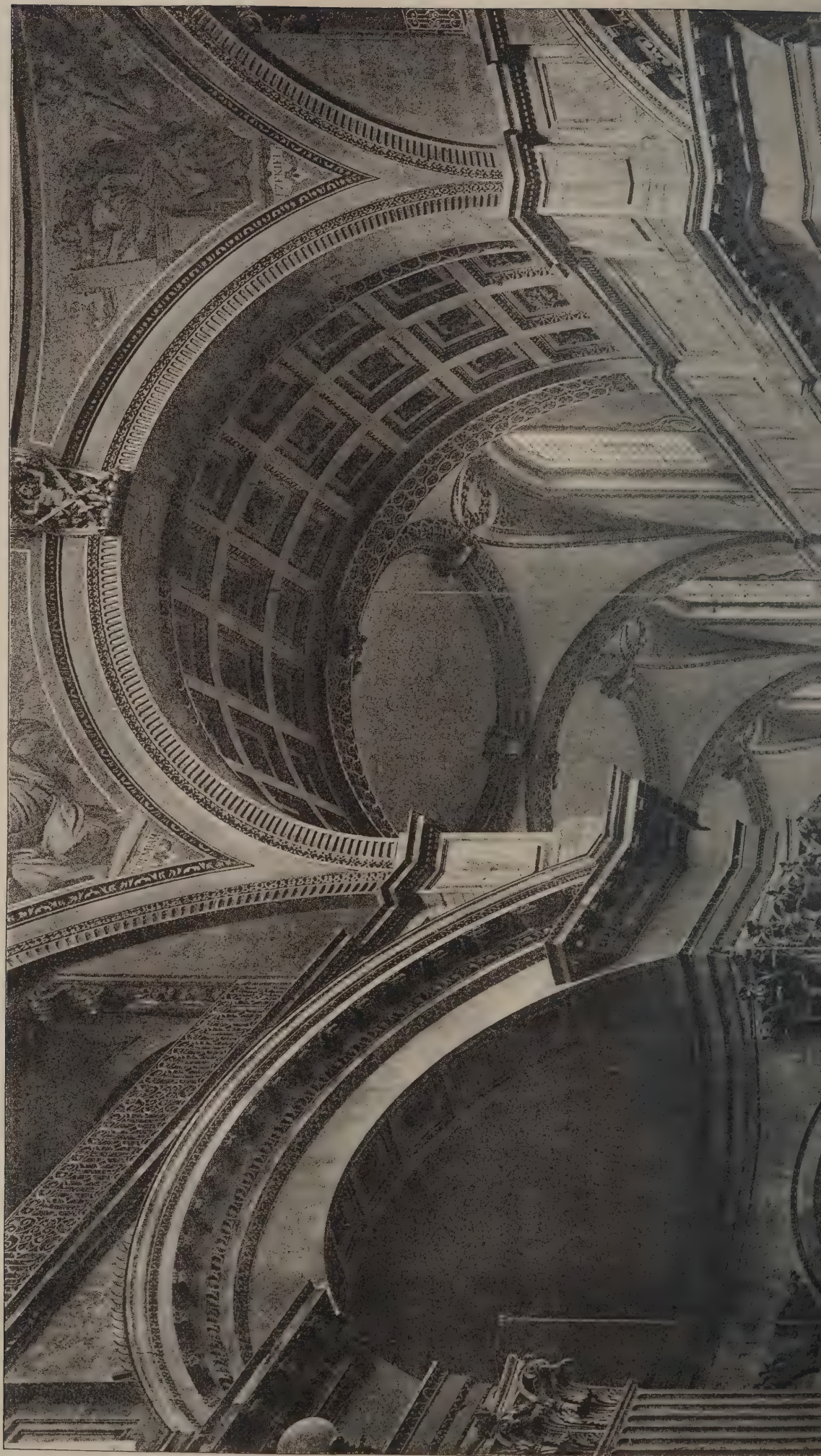




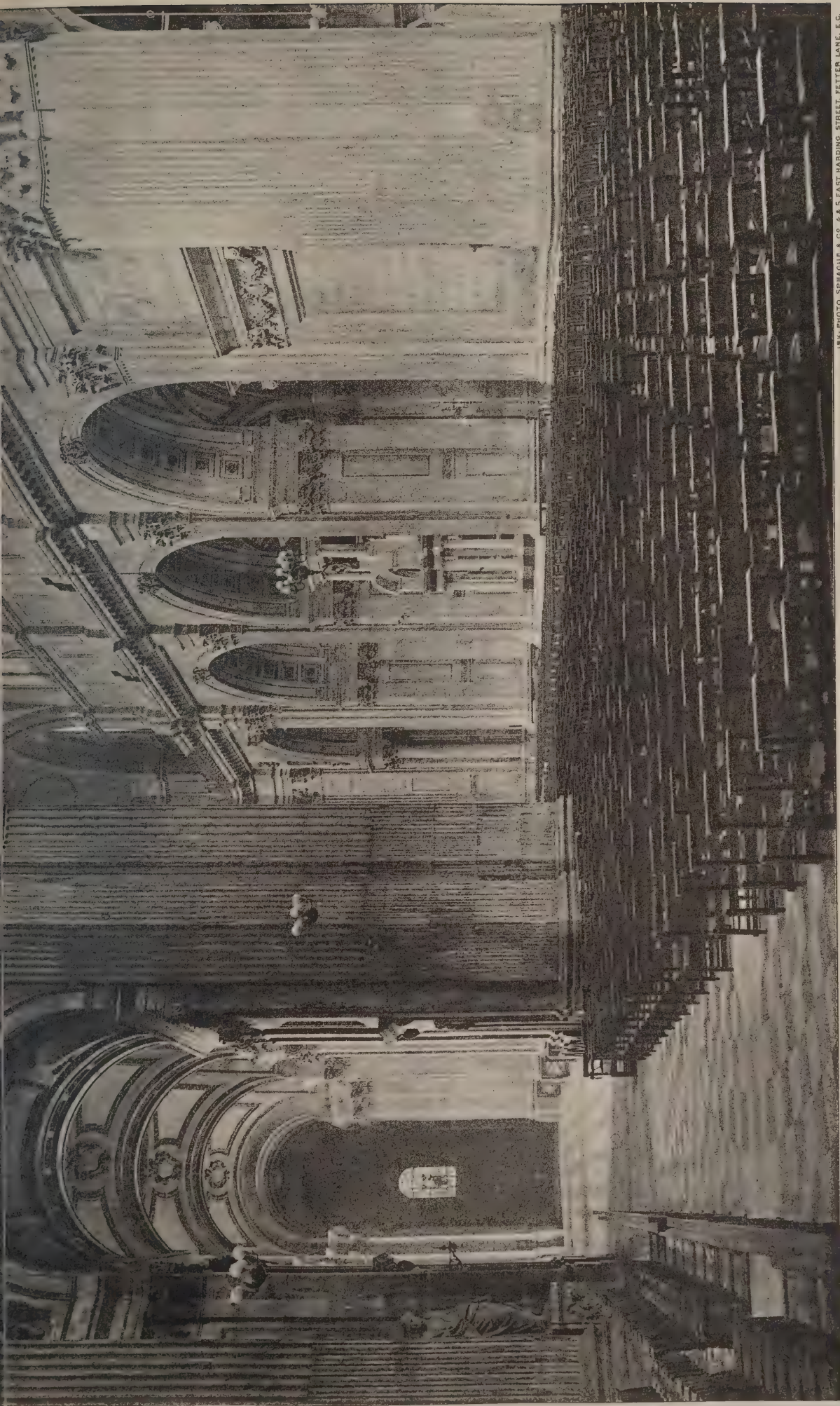




The Architect, June 18<sup>th</sup> 1897







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181-K PHOTO SPHAGNE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 46.—ST. PAUL'S: SOUTH AISLE OF NAVE, LOOKING WEST.







## THE ARCHITECTURAL SCHOOL OF THE BERLIN TECHNICAL COLLEGE.\*

WHEN I handed in the title of this paper, I was under the impression that the time available for reading it would have been the conventional one hour generally given to a lecture, and I had intended making an attempt to describe the chief feature of a well-known German technical college in all its departments. As it has been found necessary, however, to reduce the time available for each paper to twenty minutes, I am afraid that I shall have to confine my remarks to one of the sections of the institution with which I am to deal.

This institution is the Royal Technical College at Berlin, which, to my mind, is the leading establishment of its kind to be found in the German Empire, or, for the matter of that, in German-speaking countries, Austria included; and the section to which I shall devote my remarks more especially will be the architectural school or division of that institution. As an architect who has studied there, and has enjoyed the facilities of this special division, it will be easily understood that I should give preference to the department of which I have had considerable personal experience.

In the first place I would give a brief outline of the origin of this institution. The Berlin Technical College, as it now stands, has been in existence for only thirteen years, for it is since 1884 that it has occupied the premises it now holds. The scheme of organisation on which the establishment was based dates however from 1879, the intervening period being utilised chiefly for the preparation of the necessary buildings, which were designed and executed on a lavish scale. The present nature of the institution has grown out of an amalgamation of the old Architectural Academy at Berlin with the Engineering Academy of the same city, which previously had separate existences. Both had passed through similar phases of development, both having been started in a very modest way during the early years of the present century. These establishments were organised under the Prussian Government, and both were owned and practically managed as the property of the Prussian people. The new institution is also essentially a Prussian one, on which the Government of that country spends annually a considerable sum of money, and this point as to ownership of the original and, subsequently, of the new establishments, is an important feature to be remembered.

The old Architectural Academy to which I have just referred, though only in working in the opening days of the present century, officially dates from April 8, 1799, when a charter for a new "Bauschule," literally "Building School," or better school of building construction, was signed by the then reigning king, Frederick William III. Its organisation was primarily intended for the education of architects and surveyors who proposed entering Government service. The first curriculum of this early period included no less than twenty-three subjects, and though the qualifications for entry to the classes almost solely consisted in the possession of a good character and elementary education, the scope of the instruction was by no means limited. I should, perhaps, add that this institution was one of the first of its kind on the Continent. The old "Building School" very soon became popular and consequently its development was rapid; so much so indeed, that greater restrictions had to be placed on those wishing to become students. A few years later we hear that one year's practical experience in an architect's or surveyor's office was a primary condition for attendance at these classes. In 1801 no less than fifty pupils attended the schools and in 1805 the number had risen to seventy. Here I would particularly emphasise the fact that the establishment embodied only the requirements indicated by its title; it was a building school, pure and simple, not an architectural school in the modern sense. The classes were essentially of a practical nature. Architecture as an art, and design from an artist's point of view, were subjects dealt with by the Prussian Royal Academy of Art, which had then, as it has now, its architectural studio, and to which members of the "Bauschule" might belong. It was not until the year 1828, when Professor Stier was one of the leading masters of the old establishment, that the art side of an architectural education received the attention that it had long merited from the executive, and soon after, in 1835, more suitable accommodation for the development of this side was found in an extensive block especially erected by Schinkel. In 1849 the building school underwent reorganisation and became a bona-fide architectural academy, managed on university lines, and with all the freedom traditionally associated with German university life; and this not only refers to the organisation of the establishment as such, but also, on the one hand, to the spirit with which the masters treated students, and on the other, to the manner in which the students applied themselves to their studies. The organisation of 1849 practically remained unchanged until the great amalgamation of

1879 already alluded to. Throughout this period the courses were followed by an examination which entitled the successful candidate to certain claims for Government employment, and gave him the title of a Government architect, even if he did not choose to avail himself of a public office, but to practise privately as an architect or surveyor.

It would lead me too far were I to touch in a similar manner on the interesting development of the Engineering Academy, and hence I shall only note that in 1821 it was first known under the title of the Berlin Technical School. Its development was, as I have said, not unlike that of the Architectural Academy, both as regards classes, conditions of entry and so on, while in 1850 it was similarly reorganised on university lines, and from that date became an engineering academy proper. Mechanical and mining engineering, naval architecture and chemistry were comprised in its programme, and each of these sections was, to a certain extent, regarded as a separate department of the establishment.

The amalgamation of these two academies took place, as stated, in 1879, and resulted in the establishment of the Royal Technical College, which in every way possesses a university status, and is in no way to be compared to what we term a "technical college" in this country. In order that the College may offer the best opportunities for the most efficient education the executive retains the leading men of the time for its professorial chairs. The social and educational status of the student is high, for every candidate is expected to have enjoyed a superior education at a first-class school. From a German point of view, the expense of sending a youth to this college is by no means a small matter, though it may seem slight in comparison with English university fees. The whole time of the student has to be given up to his college work, a full course of instruction occupying four years or perhaps longer. The Royal Technical College has its five distinct branches or, if I may apply the academic term, faculties, *i.e.* (1) architecture; (2) civil engineering; (3) mechanical engineering; (4) mining engineering, chemistry and mineralogy; (5) general technical science. Each division has its distinct head, who is generally a *savant* of considerable experience elected from among the body of professors of the section in question, and the chancellor, vice-chancellor and general council of the establishment are elected on similar lines, subject to the approval of the Government and the sanction of the sovereign. The professorships are in the gift of the King; the tutorships are granted by the executive. The students rank with university students, and their characteristics and pastimes are almost identical. The Royal Technical College is housed in what is doubtless the finest building ever devoted to an educational establishment of this description, in fact, it is quite a palace having considerable architectural pretensions. It cannot be too much impressed on those who have witnessed technical classes carried on in almost squalid surroundings, how important it is that we should give to technical students a home which in every way embodies the achievements of this age of progress in technical science, and does credit to the period of architecture to which it belongs. I should much like to have described the beautiful building and its practical equipment, which might well serve as a model to the world, though its conception is perhaps almost too elaborate and too costly from an economic point of view. I must, however, content myself with saying that its dimensions are approximately 700 feet by 300; that it has five courts, of which the central one is covered in, and that it has four storeys, all of considerable height. Its lecture-rooms are spacious and numerous, and its class-rooms and studios thoroughly serviceable and well lighted. The number of students for which it was intended was 2,000, and to-day, although there are 2,913 on the books, it still admirably fulfils its purpose, though the popularity which its educational facilities have won for it will, no doubt, soon compel a considerable extension being made. Of these 2,913 students I should here, perhaps, at once add that there are only 366 architectural students: fully matriculated, with 221 non-matriculated, making in all 587; whilst the mechanical engineers number together nearly 1,300. I should also, perhaps, add that there are a considerable number of foreigners among the students, Russia, for instance, regularly sending a large contingent.

But, turning now to the courses available for students of the architectural section, I ought first to say that besides the subjects taught in the architectural division proper, much that is valuable is to be learned from the civil engineers' department, in the general technical classes, &c., and special facilities are afforded to the architectural student for attending suitable lectures in other sections. The architectural division has eight ordinary and twelve extraordinary professors, and fifteen tutors headed, as I have said before, by a divisional chief elected from among the professors. The courses available include a large number of different lectures on various periods of architectural and art history. Further, elementary and advanced drawing, freehand, perspective, geometrical and architectural draughtsmanship, water-colour work and modelling. Then again, there

\* A paper read by Mr. Edwin O. Sachs, at the Congress of Technical Education.



are classes for the general planning of private dwellings and public buildings of all descriptions, for design in various specific styles and for divers purposes, the designing of ornament, of furniture, of lead-glazing, metal-work, &c. In addition to these, there are exhaustive lectures on the evolution of particular features in design, such as that of ornament; while among the more practical subjects every form of construction is taught, from the simplest brickwork to the most complicated iron roofing. The characteristics of different materials are also important subjects dealt with, as are heating and ventilation. Special forms of building are also treated as separate subjects, as well as the various equipments. For instance, we find lectures on the necessary appliances for hospitals, prisons and libraries. Building legislation is, moreover, not overlooked. Turning to the lectures which are given in other sections we find those on mathematics, physics, statics, geology, chemistry, book-keeping and general elementary law included in the curriculum of the general science division, and in another department the housing of the working classes—in fact, there are few German requirements which are not fully attended to at this college. I use the expression "German requirements" advisedly, for sanitation, which really occupies a very secondary position in a German architectural practice, receives similar treatment at this institution. And again, the measuring-up and sketching on the spot, which we consider so important, the German architect does not appear to appreciate, and as a subject of study is almost overlooked in the Berlin curriculum. Of course, the student has to select his own subjects, and to distribute them over the four years which he spends at the technical college, and if we turn at random to the list of subjects taken up by a first-year man on, say, a Tuesday, we may probably find that in the forenoon he attends lectures of an hour each in mathematics, elementary construction and a class of elementary drawing, and in the afternoon, perhaps, a lecture of one hour on geology or materials, followed by a class of elementary draughtsmanship of from two to three hours' duration, and including, say, instruction in the Classic orders. If we were then to take a fourth year's student list for the same day we might, on the other hand, find a two hours' lecture on the history of architecture and a two hours' class on design in the Renaissance style; then, in the afternoon, he may give a couple of hours to practical design, such as the planning of public buildings, and attend an hour's lecture on heating and ventilation. From these examples it will be seen that, in the earlier stages of the Berlin student's work, he seeks to obtain a foundation in draughtsmanship and science, while at the latter end of his course he devotes most of his time to the designing of buildings, some historical study and to gaining a knowledge of special equipment. It would no doubt be interesting to follow the architectural student's career from year to year or from term to term, but this would take too long, and I therefore only quote a couple of examples from a student's time table.

But now, after these historical and descriptive notes on the Royal Technical College at Berlin, I would ask if there are any disadvantages in the system of architectural education adopted by the Prussian Government? To my mind, though the opportunities for study are delightful, there is obviously something wanting in the whole system. Every preparation is made for the student to obtain knowledge, yet the result is by no means as satisfactory as might be expected. Does not this arise primarily from the student starting fresh from school without any previous elementary practical knowledge of construction? He has never been on a building in the course of erection, and does not know the difference between a piece of oak and a piece of deal. Neither, owing to his not having seen an actual moulding cut, has he any idea of the method of its production. For four long years he spends nearly his whole time in theoretical study, and as far as my own experience goes, there are but few men who utilise even the smallest part of their leisure in getting some idea of the nature of practical work. Does not a school where merely the theory of architecture is taught have a tendency to produce an architect of an academic character, though of course there may be the usual exceptions of brilliant and talented men, or those who are ambitious and energetic, and who do not follow the lines laid down for them? Do not many of the masters, too, in such a school soon lose all touch with practical work, and though brilliant scientists or historians, on receiving their professorship do not they lose all sympathy with the movement of the time, and even, by going through the same course regularly year by year, become mechanical and uninteresting in their methods, inspiring no enthusiasm in their pupils whatever? I think there can be little doubt that, just as it is at Berlin, for instance, the best and most popular masters are those few who keep in constant touch with current thought and practice.

As to the remedy for any unsatisfactory results, would it not be advisable that a boy should have a whole year's practical work in an office, with the run of some works for at least six months, before he starts his elementary studies at the college,

and should not every six months of theoretical study be interspersed with three months of practical work? Should not lessons in design be accompanied by lessons in the measurement of existing buildings, to enable the student to grasp the appearance of what he is putting on paper? Would it not be well, too, that the instructors in design, construction and in special equipment should one and all be men actually in extensive practice, and that such subjects as history, the elementary sciences and freehand drawing should be left to men whose vocation is chiefly to impart knowledge, yet who should be compelled to keep themselves abreast of modern progress?

We have had under consideration an establishment organised on the most elaborate lines, in which there is but little left to improve, as far as the syllabus of the classes is concerned. The Berlin Technical College has been on its trial for over twelve years, and the results, to my mind, are not all proportionate to the amount of time and money expended by the architectural student and the Prussian Government. Indeed, as the Berlin Technical College is in many respects a model to those advocating architectural education, so it must also serve as a warning to those extremists who would advocate merely theoretic study as the primary basis of a training in architecture and its actual practice. Much as we can learn from leading men in special technical subjects, the Berlin College only too plainly shows what harm can be done by taking an able man entirely away from his profession and thus preventing him from keeping in touch with that practical work which brought him into prominence.

I would conclude by saying that the architectural school at the Royal Technical College of Berlin is an institution well worthy of our attention and in many respects of our imitation, but at the same time we must observe the disadvantages of too theoretical an education and their evil effect upon a student destined for actual practice. What I have said in regard to the architectural school I believe holds good in many respects for the several engineering divisions of the same college.

## BIRMINGHAM AND MIDLAND INSTITUTE.

A LARGE party of members of the archaeological section of the Birmingham and Midland Institute and their friends had the privilege of visiting The Nash, the seat of Sir Richard Temple, Bart., on the 12th inst. After reaching Worcester a pleasant drive of six miles brought the company to their destination, where they were cordially received by their host, whose thoughtful kindness had even prepared handsomely-printed programmes, in which all the many articles of interest which awaited inspection were noted and classified in the order of their artistic and archaeological value. The Nash, being a private residence in a somewhat secluded neighbourhood, appears to be little known, but its own beauties and the objects of value it contains are remarkable. The house presents at this moment the appearance of a delightful ivy-clad Elizabethan manor-house, and the greater part of it would be correctly so described. But the original mansion must be of much earlier date, as may be seen by the enormous thickness of the walls in certain places—capacious closets being actually ensconced in them. Several of the rooms are of great interest, being practically unchanged since the days of Shakespeare and of good Queen Bess. In this respect the dining-room is conspicuous. The old Elizabethan oak panelling, which, after being painted most of the colours of the rainbow, has been carefully restored to its original simplicity by the present owner, is yet more recent than the singularly fine ceiling in elaborate plasterwork, and the hooks for supporting the tapestry, which the wainscot replaced, were discovered in the course of recent renovations. The overmantel is an elaborate and beautiful religious subject, apparently Italian. The hall is also a very fine room, and there are peculiarities in the domed ceilings of two apartments and in other internal arrangements which are deserving of careful study. The bedrooms are delightfully quaint, unexpected in shape, prodigal of unlooked-for corners and suggestive of perfect comfort. The range of the Malverns is seen from all the principal apartments. But neither the house nor its sweet pastoral setting form the exclusive charms of The Nash. Every room is crammed with the accumulated treasures of a family which, while rendering historical service to the State, has always retained a remarkable love for literature and for the arts. The walls are covered with the paintings of three generations, among which the vivid depictions of Indian scenery by Sir Richard Temple himself are conspicuous. Rare prints, choice furniture of all ages, from Tudor times to the Sheraton period, decorative paintings on marble, attributed to Angelica Kauffmann, a well-arranged and most attractive library, medals, miniatures, old china, priceless autographs, collections of Indian arms, fine overmantels, trophies of the chase and family portraits are everywhere in bewildering profusion. Even with



the unremitting attention of the ever-courteous host a long afternoon proved too short for more than a superficial inspection of the treasures of The Nash, while the beauties of nature, at their best on a perfect summer day, perpetually distracted the attention, and presented in every window-frame an incomparable picture. The work of investigation was agreeably interrupted by tea on the lawn, where may be seen a large and elaborately-carved font of Norman work, and was cut short by a supper, at which Sir Richard Temple insisted on being the host.

A hearty vote of thanks was accorded Sir Richard Temple, on the motion of Mr. Lawson Tait, for his cordial reception and exceedingly genial hospitality.

### DELFT-WARE.\*

DELFT-WARE takes its name from the little town of Delft in Holland, which well deserves the title of "Parent of Pottery" that has been applied to it. For nearly 250 years the fabrication was continued, and at one time as many as thirty factories were in operation.

During all this long period no other special manufacture was carried on, and we have the singular spectacle of an isolated town taking up an entirely new industry, raising it to its highest perfection, and maintaining its unique position against all rivalry up to the very last, when the time had come for enamelled earthenware to give place to stoneware and porcelain.

It is true that the potters of Delft formed themselves into a guild and took all the steps which were then available for retaining in the same spot a trade that had once become domiciled there, crushing out as they arose the various factories that were started from time to time in other Dutch towns. But these methods were necessarily powerless against foreign competition, and the long pre-eminence of Delft must be attributed to the superiority of its productions, assisted no doubt by the commercial activity and maritime enterprise of Holland. There are of course natural ceramic centres like Staffordshire, where pottery of some kind has always been produced, and numerous towns can be mentioned, such as Rouen and Nevers in France, and Bristol in England, which have become celebrated for the fabrication of wares of the same class as those made at Delft, but in no other case does the fame of a town rest solely upon a single kind of earthenware, manufactured there with but little variation during a period extending over centuries.

It has been shown by M. Havard† that before the closing years of the sixteenth century no pottery or faience was made at Delft. In the fifteenth and sixteenth century the town was celebrated for its breweries and for the manufacture of cloth. The latter is, perhaps, the older of these two industries, for it certainly goes back to 1413, but the brewing was an important part of the trade of the town as early as 1450. The Delft beer acquired a considerable reputation, and there was a time when nearly 300 little breweries bordered its canals, and exported their products to all parts of Holland. In 1536 a terrible fire destroyed almost the whole of the town. In consequence of this catastrophe, the Emperor, Charles V., exempted the citizens from direct taxation and the Delft beer from excise duty for a term of twenty years. About 1573 the Stadtholder, William the Silent, took up his residence in Delft, and it was there, in the Prinsenhof, facing the old church, that he was assassinated on July 10, 1584. The presence of the Stadtholder's court at Delft had rendered the town to some extent an artistic centre, and the higher arts of the goldsmith, the tapestry-maker and the wood-carver or cabinet-maker were called into existence. William's son, Maurice, was elected Stadtholder in his place, but he never resided in Delft, so that after a brief period of political and social prosperity the town was left in 1584 to fall back upon its industries alone. At this time the manufacture of cloth seems to have died out, and the breweries were beginning to decline, but within a few years Herman Pieterz was destined to introduce the beautiful art which was to give to the town its real celebrity.

The evidence which has led M. Havard to assign to the years between 1596 and 1611 the date of the introduction of the manufacture of faience into Delft seems to be quite conclusive. He finds that all the official documents relating to the town are in perfect accord in this respect. Those of an earlier date than the seventeenth century are absolutely silent on the subject of pottery; one indeed, of 1596, is of exceptional interest, as it gives a list of all the trades permitted to be carried on in the town, and in this list the potters are not mentioned. In the book containing the decrees of the magistrate the first mention of pottery occurs in the Act constituting the Guild of St. Luke in 1611. The "Masters' Book" of the Guild begins

with 1613, and at that time there were inscribed the names of eight master potters, the first of which is Herman Pieterz.

M. Havard has divided the history of the fabrication of the ware made at Delft into three periods. The first period, 1596-1650, is characterised by an extremely full decoration, generally executed in blue, the subjects represented being principally battles, historical scenes, &c., frequently containing great numbers of figures. Pieces of this period are very scarce, even in the large museums, but a fair number of specimens are to be seen in the Rijks Museum at Amsterdam.

The second period, which we may take to be 1650-1710, is chiefly remarkable for the wonderful imitations of oriental porcelain, not only in blue, but also in red, green, yellow and gold. The so-called cachemire decoration and the superb work of Pynacker, Fictoor and Van Eenhorn, who applied polychrome decoration to a black ground, belongs to this period. The blue and white ware also underwent development and improvement. The painting often displays great talent; most of the subjects represented are Chinese in character, but there are also many charming landscapes and rural scenes.

The third period, extending from about 1710 to the end of the fabrication, was entirely commercial. Every kind of useful and ornamental article was manufactured in immense numbers and transported to all parts of the world. The quality of the work was of every degree of excellence and badness, and the decoration in every variety of style.\*

The fine and hard wares of Staffordshire became serious rivals to the softer and less durable faience, and the struggle for existence was being keenly felt, even as early as 1760, among the Delft factories. Of the thirty which existed in the town at the beginning of the century but ten survived till 1794, all in a more or less languishing condition. The manufacture, however, still lingered on until 1850, when the last factory was closed.

In order to appreciate properly the qualities of any piece of pottery, some knowledge of its technique is required, and this is especially the case where, as in delft-ware, the painting takes place upon a crude surface. It will therefore be convenient at this point to give a brief account of the process of manufacture.

The clay was thrown or moulded in the ordinary way and submitted to a first firing. The article was then dipped in a white liquid, the dense matter in which formed a white coating to the body of the earthenware. The painting was effected on this white porous substance. The article was then covered with a transparent glaze and fired again. In the second firing the white coating and the glaze were both fused, the former becoming a white enamel, generally of a milky hue, and the latter a thin layer of glass.

Both firings took place in the same kiln, but a higher temperature was required in the second firing to fuse the enamel. The articles in their raw state were placed for their first firing at the top of the kiln where the heat was less.

Leaving for the moment the exact constitution of the white liquid, it is sufficient to say that the opaque white matter held in solution consists of oxide of tin mixed with oxide of lead and other substances which became fused in the second firing. The clay in its biscuit state after the first firing is very absorbent and when dipped into the liquid rapidly drinks in, so to speak, the water, leaving behind upon the surface a white coating of solid matter. In order to paint upon this spongy substance, which may be compared to blotting-paper, very great dexterity as well as suppleness of the hand is required, which can only be acquired by early training and long practice. The difficulty is increased by the nature of the paints which are formed of a mixture of the colouring matter, itself very fluid, with pure water without the addition of gum or any other substance to give cohesion.

On account of the excessive "thirstiness" of the ground and the very liquid character of the pigments, the artist has to manipulate his brush with great skill and quickness, for the least delay or hesitation on any spot causes too much of the colour to be absorbed there, and spoils the piece. The sharpness of the contours depends upon the limpidity of the colours and the rapidity of execution. Very rapid work is also required for shadows, as otherwise, however limpid the paint, they become thick and dark. The moment the artist takes the brush in his hand he has to decide upon the exact amount of intensity to give the contours and shadows, as no subsequent rectification or alteration of the work is possible. It is clear that painting executed upon so uncongenial a substance cannot be very accurate or exact in detail, but the boldness and vigour imposed by the conditions give to the finished work a special character and charm which is quite its own. Patience and care were not the qualities required in the artist, but there was ample scope for the display of originality and dexterity, and in spite of the difficulty of working upon a spongy and absorbent surface effects could be produced of the most surprising delicacy.

\* The amount and extent of the exportation by sea in the last century is shown by the fact that in England and the United States delft was the general name for all kinds of plain domestic earthenware as distinguished from fine wares or china. The word is still used in this sense.

\* A paper by J. W. L. Glaisher, Sc.D., F.R.S., read before the Applied Art Section of the Society of Arts.

† *Histoire de la Faience de Delft*. Paris, 1878.



For my own part, I cannot bring myself to feel any satisfaction in painting executed upon the glaze. The surface is hard, and there is no intimate connection between the painting and the manufacture to which it is attached. The colours are fired at a much lower temperature than that required to produce the piece, in fact only just so much heat is applied as will make them adhere to the glaze. Such an addition to the surface of pottery or porcelain is no real part of the object. It is frequently even worse than an unsuitable excrescence, as it may effectually conceal the whole of the ware itself so that its substance might just as well have been plaster or metal. In the case of Delft, the colours are part of the actual ware itself, incorporating with the enamel and modified and brightened by their contact with the glaze through which they are seen. The body, enamel, colours and glaze are all fired together at the same high temperature and form a single work of art, complete in itself, unproducible by any other method, defiant of the attacks of time.

Although the wonderful pieces of the middle period, in which the ground is sometimes black or green or yellow, and where gold has been freely applied to heighten the effect, are very interesting and beautiful, and extremely precious on account of their great rarity, it seems to me that the real charm and beauty of the ware is to be seen in its highest perfection in some of the pieces decorated only in blue upon a white ground. The blue combines with the enamel, entering into it and blending with it, and if the firing has been successful the colour is pure and bright without undue brilliance or self-assertion. In the best specimens, where the painting has been executed by a master's hand, and all the circumstances of the firing have been favourable, there is a softness in the blue, melting into the white of the enamel—or rather, so to speak, absorbed in it—and seeming to lie deep down beneath the glaze, which gives a peculiarly charming effect, not only to the decoration but to the piece as a whole. However beautiful the polychrome work may be, it seems to me that the best pieces of "coloured delft" are not comparable to those which are decorated only in blue. None of the other colours assimilate themselves so well with the ground; the reds and red-browns often seem to lie upon the surface of the enamel without entering into it at all, and even the yellows are very rarely quite satisfactory.

In these remarks I am referring only to really good productions which show the capabilities of the ware. The decoration of the ordinary run of moderately good pieces is effective and often striking when seen from a distance; but they will not bear a closer inspection—indeed, when a piece is looked into it is sometimes difficult to understand how the rough outlines and patches of colour can form so good a design and show off so well. The collector, however, occasionally meets with specimens which lose none of their charm when carefully examined; the general effect of the painting, of course is lost, but the softness and beauty of the colour and enamel are even more delightful.

As has been already stated, the date of the origin of the manufacture at Delft of earthenware covered with a stanniferous enamel can be established to within a few years, for before 1596 there was no factory in existence, and by 1613 there were eight master potters. It seems to be certain that Delft has no previous ceramic history, and that the making of faience there was not a development of an earlier industry, but was introduced as a new and complete art.

In the case of Rouen, which it is natural to refer to now as being, next to Delft, the most considerable seat of the manufacture of stanniferous faience, it is known that tiles were made there by Abaquesne in the middle of the sixteenth century. Then comes a gap of nearly a hundred years, till 1647, when there is evidence that faience was again being made. The date of the commencement of the fabrication on an extensive scale may be taken to be 1673, when letters patent were granted to Louis Poterat for the establishment of a factory of "faience and porcelain" at Rouen. In 1722 there were eleven important factories, employing 2,000 workmen, and as late as 1783 there were eighteen master faience-makers. Towards the close of the century the manufacture languished and declined, owing to the same causes which produced the decadence of the Delft factories.

Next to Rouen in amount of production must be placed Nevers. The manufacture of faience in this town began earlier than in Rouen, and covers a much longer period of time, extending from 1608 to well into the present century.

It cannot be doubted that the manufacture of earthenware coated with a stanniferous enamel was introduced into Holland and France from Italy, for the material itself and the mode of manufacture do not differ essentially from the majolica generally associated with the name of Luca della Robbia, which had been made in various Italian towns for the previous two centuries. We know that the founders of the industry at Nevers came from Italy and we should expect that it would have been the same at Delft, but Herman Pieterz was born at Haarlem and we find no Italian names among the early Delft

potters. This is very remarkable, as the processes of manufacture at Delft show a closer connection with those which had been employed in Italy than is the case with French faience. It would seem, therefore, that the art must have travelled from Italy to Delft by the way of some other Dutch town. In the letters patent of Louis Poterat it is stated that he has found the secret of making "la véritable porcelaine de la Chine et celui de la fayence d'Holande." Thus the first important factory at Rouen was founded for the manufacture of the kind of wares which were then associated with Delft. The date is so late that of course we should not expect direct relations with Italy. It is known that some of the workmen came from Nevers, and their influence is seen in the earliest pieces.

Rouen is associated with several very well-marked styles of decoration, some of which were perhaps derived from tapestry, lace, ironwork, &c. The name suggests at once the radiating designs—the decorations "à lambrequins" and "à broderies"—the cornucopia design ("à la corne") and a few others. There are also certain special styles associated with Nevers. But in the case of Delft, it is not easy to think of any classes of decoration which can be selected as characteristic of the fabrication in the same sense; of course, there are many common designs which were reproduced over and over again, just as the willow pattern has been repeated on stonewares in this country, and which at a glance tell the origin of the piece, but they cannot be said to have enough character to be actually distinctive. It is really for the immense variety of its designs that Delft was so remarkable; there seems to have been no kind of decoration either upon Oriental or European porcelain, or any other class of ware, that was not copied and developed. Many rustic scenes and landscapes are obviously Dutch in style, but they do not bear a sufficiently large proportion to the whole to be regarded as representative of the production of the town.\*

Just as Nevers is celebrated for its early pieces in white on a beautiful "bleu de Perse" ground, so may the pieces by Pynacker, &c., be counted as one of the chief glories of Delft.

If the ware itself, as well as the decoration, be taken into account, I think that the imitations of Chinese porcelain are perhaps the most characteristic products of the town. It seems strange that it should be possible to regard a copy of another material as characteristic, and yet none of the rivals of Delft produced in any quantity a ware so curious or admirable. The imitation is often so good that even a practised eye would be deceived at a little distance as to the origin of the piece, but when examined closely the enamelled earthenware has a certain softness which is particularly attractive. The first period of the fabrication seems to be distinguished by the absence of Chinese designs, but afterwards, when Oriental china was imported into Europe on a large scale, the great mass of the decoration of the Delft pieces shows a Chinese motive. The general tendency of the times to copy Oriental designs may have been increased by the fact that much of the trade with China was carried on by the Dutch East India Company, one of whose dépôts was at Delft.

It is not impossible that some of the pieces made at Delft were meant to be forgeries, but it is sufficient to suppose that the wider knowledge of Oriental porcelain had inspired an interest in the ware, which led to a demand for pieces of a similar appearance. The skill with which the enamel and

\* Among designs that have specially interested me I may mention "dragons" and "tea-plants." The former consists of a four-footed dragon upon a background of leaves, flowers and twigs, surrounded, in the case of plates and bowls, by a border consisting of a diaper pattern alternating with white concave spaces containing a conventional design which is always the same. It is curious to notice the persistence with which the accessories of the design are repeated. Thus, in plates and bowls the dragon and leaf-ground are surrounded by a white space bounded by two concentric circles and quite destitute of decoration. Then comes the diaper border and a red-brown edge, when the decoration is in blue. In nearly every instance all these details occur without variation. The artists also have allowed themselves very little latitude even in the painting of the dragon. The "tea-plant" (so-called by the Dutch dealers) represents a bushy spreading tree having a curious scar on the trunk; the branches are divided into three tufts above the central portion, which contains two flowers resembling eyes. In this design, which is pretty and effective, there is much less uniformity, and it is interesting to examine the variations in a collection of specimens. Both designs are obviously Oriental, but I have never succeeded in seeing an Oriental piece which has a real resemblance to either. It has often been remarked that Delft plates, unlike their Oriental originals, were very seldom decorated on the back. When there is any attempt at decoration it generally consists merely of a few concentric circles or of o's and crosses placed alternately at wide distances on the part of the plate outside of the flange. The best-known Delft pattern, and one of the most striking, represents a vase containing flowers with a radiating feathery background, the whole design giving the effect of an expanded peacock's tail. Many other patterns, besides those derived from Oriental porcelain, "Water and Ducks," "The Hart," &c., will at once occur to any collector, but the variety of the designs is so enormous that I think that, no matter how many a collector may have seen, he is always liable to be surprised by curious novelties.



glaze were manipulated so as to resemble porcelain so closely, both as regards general appearance and the "shine" of the surface in various lights, is truly remarkable, but it is in the ware itself, independently of the accuracy of the reproduction, that I find the fascination. For myself, I prefer the specimens in which there is little or no Chinese motive, and even if quite undecorated, some pieces would be very attractive solely on account of the charm of the material.

Vast numbers of tiles were made at Delft and, as in the case of the other wares, they were of every degree of merit. In most of them the decoration is in blue, but it is often in violet-brown; polychrome tiles are much less common. As a rule the painting is rough, and in many cases, where the subject is religious, the treatment is somewhat grotesque; but occasionally sets of tiles are met with in which the painting is as good as on the best plates. The large plaques made of tiles are characteristic and date from a very early period of the fabrication. A great many of these plaques are exhibited in the Amsterdam Museum, but it is not easy to see good specimens elsewhere. Solid plaques (in one piece) representing landscapes, birds in cages, dogs, &c., were also produced in considerable quantities; this kind of plaque was also made at Rouen and other places.

When we consider shapes, there are several kinds of vases which instantly suggest Delft as distinguished from Rouen or other centres of production. I do not suppose that any of the shapes could have originated at Delft, but such enormous numbers of these vases were made that they are now to be seen in nearly every bric-à-brac shop of Western Europe. The forms most usually met with are either circular or somewhat flattened (frequently octagonal in reality), decorated with a scene in front, but with merely a rough ornament in the back and sides. These latter vases may fairly be regarded as representative of the town, although the majority of them do it little credit. I think it would be found that most of the shapes attributed to Rouen by French writers had been previously made at Delft, for I have several times obtained early Delft pieces the shapes of which would be classed as "Rouen." The sets of five vases (garnitures) for the decoration of chimney-pieces, &c., were made in great numbers; some of them, dating from the early part of the last century, are very beautiful and striking.\* Great quantities of curiously shaped pieces (dishes in the form of birds, vegetables, &c.) were produced. The larger objects of this class, although interesting ceramically, are not very attractive,† but many of the smaller modelled pieces (cows, &c.) are excellent. I do not think that the very large modelled pieces (such as dogs, &c.) intended for use in halls and out of doors, and for which Rouen is celebrated, were made to any great extent at Delft.

No one who is fond of the faïence of Delft can help regretting that the factories struggled on so long. A great deal that was produced after the decadence had well set in is so poor and commonplace as almost to justify even a connoisseur in taking a dislike to the whole ware. The colours are harsh and aggressive, the painting itself is bad, and sometimes the enamel is coarse, so that it seems incredible that the same process could ever have produced fine ware. It is not uncommon to see pieces belonging to this last period in which the enamel is fairly pure and good, though the painting is horrible.‡ Up to the very last some of the blue pieces seem to have been pretty good, but I do not think it likely that any good polychrome work was produced during the later years of the decadence.

Nevers resembled Delft in having a long period of decadence, but the French Revolution supplied the motive of the decoration, so that the "faïences patriotiques" of Nevers, though not in any way superior as works of art to the contem-

\* In many of the vases the moulding of the lions, dogs, &c., which form the tops of the covers is very bad. I have seen "garnitures" in which the painting on the sides of the vases was excellent, entirely spoilt by the clumsy modelling of the tops, which look as if they had been half melted in the firing; the blue, too, has often lost its brilliancy and become dark and heavy. This is curious, as some of the separately modelled pieces of the same size are so admirable.

† One reason why these larger pieces, which are generally decorated in polychrome are so unsatisfactory, is that the reds are dull and bad in colour. It seems as if the glaze, which covers the blues and greens with a thin layer of glass, entered into combination with the reds, when spread over a considerable area, giving them the appearance of having been painted afterwards and not fired at all. The yellows are sometimes bright and entirely covered by the glaze, but sometimes they share the fate of the reds. When red is sparingly used on a white ground, as in pieces by Pynacker, it shows well, but in large objects, all covered with colour (as for example in a vegetable-dish shaped like a cock), the extensive areas of dull brownish-red and yellow deprive the piece of the very qualities for which the ware deserves to be admired.

‡ In many of the plates made at the "Claw," and having the design, already referred to in a note, of the "expanded peacock's tail," the enamel is very milky and attractive, and the painting quite satisfactory. These plates are so numerous that it would seem that this must have been the principal design in use at the Claw and Blompot in their last days.

porary wares of Delft, possess a peculiar historic interest which will always render them valuable.\*

I now come to the distinguishing point between the wares of Delft and the French stanniferous faïence. This consists in the fact that the former was covered by a transparent glaze which is absent in the latter. At first sight it would seem difficult to understand how the glazing was effected without a third firing, as the dipping the painted enamel into a liquid glaze would cause the colours to run. The method is described by Gerrit Paape in his work of 1794, which has been reproduced in French by M. Havard. The workman dips a short rough-haired brush into the liquid and shakes it violently to get rid of the excess. He then sprinkles the object to be glazed, which he holds in his hand, until it is as white as snow. This process, according to M. Deck, was not followed by the French makers of faïence. The glaze not only has the effect of heightening the colours, but it also protects them from evaporation, and indeed to me it seems that it is just this glaze that gives to the best wares of Delft their superiority over those of Rouen and Nevers. The difference in effect is not very noticeable at a distance, especially if the design be large, but it becomes very evident when a closer inspection is made. Without the glaze it would have been impossible for the Delft potters to produce their wonderful imitations of Chinese porcelain, and to anyone who has become accustomed to the brightness of the best Delft pieces the dull and faded appearance of much of the most admired French faïence is very disappointing. How this essential difference between the French and Dutch processes could have arisen, and why it should have always continued, is difficult to conjecture. It is known that the Italian majolica was covered by a glaze of somewhat similar composition to that used at Delft, and it is almost impossible to resist the conviction that the process must have passed from Italy to Holland. So far as I can see, the glazing process was carried out in the English delft factories, and we should expect this to be the case also in other countries where the manufacture was introduced from Holland.

It is probable that Delft not only trained the best painters and workmen, but that it always retained their services; and it is, I think, unquestionable that the finest pieces of delft-ware (*i.e.* earthenware covered with a tin enamel and a lead glaze) that have ever been produced were made there. The general superiority of the wares of Delft over those manufactured elsewhere, even by Dutch workmen, must, however, be attributed to the excellence of the mixtures of clays adopted there, which gave to the body of the ware just the right porosity to deposit the proper thickness of enamel, and produced a contraction during firing that was in perfect sympathy with the enamel, so that there were no cracks or other signs of crazing.

Gerrit Paape states that the clay employed at Delft was obtained by the mixture of three different clays, *viz.* the Tournai clay, the Rhine clay, and the Delft clay, combined in the proportions of six, three, and two. He mentions that the Tournai clay was often replaced by that of Brabant, and that the Rhine clay came from the neighbourhood of Leyden, and even of Delft itself.†

M. Deck, referring to French factories (Rouen, Nevers, Moustiers), remarks that the composition of the enamel was the same, and that the great differences in the appearance of the pieces are due solely to the quality and properties of the local clays. I think we may assume that this is substantially true generally, the great variations in the quality of the products of the different towns being attributable almost wholly to the nature of the clays, so that the composition of the enamel (except as regards tint or colour) need not be taken into account. The body of the ware made at Delft was buff-coloured after firing and is very light in weight. The pinkish appearance seen under the enamel in so many English pieces is, as is well known, due to the less absorbent quality of the English body, the reddish hue of which shows through. Pieces made in the North of France (Desvres, &c.) or at Brussels or Bruges are often as well painted as those of Delft, their inferior quality being obviously due merely to the hard and coarse body, too thinly covered by the enamel. I have frequently met with plates in France, possibly made at the minor factories, which, though elaborately and excellently painted in polychrome, were quite spoilt by their dull and blistered appearance. At first sight it would be natural to regard these as good pieces which had gone wrong in the firing, but they are too numerous to be

\* The only corresponding products of Delft are the plates representing Prince William V. and the Princess Sophia Wilhelmina, generally separated by an orange tree. These plates must have been made in enormous quantities, judging by the number that are now to be met with. The "patriotic" designs were also painted on English stone ware and exported into Holland.

† It is noticeable that Delft seems to have possessed no special natural advantages for the making of earthenware. The clays used would have been available also for other towns, which probably would have been equally well placed as regards water carriage. The conditions were such, however, that when Delft had gained the trade, it would clearly be difficult for any other town to deprive her of it.



so explained, and I think that the bad result must be attributed to an unsatisfactory body and the absence of a glaze.\*

The ordinary German delft-ware are easily distinguished from those made at Delft. The blue is raw and harsh and the quality is poor. As a rule the softness which characterises the good ware of Delft is quite absent. In the districts near Nuremberg, and probably elsewhere in Bavaria, great numbers of tankards, generally decorated in polychrome, were made, and some of these are comparable to the products of Delft itself, though in most cases the true "shine" is missing. In quite a number of pieces the enamel itself is coloured (green, yellow or blue). Sprinkled or mottled grounds, such as are in this country associated with Liverpool, are also common in Bavaria.† The Zürich delft is not unlike that made near Nuremberg; but the body of the delft-ware of Winterthur is so hard and the enamel so thin that it is of quite a distinct character. On the whole, I think that next to the English delft the products of Zürich and the region around Nuremberg have the closest general resemblance to the ware made at Delft. Most of the contemporary Italian and Spanish faïences, though technically to be classed as a delft-ware, as the enamel is stanniferous, are so different in character, being often dull and with a smeary appearance, that they need not be referred to here. It is curious, however, that some of the best pieces of white delft (scallop plates and drug pots), both as regards quality and glaze that I have seen, are (presumably) Italian.

The stanniferous enamel was composed of lead, tin, silica and alkaline substances. The lead and tin were first combined into what may be called the calcine as follows:—After the furnace had been lighted four or five hours the lead and tin were introduced (in bars or ingots) in the proportion of about three to one. The heat of the furnace was gradually raised, and when the metals had become perfectly liquefied a kind of foam was seen to form upon their surface, in which little bright stars flashed out from time to time. The oxygen of the atmosphere was then combining with the metals. The process was continued until the metals were completely oxidised.

A substance called mastic was formed by melting sand, sea-salt and soda in the proportions of 500, 60 and 30. When fused a fragile body was produced which was finely pounded.

The enamel or "wit" (white) was then obtained by fusing 50 parts of calcine, 65 of mastic, half a part of smalt and a small quantity of red copper filings. A very great heat was required to melt this composition, which was therefore placed in the hottest part of the oven. It was then pounded and ground to a great degree of fineness between millstones. This powder, when mixed with a suitable quantity of water, formed the enamel into which the objects were dipped in the biscuit state after their first firing. The smalt was evidently introduced in order to improve the colour.‡

(To be concluded.)

## LIVERPOOL SCHOOL OF ARCHITECTURE AND APPLIED ARTS.

THE annual exhibition of selected works done by the students during the past session was opened on the 11th inst. in the Applied Art Building. The exhibits include architectural drawings and designs by first and second year's men and more advanced students, modelling from the life, designs for fabrics, wall-papers, book-plates, stained-glass, posters, &c., and many charming and fanciful sketches submitted for the Sketch Club competitions. There are some specimens of wood-carving, and a few, but very excellent examples of wrought-iron work, which show that this class is educating the apprentices in this most important branch.

The exhibition conveys favourable impression, not only of the capabilities of the students, but of the lines upon which the teaching proceeds. An example is afforded by what may be called the premier department—that of architecture, which is under the direction of Professor Simpson, the principal of the schools. The collection of architectural drawings not only shows good, and in some instances excellent, draughtsmanship, but a thorough grip of the practical as well as the artistic side of architecture, as evidenced by the treatment of working details. This scientific thoroughness, the best foundation for artistic achievements, is insisted upon in every instance, but it

is interesting especially to note the several groups of drawings illustrating the treatment of the same subject by different students. The subjects in this instance are a two-storey façade in the Classical style; a doorway in the same style with arched pediment, and a complete set of drawings and plans for a small country mansion. The drawings show interesting individual treatment of the same principles, as well as the stimulus given to independent reflection and the use of knowledge. In regard to the department of modelling and sculpture, the main feature is the prominence given to direct study from the life. There is a beautifully-modelled bust by Mr. L. Crosfield, showing vigorous insight into plastic effect, the work having a strongly marked character. The series of models of a figure adapted for telephones and the half-dozen reliefs of a half-length female figure, a classical study for "Pandora," are instances of healthy emulation upon right lines. The reliefs and modellings of a more purely architectural character are also interesting. The same practical view is uppermost in the exhibits of the students of decorative design and painting—that is to say, the object of the school as one of applied art is obviously kept steadily in view by Mr. Anning Bell, since the designs are for friezes, wall-papers, posters, book covers, cushions, hangings and illustrations for periodicals and books and are of a strictly applicable character, whether in black and white or colours. The black and white work predominates and much of it is of distinctly fine quality, and while originality is fostered eccentricity is kept down. The examples of wrought-iron work are really admirable bits of craftsmanship and skill.

## ARCHITECTURAL ASSOCIATION OF IRELAND.

THE annual excursion took place on Saturday last. The members left Amiens Street for Drogheda, where brakes were in readiness to convey the party to Mellifont and Monasterboice. The route taken lay through the fine scenery of the valley of the Boyne and the beautiful demesne of Mr. R. H. Balfour, D.L., Townley Hall. At Mellifont Abbey a couple of hours were spent in measuring and sketching the remains of this fine old Cistercian foundation. The chapter-house in particular is in an excellent state of preservation, and affords much material for study by the architect and the antiquarian. After lunch at Mellifont, Monasterboice was visited and the round tower and two fine Celtic crosses were examined and sketched. The party then returned to Drogheda, where some places of interest were visited, including the old abbey, St. Laurence Gate, and a rather quaint Georgian building, now used as a police barracks.

## TESSERÆ.

### Westminster Hall and the Coronation of George III.

A PLATFORM was erected from the upper end of Westminster Hall, where the procession commenced, which continued through New Palace Yard, Parliament Street and Bridge Street into King Street, and so round through the west door of the Abbey on to the choir, where His Majesty was crowned. In view of this platform, the houses on each side were lined with scaffolding, the seats on which were let at the most exorbitant prices. The front seats in the galleries of the Abbey were hired at ten guineas each, and those in commodious houses along the procession at no less prices. The terms in ordinary houses were from one guinea to five, so that a small house in Coronation Row, after the scaffolding was paid for, cleared 700%, and some large houses upwards of 1,000%. In the coronation theatres, as they were called, which were large temporary erections, capable of containing from 1,200 to 1,500 seats, the prices were beyond all precedent, though some who fitted up houses and scaffolds on this occasion lost considerably through the greatness of their demands. The ground rent where the scaffolding was built was proportionately extravagant. That in the Broad Sanctuary was 3*l.* 13*s.* 6*d.* per foot, and that within the rails enclosing the Abbey was five guineas. For the celebrating of the coronation feast, Westminster Hall was laid open throughout, and everything it before contained entirely removed, excepting the floor and steps of the King's Bench Court. A new boarded floor was then laid from the north gate up to the middle of the hall to those steps, and covered with matting. On each side was built a large gallery, the lower part about 5 feet from the ground, and containing eight benches, covered also with matting, for the spectators. Over this was erected a second gallery, not so wide but of the same length as the open part of the hall when the King's Bench Court was standing; over which also a third gallery was fixed as it were in the roof, and supported by those beams which are decorated at the ends with figures of angels, being nearly the same length as the others but scarcely so wide from its being placed in a narrower part of the building. Between the first gallery and the floor were erected, on each side, large closets or pantries with double doors, answering the purpose of sideboards and cellarets, as well as to contain the plates, dishes,

\* It is a singular fact that the brightest delft plates that I have ever seen were met with in France. This would seem to suggest that the wares made by Aegestyn Reygens and others for exportation to France were especially brilliant.

† These grounds also occur frequently in Bruges pieces.

‡ The coloured enamels were of course obtained by introducing colouring substances into the constitution of the enamel, and this may have been effected in different ways. There are great varieties in the tint of the white enamel, much of it having a greenish hue. One form of border decoration associated in this country with Bristol consisted in "painting" with a pure or cream white enamel slip upon a greenish-white ground.



glasses, &c., wanted by the company and waiters. In a space left between these pantries and the platform up the middle of the hall the tables were placed for that part of the company who had not the honour to be seated with the king. His Majesty, with the queen, nobility, great officers of State, &c., dined in the elevated part of the hall, near the Court of King's Bench. The whole was lighted by fifty-two large chandeliers, each ornamented at the top with a gilt imperial crown. Over the north gate, opposite the king's table, was erected a large balcony for the trumpets, kettledrums, and other music, and in the centre over them was fixed an organ. It was under this music that the champion, attended by the Lord High Constable and the Earl Marshal, made their entrée on horseback into the hall.

### Greek Scholarship in England.

Among the first and most liberal encouragers of Greek learning was Humphrey, Duke of Gloucester, brother to Henry V. This royal "bibliomaniac of the dark ages," as he is styled by Mr. Tytler, earnestly laboured to banish the gloom of barbarism, in which England was in his time involved, by his own example as an author and a scholar, by a munificent and enlightened patronage of contemporary efforts of learning, especially of such as were directed to enriching modern Europe with Latin translations of the Greek classics—a labour in which the learned of Italy were at that time largely occupied—but especially by forming collections of the best ancient authors. Of the latter mode, his present to the University of Oxford of above 600 splendid volumes, written on vellum and elegantly embellished with miniatures and illuminations, was a noble example. It is deeply to be lamented that a single specimen only survives of this monument of Humphrey's taste and munificence—a beautiful manuscript, in folio, of "Valerius Maximus"—the rest, under suspicion of containing matter savouring of Popish superstition, having been sacrificed to the zeal or ignorance of the pious visitors in the reign of Edward VI. Among those patronised by Humphrey were Leonard Aretin, Piero del Monti, Petrus Candidus December, Lopus de Castellione, Tito Livio of Foro Julii, whom he constituted his poet and orator, and Antonio Beccaria his secretary, whose translation of six tracts of Athanasius, undertaken by command of the duke, is among the royal manuscripts in the British Museum. The first of those English scholars who studied the Greek language in Italy, then the only school of polite letters, are John Tiptoft, Earl of Worcester, Lord Chancellor to Edward IV., and John Free (or Phreas, as he is called by Leland). Tiptoft and Free, with Grey, Fleming and Gundorp, passed over from Oxford into Italy; and either together, or at no great interval of time from each other, became pupils of Guarini, of which celebrated teacher it is related, as a striking evidence how deeply interested his feelings were in the learned pursuits in which he was engaged, that having, while studying in Greece under the celebrated Chrysolorus, collected two large boxes of manuscripts, the loss of one of them, by the shipwreck of the vessel in which he was returning to Italy, caused him such profound concern that his hair became grey in a single night. Tiptoft brought back with him to England, whither he was accompanied by the Italian scholar Ludovicus Carbo, a valuable collection of manuscripts, intended both for his private use and to enrich the Humphreidian library at Oxford. These, after his execution, upon the restoration of Henry VI., were with some difficulty secured to the University by George Neville, Archbishop of York; under Edward VI. they followed the fate of the rest of Duke Humphrey's library. Tiptoft left several works in Latin and in English, at the end of his impression of one of which, a version of two orations of Banatusius Magnomontanus, Caxton has paid a tribute of enthusiastic affection to the memory of the accomplished earl. Of Free, we are told, there remain high encomiums from the pen of Guarini himself in the collection of his epistles preserved in the library of Balliol College. Johannes Anglicus (so Free was styled) stood so high in the estimation of the accomplished scholars of Italy that, when time or accident had effaced the original epitaph upon the tomb of Petrarch, he was requested to compose an inscription to succeed it more consonant with the approved Latinity of the age. Some of his works deposited in Jesus College, Oxford, have perished; those which remain are:—"Cosmographia Mundi," consisting of extracts from Pliny; a translation of some parts of "Xenophon;" a collection of ten Latin epistles, and a little poem, "Carmen ad miraculum usque elegans" (says Leland), addressed to Tiptoft.

### James Heffernan, the Sculptor.

Had James Heffernan met with a liberal patron in early life who would have afforded him the means and the opportunity he might have ranked high in the world of art, but he fell into the hands of a selfish and ungenerous man, Sir Francis Chantrey, who overshadowed his modest merit under the greatness of his name, and who, employing him as a mere drudge, reaped all the benefit of his cultivated mind and practical ability. Born in Londonderry in the year 1785, he quitted that city for Cork at the early age of eleven,

at which time he displayed great talent for drawing. Shanahan, with whom he left his birth-place, was engaged extensively in marble works, besides being occupied as an architect in considerable practice. That young Heffernan should try his prentice hand at such minor efforts with the chisel as chimneypieces and tombstones admitted of is but natural to suppose, especially of one whose love of imitation was manifested at an age when other boys are engrossed in tops or luxuriate in leap-frog. The love of the art grew upon him even before he approached the vestibule of the Temple; and from that time James Heffernan felt within him the divine impulses of genius, and those passionate longings after the beautiful which distinguish the true artist. With such aid as Cork then afforded the young sculptor studied intensely and toiled with unremitting energy, until he felt his strength equal to a bolder effort. When little more than twenty-two he left Cork for London, and was in a short time afterwards engaged in the studio of the sculptor Rossi, whose employment he left for that of Chantrey—an artist who owed much of his fame to the imagination of Allan Cunningham and the cunning chisel of the modest Heffernan. During his first connection with Chantrey he devoted himself to a study of sculpture with a perseverance which was followed in his case with the most beneficial results. After a sojourn in Rome he returned to London, when fate threw him in the path of his former employer, who lured him to his studio by promises which he never realised, and most probably never intended to realise. At any rate Heffernan remained with Chantrey till the death of the latter, in whose will, of course, there was no mention of his gifted assistant. The death of his faithless employer was of this advantage to him—that he was called on to finish some of his most important works, which he did in a manner that acquired for him both fame and emolument. But just as the path was being cleared before him, and he saw himself at last on the eve of realising the dream of his youthful ambition, his health failed him, and he was compelled to seek its restoration by the waters of that river which he loved from his boyhood. After a residence of some years in Cork he fell a victim to an acute disease in the month of October 1847.

### Memorials of Ancient Greek Triumphs.

Burglars in Athens swarmed like flies in a hot August with us, in fact, so plentiful that even the memorials dearest to their vanity and patriotism—viz. their battle trophies—could not otherwise be protected from the rapacity of domestic robbers than by making them of materials which would hardly pay the cost of removal. The Greeks, after any victory of one little clan over another—of Spartans over Thebans, or of Thebans over Spartans—used to do two things in the way of self-glorification; first, they chanted a hymn or *psalm*, which was their mode of singing *Te Deum*; secondly, they erected a trophy or memorial of their victory on the ground. But this trophy one might naturally expect to be framed of the most durable materials, whereas, on the contrary, it was framed of the very frailest, viz. firewood. Why the wood rapidly disappeared is therefore easy to understand, but not why it had ever been relied on as a durable record. The Greeks, who were masters in the arts of varnishing and gilding, reported the whole case in the following superfine terms:—"It is right and simply a necessity of our human nature that we should quarrel intermittingly. We Grecians are all brothers, it is true; but still even brothers must, for the sake of health, have a monthly allowance of fighting and kicking. Not at all less natural it is that the conquerors in each particular round of our never-ending battle should triumph gloriously and crow like 20,000 gamecocks, each flapping his wings on his own dunghill, armed with spurs each according to the Socratic model left us by Plato. An allowance, in short, of shouting and jubilation is but fair. Still, all this should have a speedy end, not only upon the prudential maxim that he who is the kicking party to-day will often be the kicked party to-morrow, but also on a moral motive, viz. to forget and forgive. Under these suggestions it becomes right to raise no memorials of fighting triumphs in any but fugitive materials; not, therefore, of brass or of marble, which would be too durable and would be too costly, but rather of wood the most worm-eaten, and if it shows signs of dry-rot all the better. Under this limitation our triumph puts on a human and natural shape. It very soon decays and typifies our exultation, which decays concurrently." The reason, therefore, for not using brass or copper was because in that case, long before the moon had run her circuit, the trophy would have been found in a blacksmith's shop at Corinth or Athens, sold or pawned at the rate of a drachma a head for a gang of forty thieves.

### Arundel Castle.

The earliest notice of the place occurs in King Alfred's will, where it is termed the manor (ham) of Erundellan, and it seems probable that the castle was one of those which he erected to guard the southern coast, and which, it is not unlikely, might at one period have been honoured as his residence. That a castle stood there in the time of Edward the Confessor is proved by



Domesday Book, in which the castle of "Harundell" is expressly mentioned as having rendered in the reign of Edward a certain payment for a mill; from the same document we learn that there was already a port and a town. Of this early castle it may well be supposed that little, if any, remains, and we must proceed to Norman times to trace the advancing splendour of the castle of Arundel. When the Conquest transferred nearly all the property to the retainers of William, the castle, together with the entire rapes of Arundel and Chichester, containing eighty-four and a half knights' fees, or 57,460 acres, were marked out to form "the honour of Arundel," which, with the title of earl, was bestowed upon a relative of the Conqueror, Roger de Montgomerie, who had commanded the centre division of the victorious army on the field of Hastings. It was under the superintendence of this earl that the castle of Arundel assumed the stern, but imposing, character of the Norman stronghold—arches adorned with the chevron moulding, unruined in the lapse of more than seven centuries, walls of 8 and 10 feet thickness, firm and strong as the work of yesterday, add another attestation to the superior ability of the Norman architects; while the "donjon," that proud appendage to the baronial castle, might still be converted into a place of captivity. Toward the close of the thirteenth century, Earl Richard, the third of the Fitzalans, greatly enlarged and improved the castle, while in the following century his grandson erected the hall, which, unfortunately, was wholly destroyed during the siege in 1643-44. But it was not until the sixteenth century that the castle was entirely completed, for then the north-east wing was added, and a splendid gallery erected. And thus might the castle of Arundel have stood, even to the present day, perfect in its ancient form, and altered only in its inferior appendages, had not the violence of civil discord intervened to destroy its glories and reduce the most venerable portion of its fabric to a ruin. From this time until the year 1720 no attention was bestowed on these ruinous remains. At that period, however, the Duke of Norfolk determined to restore the castle, at least to a habitable state; this determination was carried into effect by his son.

#### Early Greek Coins.

Early Greek coins, which were fabricated prior to the time of Alexander I. of Macedon, are generally characterised by having on the reverses indented squares or rude indentations; but some have an incuse (sunk in) reverse, answering, or nearly so, to the subject which is in relief on the obverse or head side. Some, however, have upon the reverse an indented object, different from that which is raised on the obverse, as may be seen in a very ancient coin of Metapontum; while the coins of Metapontum, Paestum (or Posidonia), Crotona and Caulonia have a dotted circle at the extreme edge. One of the most interesting coins of antiquity, and certainly one of the most ancient, is the gold Daric, which is said to have been first coined by Darius son of Hystaspes in the second year of the 64th Olympiad, or 522 before Christ; it is indeed doubtful whether there be any coins of greater antiquity. These gold Darics are of great purity as to the metal, but of a rude, irregular shape and coarse workmanship. They have on the obverse the figure of a king kneeling upon one knee, holding in the left hand a bow and in the right an arrow; upon the reverse merely a rude indentation. It was this type of an archer which gave rise to the pun that Agesilaus, king of Sparta, had been driven out of Asia by 30,000 archers, he having, it is said, taken a bribe of that amount from Artaxerxes to evacuate Ionia, where he had gone to free the Greek cities, then groaning under the tyranny of Persia. The most obvious peculiarity to be observed in this epoch is the indented or hollow square, which may probably have arisen in rude efforts to fix the blank piece of metal between the two dies whilst the blow was struck. The second epoch is from Alexander I. of Macedon to Philip II., or the 395th year from the building of Rome; and during this period we discover a considerable improvement, but still the peculiarities of the earlier coins are visible; we have still the indented squares on the reverses, but the name of the city where struck or of the king in whose reign appears, or there is engraved a head or some other object, or the same subject is repeated which appears on the obverse. Examples of this may be found in the coins of Acanthus, of Alexander I. of Macedon, of Thebes, of Syracuse, of Selinus, of Himera and of Argos. Towards the end of this epoch some remarkably fine coins occur, as in those of Amphipolis of Thebes (with the head of the Indian Bacchus), of Methymna, of Chios, of Chalcis in Macedon and many other specimens.

#### Sir David Wilkie and Dutch Art.

The works of Wilkie have contributed largely to the extinction of that erroneous prejudice which, too generally spread, maintained that the old masters were in possession of some method of preparing their pigments to the moderns unknown. In dexterity of execution he is perhaps not equal to Teniers, but in composition he is certainly as original, as natural, and in invention and expression superior, not only to

him, but equal to any artist of those schools—not even excepting Jan Steen. In the union of brilliancy and powerful effect, as combined with execution and finishing, perhaps, the famed picture commemorative of the victory of Waterloo is as high an example as can be produced in art. There is another picture by this artist, the *Interior of a Scottish Distillery*, which, quite in the gusto of these schools, is equal to any subject of the same class that can be named. There are, among other impediments to modern practice, however, two material difficulties, neither of which the old masters had the misfortune to experience. In the flourishing periods of the Dutch and Flemish schools the various painters were encouraged to paint whatever presented itself to their imitative powers. The everyday occurrences, and all the local circumstances of time and place, afforded subjects for their pictures. Hence they were spared the toil and inconvenience of research for themes. Their own families furnished them with living models; their own demesnes, however limited, with scenery; and their furniture with those accessories and expletives technically denominated still life. With this allowance, and thus abundantly surrounded with material, we are less surprised that their works exhibit so close an imitation of all the objects which compose their pictures. Of this first advantage, then, which was positive, they had the full benefit. The second, though negative, was, comparatively with modern practice, equally in their favour. Painting was admired then as an imitative art, when it was well executed, purely for its own sake. There were no former schools to compare their works by, to their certain prejudice, as in later times. Their pictures were only compared with the objects from which they wrought; and if the imitation was faithful the end was answered, and the patron and the patronised were mutually satisfied. Now the practice is widely different. He who expects to please the connoisseur must invent as well as imitate. Indeed it is so with the public at large. The localities of everyday life are not endurable as *thematæ* for the painter. If, however, he venture to attempt the costume of the day, he must contrive a story wherein the *dramatis personæ* are moved by some passion; for, without expression, and that not equivocal, the figures in a modern composition go for naught. It is with painting as with the dramatic art—local circumstance, according to modern taste, will form but an insipid play. He who would draw a crowded audience to his piece, built on the living manners of the times, must make his characters outrage truth. So he who would expect to sell a picture of things, with the localities of the nineteenth century, must do more than paint modern cabinet-work, with all its elegance, or homely spinsters at their writing-desks; though the silks and satins, carpets and stools, with all the accessories, little and great, were imitated, if possible, with even greater truth and skill than by the pencil of a Terburg, a Metz, or a Gerard Dow.

#### GENERAL.

**Mr. Frank T. Verity**, architect, has removed to No. 7 Sackville Street, Piccadilly, W.

**A Portrait** of two children in a garden, by Romney, was sold on Wednesday for 9,100*l.* It is from the collection of Mr. Cowper, of Penrith, and probably the original price was 100 guineas.

**The Sheffield City Council** have decided to ask the Duke of Norfolk to accept the mayoralty for a third year. A statue in recognition of his Grace's services to Sheffield is to be erected within the newly-opened Town Hall.

**At a General Assembly** of the Royal Society of British Artists, Professor Herkomer, R.A., and Professor Richmond, R.A., were elected honorary members of the Society.

**A Mace**, designed by Mr. A. Willms for the Birmingham Corporation, will shortly be complete. The head or bowl portion of the mace is divided into four panels, one of them bearing a bold representation of the city arms, while the others are occupied by emblematical devices. The panels are divided by leafage of oak, emblematical of strength. An open imperial crown surmounts the head. This portion of the mace is joined to the stem by brackets, formed out of the figure of Britannia, while the stem, suitably divided by bosses, will have spiral *repoussé* enrichment of oak and laurel. In the terminal boss will be inserted a crown piece of the present year's coinage.

**At an Annual General Meeting** of the Imperial Insurance Company, Limited (Fire), held at the company's offices, Old Broad Street, on Thursday, a dividend was declared for the year 1896 at the rate of 25*s.* per share, being an increase of 5*s.* per share over that paid for the preceding three years. As the result of the year's transactions, after providing for payment of that dividend, 57,449*l.* was carried to reserves, making them 868,688*l.*, and that sum, in addition to the paid-up capital (300,000*l.*) and special reserve (400,000*l.*), brings up the total funds of the company to 1,568,688*l.*



# The Architect.

## THE WEEK.

PUBLIC fêtes occur so rarely in this country it is no wonder we cannot produce them in a style that will bear comparison with French fêtes. In Paris the production of the accessories is a regular branch of trade, and consequently there is competition not only in price, but in style. Efforts are made to introduce improvements every year in one way or another, and the aid of artists is constantly invoked. In England there is a sort of monopoly, and the public are compelled to adopt "stock patterns" or to pay an enormous price for decorating a building. commonplace forms are consequently to be seen everywhere. On such occasions also co-operation is invaluable, if a successful effect is to be produced. Men who are rivals in Paris streets do not hesitate where there are fêtes to unite, for they know that a fine decorated street is a gain to all who have shops in it, while a single example of discord can spoil a long stretch of excellent work. The local authorities are also on their mettle, and are ambitious to hear their *arrondissement* or *quartier* praised for its effect, as in that way their influence is extended. The streets along which the procession passed this week were more creditable to the authorities than on former occasions, but it was too evident that the contractor was in most cases the arbiter of taste. The decoration of private houses varied to a remarkable extent, and it must be said there was a more vast display of crude colours than we had anticipated. But the people who used the flags and drapery would say they were helpless, for they could not obtain a piece of drapery in quiet colours without a search for which there was no time. Whenever there are shortcomings in public displays among us, it is well to take the goodwill rather than what has been accomplished. There was enough heartiness, loyalty and enthusiasm exhibited on Tuesday to inspire a whole year's rejoicings in any continental town. The individuality, of which the defects were a sign, was all concentrated on one idea, in expressing the general joy for so long and so beneficent a reign.

FOR more than a quarter of a century the erection of the Albany Capitol has been in progress. Work had to be undone as well as done. According to *Architecture and Building* the final contracts were to be signed by Governor BLACK a fortnight ago, and the work of completion will be under the direction of Superintendent of Public Works ALDRICH. The bulk of the work yet to be done comprises the finishing of the eastern approach and the southern and the northern entrances, and the carving of the western staircase. As soon as possible landscape architects will prepare a plan for laying out Capitol Park. The building of a central tower has been abandoned. The fifth storey of the Capitol will be left in an incomplete condition. It is used at present for storage purposes. Most of the stuff put there is to be auctioned off, as the Capitol authorities are apprehensive that damage may be done the building by the breaking out of fire on this unused floor. The entire cost of completing the Capitol (ground values included) will exceed 23,000,000 dols. But as the central tower will not exist, the building will be a disappointment to those who expected to have at Albany a rival to the Washington Capitol.

THE Plumbers' Registration Bill now before Parliament does not obtain the unanimous approval of some of the bodies having interest in technical education. The National Association for the Promotion of Technical and Secondary Education has passed the following resolution:—"That this executive committee is strongly of opinion that while it is very desirable that a register should be formed of competent plumbers, and that the register might be kept by the Plumbers' Company, the general council under the Plumbers' Registration Bill should be required to place upon the register those workmen who have passed the examinations in plumbing of competent public bodies approved by the Local Government Board and who apply to be placed on it; that, with respect to clause 9, the body upon whom should devolve, subject to the orders and supervision of the general council, the carrying out of the objects of the

Act should be a committee of members of the general council elected by the general council, to be approved by the Local Government Board." By the London Polytechnic Council, consisting of representatives of the City Parochial Foundation, the City and Guilds of London Institute and the Technical Education Board of the London County Council, the following resolution was also unanimously adopted:—"That this Council is of opinion that the objects of the proposed Bill, so far as regards the registration of plumbers by the Plumbers' Company, command the support and approval of the London Polytechnic Council, but that the Bill requires considerable amendment in the direction of the adequate recognition of the work and examination of the City and Guilds of London Institute, and of the substitution of some more representative body for the Plumbers' Company as defined by the Bill on whom shall devolve the carrying out the examinations and other educational objects of the Bill; also that the constitution of the General Council should be made less cumbrous and be more directly representative of educational authorities. That a copy of this resolution be sent to Mr. E. BOND, M.P., and that he be requested to secure the introduction into the Bill of such amendments as may be necessary to give effect thereto, and that copies of the same be forwarded to the Local Government Board and Education Department."

THE Board of Trustees have decided that the design for the New York Library is to be obtained by a dual competition. The building is to stand on a site at the east end of Bryant Park, measuring 482 feet by 455 feet. The building is to cost 1,700,000 dols. All architects having offices or fixed places of business within the limits of Greater New York can take part in the first competition. This preliminary competition will be judged by the committee's present advisers, Professor WARE, Mr. BERNARD R. GREEN, the constructor of the new Congressional Library, and Dr. J. S. BILLINGS, the director. For the twelve sketches which in their judgment are the most meritorious will be given a premium of 400 dols. each. The committee will then choose from the authors of the twelve sketches so selected certain of the competitors, not more than six in number, to take part in the second competition, selecting those among them who in their judgment are best qualified by their professional training and experience to undertake so important a work. In order that they may make this selection with the fullest knowledge, these twelve competitors will be invited to send to the committee for their information a statement of whatever facts they may desire to bring to the committee's attention. The persons thus selected, and not more than six other persons or firms hereafter to be named by the trustees (or by the committee acting on the behalf of the trustees), will then be invited to take part in a second competition, which will be conducted under such conditions and in accordance with such instructions as the committee may then frame. The competitors in the second competition will be paid 800 dols. each, as the estimated cost to them of the drawings required. These drawings will be judged by a jury of seven persons, consisting of three members of the board of trustees, to be named by the board, the director and three practising architects, to be chosen by the competitors. This jury will, by a majority vote, select the designs, at least three in number, which they find to be on the whole the most meritorious, and will send them to the trustees, naming them in order of their merit, and adding such comments and criticisms as they may see fit to make. The trustees will send one of the designs thus submitted to the Board of Estimate and Apportionment for their approval, subject to such alterations and changes as may prove necessary or advisable, and will recommend the author as architect of the building. If the choice of the trustees should fall upon one of the architects chosen in the preliminary competition, the trustees reserve the right of association with him in the conduct and execution of the work, if they see fit so to do, some other architect to be agreed upon between him and them, and to divide the fees between these two, according to the division of the work and of the responsibility. The trustees may also, if they see fit, appoint an engineer to look after the work, to whom all drawings must be submitted for approval before they are carried into execution.



## ST. PAUL'S CATHEDRAL.—II.

**D**URING the present week no building in the world has been so much observed as St. Paul's Cathedral. Among the hundreds of thousands of people who have gazed at the outside it would be interesting to discover what percentage of them have realised the relation between the exterior and interior arrangements. To many it must have appeared as if the architect had anticipated the event of Tuesday and provided for it, although the authorities of the cathedral were unable to realise for so long a period the extent of the accommodation. The immense steps seemed to be prepared for the display of bishops and other ecclesiastical dignitaries, for civic authorities, for the representative men of the vast and scattered empire. The western gallery would have been more suitable for the performance of a purely ecclesiastical function, and WREN, when designing it, may have thought of one of the Roman galleries from whence the POPE bestows his blessing on Rome and the world; but on an occasion like the Jubilee commemoration, as on many others in England, the civil dare not be separated from the sacerdotal, and such a crowd of notabilities could not be arranged elsewhere than on the steps. The filling of the gallery with sightseers was undoubtedly a converting of what ought to be a religious ceremony into a spectacle, but we are afraid that in all ages the pleasure of the eyes has assumed more importance than the elevation of the soul. But on seeing how well the western part of St. Paul's lent itself to novel demands every Londoner must have felt more proud of his cathedral, and was more assured than ever about its being one of the few great marvels of architecture, and that its dome was the noblest in all the world and a type of the City.

The average citizen will not realise that the dome he looks on with so much pride from the streets, river or bridges is not the dome which meets his view whenever he attends service in the cathedral. Still less is he disposed to agree that there are not only two domes but three, for the cone and timber which give stability to the compound structure when gales sweep around St. Paul's is surely deserving of having a recognised existence. The exterior also generally gives the effect of a two-storey building; but where have the two vanished when we seek for them in the nave and aisles? St. Paul's is a scenic church, and foreign painters may have had a share in the preparation of the designs. We must, therefore, make allowance if occasional stage effects are borrowed in order to produce a sort of exaltation in the mind of the uninitiated spectator. If the cathedral could be considered as a building and no more, the differences between outside and inside might be condoned, but when writers like PUGIN assume St. Paul's to be a sort of symbol of doctrine, every deviation from constructional truth becomes an offence. WREN's straining after effect has created prejudices in the minds of some critics which are not justified. KUGLER, for example, who was acquainted with many architectural freaks, will hardly allow that St. Paul's deserves to be accepted as a church. He says it is "eines Gebäudes, dem es zwar an der höheren Würde des kirchlichen Charakters fehlt;" but anyone who was present at the impressive service of Sunday would not agree with that conclusion. When the mosaic decoration of the interior is completed the Christian character of the building will then be more manifest than at present.

If the sculptured decoration were alone considered, it must be allowed that WREN sanctioned much which would be equally in place in a secular building. With the exception of cherubs' heads, the sword assigned to St. PAUL and an occasional martyr's palm, the subjects of the ornament would not have appeared inapposite in a pagan temple. But it should be remembered that at the time the cathedral was erected there was as much fear of decoration that suggested Christian truths as if it carried contagion to all who looked on it. The sculptor or painter dare not attempt to assume a share in the minister's office by producing anything that would recall doctrine or history. Statuary and BIRD's relief in the pediment would probably never have been tolerated on the exterior if several vases were not set up near to suggest the standard which should be applied to them. In those days also architectural sculptors were not as abundant as they are now and such a man as GRINLING GIBBONS would be allowed to have his own way. His training was

not among ecclesiastical objects and he would feel he was to be commended for deriving so many elements from natural objects which were not tainted by heresy or superstition.

In creating a dual dome WREN was obeying an optical law. The eye is not satisfied when a convexity is turned into a concavity. The dome of St. Peter's, Rome, has more consistency than WREN's; but, however impressive is the interior, the outer appearance causes disappointment to all who see it for the first time. It cannot be said that the disappointment is a consequence of association, because we are accustomed to see spires on the outside of buildings, and a squat dome is therefore too much of a departure from precedent. The Italians and Romans are not familiar with the sight of spires, yet to them the dome of St. Peter's is not a perfect object. If we allow that the eye is to be gratified rather than the logical sense, WREN's treatment merits approval. It is true he conceals much, and he may be charged with artistic deception. But he could say he was only following nature's own precedents. "Things are not what they seem," and the latest, like the earliest, philosophy is based on the assumption that illusion is universal.

If judged by the principles of Mediæval construction, the screen forming the upper part of the side elevations is also factitious. Its main use is to conceal the buttresses which are needed to insure the stability of the vaults of the nave. If they are equivalents for the flying buttresses of Gothic buildings it is maintained they are too important to need any concealment. The same principle applies in this case with stronger force than in the case of the dome. If construction must be everywhere apparent, then the screen is unnecessary. WREN wished to suggest that his building was steadfast because of its weight and the proportion of its supports to the upper mass. Every part was, or should be, like a column, the weights falling along perpendicular lines to the foundations. The expression of a continuation of counter forces and resistances was to his mind, as to the ancients, inartistic, and he drew a veil over that part of his work where dynamics rather than statics were in operation. It is not improbable that WREN's work would have stood without so much buttressing, but he may have recollected how easily INIGO JONES's work was overturned because the piers were not erected so truly as the plans indicated. A letter, dated April 25, 1668, from JOHN EVELYN to WREN, suggests that in the seventeenth century the ablest masons could not be relied on:—

As they said of old *prudencia est quedam divinatio*, so science, at the height you are master of it, is prophetic too. What you whispered in my ear at your last coming hither is now come to pass. Our work at the west end of St. Paul's is fallen about our ears. Your quick eye discerned the walls and pillars gone off from their perpendiculars, and I believe other defects too, which are now exposed to every common observer. About a week since we being at work about the third pillar from the west end on the south side, which we had new cased with stone where it was most defective, almost up to the chapitre, a great weight falling from the high wall so disabled the vaulting of the side aisle that it threatened a sudden ruin so visibly that the workmen presently removed, and the next night the whole pillar fell and carried scaffolds and all to the very ground. This breach has discovered two great defects in Inigo Jones's work; one, that his new case of stone in the upper walls, massy as it is, was not set upon the upright of the pillars but upon the core of the groins of the vaulting; the other, that there were no keystones at all to tie it to the old work; and all this being very heavy with the Roman ornaments on the top of it; and being already so far gone outward, cannot possibly stand long. In fine, it is the opinion of all men that we can proceed no further at the west end. What we are to do next is the present deliberation, in which you are so absolutely and indispensably necessary to us that we can do nothing—resolve on nothing without you.

WREN may have thought there were contingencies which the keenest eyes could not discover, especially in a building so large where the foundations were laid with difficulty. He may also have suspected the loyalty of some of STRONG's mutinous masons. But to dispense with a screen and to allow the height of the aisles to be expressed by the exterior, although in keeping with many Italian examples, would have appeared undignified to WREN, who considered height was an indispensable element of grandeur.

In the exterior WREN could not expect to have



ancillaries in the form of altars, paintings, sculpture, &c., which not only in continental churches add to the effect, but often compensate for architectural defects. His building was to be deprived of colour, and must depend on its masonry. Accepting the restrictions WREN endeavoured to avoid monotony. He could have gained variety by the employment of columns and rounded surfaces, but although in the exterior of the building and of the dome WREN employed them with skill that must command admiration from captious critics, in the interior the squared pilaster is supreme. Some he fluted and cabled, others he left plain; he introduced panels wherever he could, and he coffered the greater arches. In all this we see an earnest endeavour to avoid monotonous surfaces, and his arrangements will hereafter enable a more effective system of decoration to be produced. The treatment of the archivolt over the arches which form part of the piers sustaining the cupola suggest that WREN had not sufficiently thought out the detail, and when the error was perceived it was too late for a remedy. All that could be done was to "fudge." That defect by itself is enough to suggest WREN's dependence on other men. But if we consider how inadequate was his training in the art of architecture, one must wonder the cathedral is not crowded with examples of the want of an exercise of foresight.

## A SHORT INTELLECTUAL HOLIDAY.

BY A CORRESPONDENT.

THE weary student, the jaded contractor, the clerk of the works—fagged out with the continual inspection of material, and sick at heart of being suspicious of every one's integrity—all these and many others hail with delight the prospect of rest and change. But where can that rest and change be found unassociated with vulgarity, frivolity and extravagance? Where can it be found associated with intellectual growth, change of scene and economy? These were the questions asked by the writer; the sequel will give the reply.

A holiday to be really enjoyable must meet the tastes of the holiday maker, it should make him physically and mentally more suitable for his daily toil, and it should not disturb his mind by its unflinching demands on the purse. The man who comes back to his work with his ideas enlarged, with broader views of humanity and with a keener love for the common tasks of life has certainly found the secret of a true holiday. The writer does not pretend to be the guide, philosopher and friend of the holiday-seeker, he simply desires to make known what he has himself experienced, and from which others through want of knowledge may shrink from attempting.

Take it for granted that the holiday merely extends from the Friday evening to the Wednesday morning after; let us see how much in that short time can be enjoyed, if the hours are but properly mapped out.

Friday evening finds us uttering a delightful "hurrah" as we hide away the implements of our constant labour; then, dressed in an easy travelling suit, with no more luggage than can be carried in our pockets or, at most, in a light hand-bag, and with a stout umbrella, we are soon seated in the train and hurrying along to Dover. As we mean to get rest in our holiday as well as pleasure, we study the guide-book and learn that Dover is so named from the river Dour, which runs through the town, and then prepare for a long night's rest, the enjoyment of which is another of the secrets of a successful holiday. We are out early in the morning, and are soon appreciating the bracing breeze on Shakespeare's Cliff, that

Cliff whose high and bending head  
Looks fearfully in the confined deep.

And here, with note-book in hand, we may certainly allow the imagination to run wild, picturing to ourselves scenes in English history familiar to every schoolboy; and if we possess but the mere outlines of the science of geology, the view of the white cliffs must awaken a train of thought into which such words as foraminifera, encrinite and spirifer will most certainly introduce themselves.

We have only time to pay a visit to the Castle heights, for our boat will start at noon for our trip across the

Channel. As we make our way to the Colton Gate we may, without doubt, believe that we are walking over the same road used by the Romans, the Thanes, the forces of Earl GODWIN and many others. Of the original fortress we can find nothing but the basement of a strong rubble rampart; Saxons and Normans had a share in this grand work, and placed as it is 375 feet above the level of the sea, it presents a defiant aspect to any future NAPOLEON who may contemplate its capture.

We glance at the many towers, examine the Roman Pharos, admire the ancient church of St. Mary-in-Castro, look at Queen ELIZABETH'S Pocket Pistol, cast at Utrecht in 1544, and presented to HENRY VIII. by CHARLES V., and having obtained all the information possible from our guide, we make ourselves comfortable on board the boat for our sixty miles trip across the Channel.

The boats of the Belgian Mail Packet Service are too well known to need description; the three hours' journey from Dover to Ostend on the *Henriette* or the *Josephine* can only be described by those who have enjoyed it by the term *par excellence*. The invigorating breezes of the Channel soon prove to us what restoration to a tired mind is to be found even in so short a journey. Safely landed at Ostend, we have only time to get some much-needed refreshment when we start on our seventy-five mile journey to the capital of Belgium.

The country is flat, but the green pastures abundant and ever refreshing. If this be our first visit, we shall find much to interest us. Our note-books will be constantly employed, for we have come to learn as well as to enjoy.

The evening finds us at Brussels. Having secured our room, and knowing, of course, by previous study of our "Baedeker," all the principal tram routes, we spend a couple of hours in tram rides through the city, and find that its general description of a miniature Paris is borne out by its wide boulevards, its magnificent shops, the grand cafés, and the general open-air life enjoyed by its inhabitants.

When we look out of our hotel window on Sunday morning, we shall be astonished to find so few indications of the ordinary repose of our English Sunday; but we have come for rest, and not for toilsome hurrying from place to place on an ordinary day of quietude. There are English churches at which we can feel quite as much at home as in our parish church, and surely we cannot spend our Sunday morning better than in peaceful worship.

There are many churches to visit, to miss which would be a pity. The ancient cathedral of St. Gudule must, of course, be inspected with care. We shall find it in the lower part of the town; it is erected on a slope; we approach it by ascending a flight of steps, and at once recognise it as an imposing Gothic church. The original church on this site was consecrated in 1047, the present church being commenced in the twelfth century; in the retro-choir we shall find some remains of the Transition style; the transept, the arcades of the nave and the south aisle are in Early Gothic and were completed in 1273, chapels were added from time to time and the whole restored between 1848 and 1856. We shall, however, remember St. Gudule more for its magnificent stained-glass windows dating from the thirteenth century, and the carved pulpit by VERLACGEN, which represents the expulsion of ADAM and EVE from the Garden of Eden. It is good to sit quietly in such a building as St. Gudule and let the mind wander for a time into other regions; no exercise gives the mind more perfect repose, and for a long time its influence casts a delightful halo over the most tiresome duties of life. There are many other churches to be visited, all of them having peculiarities described in the guide-books, so that we need not enter into details.

Monday is our day of serious business, for we have much to do; we must be out early in the morning to see the country people at the market and the milk carts drawn by dogs. Of course, our day's work is properly planned, so that we may not waste time. In the Rue Royale near the park gates we shall find the Palais du Roi; here pictures by RUBENS, VANDYKE and other great artists will attract our attention. Not far off is the Palais des Académies; from here we go to the Palais de la Nation, where the Chamber of Deputies holds its sittings. At the corner of the Place Royale is the Royal Library, containing 3,000,000 volumes, 60,000 engravings and 20,000 MSS. We may also visit the



National Picture Gallery and feast our eyes upon marvellous examples of paintings by TENIERS, RUBENS, VANDYKE and CUYP; the startling and extraordinary pictures in the Musée Wiertz will provide us subjects for many a dreamy night.

There are, however, two buildings to which we must pay special attention; they are the Hôtel de Ville and the Palais de Justice. The former is situated in one of the finest Mediæval squares to be found in Belgium; here in 1568 twenty-five nobles of the Netherlands were beheaded by order of the Duke of ALVA. The Hôtel de Ville will excite our attention by its highly decorated front, its banqueting hall of Gothic carved oak, the pictures in the waiting-hall representing scenes in the history of Brussels. If we have time to climb the spiral staircase, over 200 feet in height, we shall obtain a fine view of the surrounding country, extending even as far as the Field of Waterloo. As we leave the Hôtel de Ville we must not forget to go down a by-street to look at the celebrated Manikin Fountain.

The tram will now take us to the Palais de Justice. As we approach it we shall be astounded at its immense proportions; it is probably the largest building of modern days, and one smiles at the ambition of so small a State as Belgium that so large a building should be required in which to conduct its legal affairs. But a glance and the mind immediately thinks of the mighty structures of ancient Egypt and Assyria, and indeed POELAERT, who designed it, confessed that it was his object to adapt Assyrian forms to suit modern requirements.

Commenced in 1866, it was not inaugurated till 1883, the jubilee of Belgium's existence as a separate kingdom, and cost two millions of money. As we ascend one of the flights of steps leading to the vestibule we meet the colossal statues of DEMOSTHENES, LYCURGUS, CICERO and DOMITIUS ULPIAN. Constructed of Belgian granite, we see that the Græco-Roman style has been for the most part adopted; curved lines have been avoided, the porch having rectilinear terminations. Once in the waiting-hall, or Salle des Pas Perdus, we can conceive a little the immense size of the construction as we gaze up to the comparatively small dome 320 feet above our heads. We must not forget to look at the immense figures representing Justice, Law, Strength and Clemency. The number of rooms in this building astounds us—27 large court-rooms, 245 apartments for officials and 8 open courts. We have only time to examine a few. We find that great care has been bestowed in the selection of material, and great taste displayed in the decoration and furnishing.

The grandeur of this building can only be realised by those who have seen it, and who by personal inspection have been able to obtain some idea of its wonders; the view from the summit can never be effaced from the memory. As a matter of comparison it should be stated that the area of the Palais de Justice is 270,000 square feet, that of St. Peter's at Rome 212,000, St. Paul's 109,000.

Monday evening will find us congratulating ourselves, like LONGFELLOW's blacksmith, that

Something attempted, something done,  
Has earned a night's repose.

We shall be wise if we make it a long night, for Tuesday will bring us much to enjoy. We are early at the railway station, for we have an hour's ride to the city of Ghent. Here in the capital of East Flanders we fancy ourselves in Holland, for Ghent is a city of 26 islands, 270 bridges over canals, and still has its wall and its seven gates of entrance.

A delightful exercise at this spot would be to sit in the old square, the Marché du Vendredi, and there, gazing on the antiquated buildings, to consider the history of this remarkable town. Were there ever such warlike citizens? In 1297 they conquered a British army of 24,000 men under EDWARD I., for many years they maintained a vigorous resistance against the Dukes of BURGUNDY, whom they would not, till compelled, recognise as the Counts of FLANDERS; they showed the kings of Spain of what metal they were made; they erected belfries from which they might call the citizens to arms. We gaze upon the statue of JACQUES VON ARTEVELDE, their CROMWELL, and remember that though of noble family he became a brewer that he might be one of the people; in 1337 he was

Protector of Flanders, but he aroused the anger of the citizens when he proposed that EDWARD III. of England should be elected Count of FLANDERS, so that he was killed in his own house in 1345.

At Ghent we must visit the cathedral of St. Bavon, famous for the picture, *The Adoration of the Lamb*, by the Brothers VAN EYCK. We must examine the church of St. Pierre, said to have been founded in 610 on the site of a Temple of Mars.

It will be with feelings of regret that we find ourselves again at the station, and soon hurrying along for an hour and a half to the city of Bruges, the capital of West Flanders.

This we may call a dead city—in the thirteenth century the great mart of the Hanseatic League; but when the Archduke MAXIMILIAN drove the traders to England in 1488, Bruges declined, and England commenced her manufacturing superiority.

How rich is this city in Mediæval characteristics. At the cathedral, St. Sauveur, we may look upon works of art by JACOB VON OOST the Elder. At Notre-Dame we may see a small statue of the Virgin and Child by MICHEL ANGELO, truly a group of exquisite beauty. The Hospital of St. John, the Chapelle du Saint Sang, and the church of St. Jacques each have treasures on which to feast the mind.

We must not omit to visit the belfry tower, 353 feet in height; the climb of the 400 steps will be amply repaid by the view we shall behold, and also by the explanations we shall receive of the mechanical contrivance by which an enormous brass cylinder makes the forty-eight bells to send forth the most exquisite music, and caused LONGFELLOW to sing:—

In the ancient town of Bruges,  
In the quaint old Flemish city;  
As the evening shades descended,  
Low and loud and sweetly blended,  
Low at times, and loud at times,  
And changing like a poet's rhymes,  
Rang the beautiful wild chimes,  
From the belfry in the market  
Of the ancient town of Bruges.

Another hour in the train and we are again at Ostend, and once more ploughing the sea, for we have no time left to see anything but perhaps the outside of the celebrated Kursaal.

We are at St. Paul's before midnight, and back to our business on Wednesday morning, with our minds so refreshed, with such enlarged ideas of the world of art, that life after all is found to be worth the living.

## PROFITABLE EXTENSIONS OF ELECTRICITY SUPPLY STATIONS.

A PAPER was recently read at Niagara Falls, before the National Electric Light Association, by Mr. Arthur Wright, borough electrical engineer of Brighton, who has been the pioneer of the constant profit system as opposed to constant price for electricity.

The paper begins with a consideration of the question of extensions of plant, but it soon develops into a vindication of the Brighton system of charging, and an attack upon the others. In fact, the paper really is one upon cost of electrical energy, and is almost the same as the previous paper read before the Municipal Electrical Association.

Mr. Wright shows that the fact of a call upon a central station to extend its mains does not necessarily mean that the station is a commercial success. It will mean that the extension is a success if there is a profit derived from it, and the class of consumer tapped by the new mains will be a factor in determining the success or otherwise of the extension. Mr. Wright then goes on to say that there is an enormous field for extension amongst the small, long-hour consumer, and that this consumer is almost invariably a profitable one if he can be secured. To do so, electricity must be supplied at a price which will compete favourably with gas. The price cannot be reduced all round owing to the unprofitable customers becoming still more unprofitable, and in consequence a sliding scale is necessary.

For the domestic supply, price is of the greatest importance. The amount of electricity used is large per lamp; consequently the bills are serious if the price is high, and fortunately the very largeness of the consumption per lamp per annum allows the price to be brought down to a lower figure than gas, while the supply company can obtain a profit on its extension. Mr.



Wright further throws cold water on the efforts of engineers to increase their profits by the day load from motive power, while they leave the domestic lighting alone. He says:—"One would think, to judge from the load curves of many of the stations charging on the uniform-price system, that nine-tenths of the population went to bed about eight o'clock in the evening, yet an immense amount of light is required right on until eleven or twelve P.M., and being a prolongation of the load on the station can be dealt with under conditions most favourable to cheap supply. As a matter of fact, in such districts it will be found that consumers pay two lighting bills—one for electricity, which by reason of the high uniform price is only used for short-hour lamps in show places, and a second for gas or other illuminant which is used in the long-hour burners, yet the actual conditions under which these different lights are produced and supplied favour quite the reverse order of things. The public freely admit that electric lighting is necessary for living-rooms, offices, shops, theatres and restaurants, but with electrical energy at a uniform price, or other form of restricted tariff, they are apt to remain satisfied with gas in corridors, kitchens, bedrooms, &c."

The system proposed and used in Manchester, of charging a fixed sum per annum per lamp installed and a small price per unit, is also condemned, and the effect is shown to be an encouragement to people to use as few lights as possible, which means that the load connected is all of one kind and on at one time, it being to the consumer's disadvantage to install lamps which are seldom used, although they would probably be on at a different time from the other ones. The consequence is that the load factor is made worse. Also it is impossible in practice to get a correct idea of the number and size of lamps. The really most important objection is "the unwisdom and expense of, the domiciliary searches in private houses, hotels, &c., which this system requires. These visits are very objectionable to the consumers by reason of the intrusion upon the privacy of every part of the building; and from the company's point of view the expense entailed is considerable."

"In one way or another the public has tolerated a good deal from electrical men, but the author's own experience has led him to the conviction that the best policy is to give them a good and steady supply on an encouraging tariff and draw the revenues in due season, and otherwise to trouble them as little as possible." With this opinion we entirely agree and it would be well if managers of supply companies, and in fact all public companies, would take this to heart.

Another point which may be of interest is the condemnation of the system which charges less for power than light, irrespective of the amount of power and the time it is used. "For the *reductio ad absurdum* of this practice we have only to compare the relative profitableness of a basement user of lamps with that of an elevator motor. The former is the steadiest and longest consumer any manager can wish for, and the latter the most objectionable kind of short-hour user of electricity."

Then follows a most interesting portion of the paper referring to the great field in the displacement of private plants. The private plant is seldom laid down where the lamps are only used a short time per diem, as it would not pay; consequently a fair sliding scale would be the means of displacing the whole of the private plants. This point is discussed in a very able manner, and an extract may be of interest. "What is there fundamental in the organism of a central station which should enable it to furnish a block with electrical energy more favourably than can be done by means of an isolated plant? Clearly it is the diversity of the duty which may be performed by the central station. The costs of a plant supplying a few premises whose requirements make their individual load diagrams pretty closely coincide must clearly be higher than those of a station catering for a wide variety of demand. . . . This diversity of demand obviously entails a much smaller plant capacity than would be the case were all the lamps required for much the same purpose and at the same time."

In Brighton, since the adoption of the Wright system, many valuable private plants have been turned over to the supply mains, and not a single private plant has been put in.

This latter point should be of great interest to architects and those contemplating the use of a private plant, and they will do well to ascertain the system of charging from the supply mains before finally deciding on a private plant. There are many other very interesting points in this paper, but they are chiefly of interest to electrical engineers.

If the mission of Mr. Wright and others in advocating an equitable system of charging is a success, it is certain that electricity will become the cheapest light for the poor man, and that the rich will find it dearer than gas. This seems rather an extraordinary result, but on second thought it will be seen that it is the best possible arrangement and one which is eminently fair. The poor man requires, first of all, a cheap light and a healthy one; the rich one a light which will be artistic and pure, and which will not spoil his art treasures and decorations, and he does not mind what he pays for these qualities. Electricity sold under a tariff which gives a constant profit per unit sold for any purpose will conform to both these conditions,

and must therefore very soon displace gas in both classes of house. We wish Mr. Wright every success in his campaign against the constant price system, and soon hope to see electricity the light of all classes, from the sanitary aspect if no other.

### DELFT-WARE.\*

(Concluded from last week.)

THE preceding description relates to the process employed at Delft, the proportions being taken from Gerrit Paape. M. Deck states that in France the proportion of lead and tin in the calcine varied between three to one and four to one, and that the enamel consisted of calcine 44 parts, sand 44, sea-salt 8, soda 2, minium 2. These substances were mixed together and fused. He adds that the amount of calcine and sand were always equal, and that the fluxes alone varied, but within very restricted limits. Taking Gerrit Paape's proportions and reducing them to a common denominator of 100 for comparison with M. Deck's, we find as the composition of the Delft enamel, calcine 43½, sand 47½, sea-salt 6, soda 3. The constitution of the enamel is therefore nearly the same in both cases.

According to Piccolpasso the enamel of the Italian majolica of the sixteenth century consisted of a combination of the calcine, a frit called marzacotto, and sand. In the calcine the proportion of lead to tin varied between two to one and four to one. The marzacotto usually consisted of sand 12 parts, lees of wine 10, salt 3. The calcine, marzacotto and sand were fused in various proportions to form the enamel. Thus the marzacotto was of the same nature as the mastic, and contained the alkalies, but the proportion of sand was much less. A good deal of sand was therefore added independently, the proportions of calcine, marzacotto and sand being in two of the formulæ, 10, 10, 12 and 16, 10, 10. M. Deck states that in no other country but Italy and Holland were the alkalies introduced into the enamel by means of a frit. He considers this method preferable to that employed in France of fusing all the constituents of the enamel together at once, as the materials, being better incorporated, do not produce a saline efflorescence.

The glaze used at Delft (called the "Kwaart") was composed of mastic 36 parts, litharge of gold 42, potash 4, salt 7. These constituents were well mixed and fused, forming a substance of great hardness, which was then ground to an exceedingly fine powder. The litharge of gold is plumbic oxide, with a little minium. Replacing the mastic by its components, we see that the glaze may be regarded as composed of litharge 42, sand 30½, salt 10½, potash 4, soda 2. The Kwaart was, therefore, by no means a purely lead glaze, but was partly lead and partly alkaline.

Gerrit Paape gives the following two formulæ for the blue:—Zaffre 8, smalt 5, mastic 4; or zaffre 50, sand 25, potash 25. In both cases the composition was fused and ground to powder. A more common kind of blue was made by increasing the proportion of mastic or sand to the zaffre. On the other hand, the blue was improved by increasing the proportion of zaffre. The zaffre is a mixture of cobalt and sand; smalt is powdered glass coloured with cobalt.

Similarly for the violet there were two formulæ, according as the mastic was used or not, both of which are very simple, viz. "brownstone" 1, mastic 1; or "brownstone" 1, sand 2, potash 2. The "brownstone" was an ore of manganese. The formulæ for the yellow were: antimony 9, litharge of gold 7, calcine 1½, salt 1½; or antimony 10, litharge of gold 6, calcine 2, salt 3. Gerrit Paape states that the red was obtained by burning good bole five or six times. The bole was a clay coloured by oxide of iron.

There were no other colours; green was obtained by mixing yellow and blue, and orange by mixing red and yellow.

The fact that both the Italians and the Dutch introduced the alkalies into the enamel by means of a special frit, and that in both countries the ware was covered with a glaze, which was partly plumbic and partly alkaline, affords strong evidence that the Dutch must have derived their method of fabrication directly from the Italians, and it would seem to establish a closer connection in this respect between Italy and Holland than between Italy and any other country.

Now that the "mystery of porcelain" has long since passed away and that it is certain that hard porcelain will continue to be manufactured for years to come in great and possibly increasing quantities, it would seem that the relative positions of porcelain and faience have become inverted since the first half of the last century. Faience belongs, as an industrial product, to a past stage in the world's history and it is unlikely that delft-ware will ever be made again commercially on an extensive scale for practical use. There may be artistic revivals, but it is clear that for domestic purposes (dinner services, &c.) the fragile and clumsy faience cannot compete with stone

\* A paper by J. W. L. Glaisher, Sc.D., F.R.S., read before the Applied Art Section of the Society of Arts.



wares and porcelains.\* We have seen that in the manufacture of delft-ware the nature of the surface called into existence a special kind of rapid painting—a distinct art, which was capable of producing unique results of great merit. We may feel pretty sure that if artistic work of a high character is again produced upon a stanniferous enamel under a lead-alkaline glaze, it will be essentially different from the fabrics of the old Delft potter.

In the last few years the old delft-ware has been copied in immense profusion, not only the forms and designs, but often the makers' marks being reproduced.† The surface and colours, however, are so dull that no one who has made any study of the subject could be deceived. It seems probable that the difference may be partly due to the fact that in the modern copies some mode of painting on a hardened surface is adopted. Judging by the vast amount of modern "blue and white" delft-ware exhibited in the shops of all the countries in Europe, the amount placed upon the market must have been enormous.

It is singular that there should be, apparently, so great a sale for these modern goods, which are high-priced and wanting in the very qualities which gave to the old delft its chief attractiveness; and it is also curious that the new wares should not cause greater attention to be paid to the old, but, so far as I can see, the flooding the shops with the reproductions and forgeries seems to have made no difference to the collector; of course prices have risen, but this is probably merely as a consequence of the generally increased interest which is being taken in all kinds of antique works of art.

At the old factory of "The Porcelain Bottle," at Delft, an excellent and interesting ware is now made by MM. Thooft & Labouchere, but it is quite different in character from the ancient products of the town, the body being white and hard. This factory has never ceased to exist, though for a time, after the extinction of the old trade of the town, M. Thooft used it merely for the manufacture of fire-bricks, &c.

It is greatly to be regretted that delft-ware should be so poorly represented in ceramic collections. In the continental museums Holland has almost as much ground for complaint as England with respect to the kind of specimens exhibited. There are small but interesting collections of Dutch delft at the Cluny Museum in Paris, at Sèvres, and a few other places, and valuable local collections are to be found in the museums of Nuremberg, Boulogne and very many other towns. But, as a rule, the specimens of Dutch delft exhibited consist of pieces of the commonest order, which give an unjust and misleading idea of the character of the ware. The only representative collection which I know of that contained in the Rijks Museum at Amsterdam. Next in order of value I should be inclined to place the collection at South Kensington, as though the pieces are few in number they are as a rule beautiful of their kind, and well display the merits of the ware. Moreover, they are of the class which a collector has but little chance of obtaining for himself, except on the dispersal of one of the great private collections.

Everyone who is interested in delft-ware must feel himself under the deepest obligation to M. Havard for his splendid work, which has made it possible, for the first time, to study the subject with the help of accurate historical knowledge. Not only has M. Havard searched all the known documents relating to the town and the guild, but he has minutely examined the register of the two churches—the Oude Kerk and the Nieuwe Kerk—at Delft, and extracted all the references to any person whose description showed any connection with pottery. He has thus brought to light and classified a great mass of authentic facts and dates respecting the faience-makers of the

town, which is quite independent of any knowledge derived from the wares themselves.

Before M. Havard had laid down the lines of the subject, and placed at our disposal this invaluable body of unimpeachable evidence, all that was known of the history of the manufacture consisted of some references contained in contemporary works, of a few names, marks and dates, extracted from the records of the guild, and of a certain number of other marks, which had been identified, some on very questionable grounds, and, as we know now, quite erroneously.

All this has been changed, and the student of the ware, having M. Havard's framework on which he can perfectly rely, and being assured of the main facts of the history, is enabled to group his pieces according to their date and maker, with some approach to certainty, and instead of wandering aimlessly among a wilderness of marks, he has it in his power to supplement the documentary evidence by useful additions to the history of the fabrication.

M. Havard's list, though it contains no less than 763 delft ceramists, is necessarily very far from exhaustive; for example, it is not possible to derive from it a complete succession of proprietors of any one factory, the dates showing at once that there must be numerous gaps. The collector may therefore perform a useful service by noting the existence of a factory mark occurring with new initials, and indeed, by placing on record any initials or makers' marks occurring upon any piece presumably made at Delft, and which are not identifiable by means of M. Havard's data. No doubt the principal delight of the collector is derived from the contemplation of the objects themselves, associated as they are with artistic or technical or archaeological interest, but it is always extremely unsatisfactory when he has to be content with this personal pleasure, and is debarred from the means of contributing to the literature or history of a subject in which he takes a real interest.

I think that any connoisseur in delft would always do well to make a serious study of the wares actually made in Delft—treating them as the standard or criterion with which all other wares made elsewhere were to be compared—whatever further investigations he might make with respect to the products of other localities. M. Havard has provided him with an admirable guide, which is not only a history but a mine of facts, from which he may deduce much additional knowledge for himself. The old town of Delft is so little altered from the time when its canals were filled with barges laden with the wares just carried across the quays from the factories (which were all in the town) that it is very easy as one walks through the quiet streets to-day to picture the scene when the trade was at the height of its prosperity. M. Havard gives the position of the factories and the place of abode of the potters, as extracted from the books and registers, and there is scarcely a street or lane that is not associated with a name or a factory familiar to the collector or connoisseur.

It would be quite unpracticable, I believe, for any one person to attempt a detailed study of delft-ware as a whole, so numerous and widely scattered were the places at which it was made.\* At whatever part of Europe one is staying there is always ample scope for research in the collection and examination of the delft-wares which have been in use in the vicinity. Leaving out of consideration the objects obtained for their quality or artistic excellence, and having regard only to those of antiquarian interest, the collector would probably find it most profitable to restrict himself to the products of a single country or a few localities, and to harden his heart to the delft-wares of minor factories of other places, unless they were remarkable in themselves, or helped to illustrate certain points.

It is natural in England to pay special attention to the English delft-wares, although, as has been pointed out by Mr. Solon, not being original products of the country, they necessarily present less interest than the purely English ceramic work of the seventeenth and eighteenth centuries. Still they afford a very attractive and untouched field for investigation, and offer many curious problems for solution.

Taking, for example, the so-called Staffordshire delft dishes, generally ornamented with blue dashes on the border, and painted in the middle with representations of Adam and Eve, King William, William and Mary, &c., why were they of this particular form, why are they without enamel on the back, when

\* In 1789 there were in France no less than 165 manufactories of faience and porcelain (exclusive of mere potteries) established in seventy-four towns. Rouen had 16 factories and was followed by Paris 14, Nevers 12, Marseilles 11, Bordeaux 8 and Meusiers 5. This list of places and number of factories is attached to a protest from the French makers of faience and porcelain to the National Assembly against the treaty of commerce with England (*Champfleury, Histoire des Faïences patriotiques*, third edition, Paris 1875, p. 376). Even if we suppose that France possessed more than its natural proportion of faience-makers, these figures suffice to show how numerous must have been the localities at which delft-ware was made in Europe. It is not unlikely that there were many more English factories than has been supposed, and that some existed in parts of the country which have not hitherto been regarded as probable ceramic centres.

\* The fragile nature of delft-ware is well illustrated by the great scarcity of articles intended for domestic use, excepting only plates and punch-bowls. I have in my collection but one wash-hand basin and one teapot. Teacups are excessively rare, although they must have been made in great numbers. It is curious, however, to note that delft-ware jugs are still made in France for ordinary domestic use. Last year at a crockery shop in Caen I bought a small white jug (not unlike Lambeth delft) which was stamped with the name of its factory, Lunéville, and I have bought at similar shops in Dieppe and Rouen modern delft jugs (possibly also made at Lunéville) with a white decoration upon a blue enamel, exactly similar to the jugs occasionally met with in England and believed to have been made in Staffordshire during the last century in imitation of the blue ware of Nevers.

† Some of the modern so-called "delft" is very far from being a reproduction of the old ware; the shape and perhaps general style of design are followed, but the treatment is different, and the pieces bear the mark of their (modern) factory. In many cases, however, the old pieces are exactly copied, and also the mark of an old Delft potter or factory or both, without the addition of any modern mark. These objects are constantly labelled in shops "fine old delft," and presumably they were intended to be sold as such. It should be mentioned that the coloured ware of Rouen has also been reproduced very successfully in great quantities; and reference should be made to the faience produced at Quimper, which is properly marked, and may be regarded rather as a development than as a reproduction of the old wares of the town.



were they manufactured, and over what period do they extend? I have never seen any Dutch pieces of the same class, and, in fact, they suggest Italy and not Holland. On comparing a number of specimens, the body of the ware is seen to exhibit so many marked differences that it is evident that these dishes must have been produced in several, and probably in a good many, distinct localities, although no actual places of manufacture can be suggested at present with any show of evidence except Lambeth and Staffordshire.\* The limits of date are probably from about 1640 to 1750, but nothing is known or has been conjectured so far as I know with respect to the origin of these pieces, either as regards shape or decoration. A collector continually meets with curious and puzzling specimens, but it may safely be said that there are no more interesting or mysterious groups of objects in English ceramic history than these early enamelled earthenwares. But however suggestive the existing specimens of this rough ware may be, it is not likely that anything very definite can ever be ascertained except from documentary evidence or excavations on the site of old potteries.

The course of the development of English delft is peculiarly interesting from several points of view, but especially in connection with the efforts which were being continually made by the delft-potter to imitate in his more cumbrous ware the shapes and styles of the porcelain of Chelsea, of the perforated ware of Leeds, &c. The same attempt at rivalry is apparent also in respect to the transfer-printed designs on stoneware, and I possess a delft plate with a hand-painted attempt at the willow pattern. The reproduction of the styles and designs of Dresden, &c., took place also on the Continent, but the contest between the cheaper delft and the finer English wares that were to supplant it is more noticeable in this country, and some of the efforts of Delft to rival the contemporary porcelain or stoneware form curious records of a struggle to which there could be but one end.

#### YORKSHIRE ARCHÆOLOGICAL SOCIETY.

THE members of the Yorkshire Archæological Society held their biennial excursion on the 18th inst. Markenfield Hall and Ripon Minster were visited by about seventy members and a large number of ladies. At the Ripon railway station the party was met by half a dozen waggonettes, in which they drove direct to Markenfield Hall, which, with one or two unimportant alterations, stands precisely as it did at the beginning of the fourteenth century. Indeed, Markenfield Hall is the finest example of a thirteenth or fourteenth-century manor-house in the northern counties. In the hall, the hon. secretary, Mr. William Brown, of Trenholme, Northallerton, gave a brief and interesting sketch of Markenfield Hall and its owners. The earliest mention of the house appears to have been in Domesday Book. Not until early in the thirteenth century did it come into the possession of the Markenfield family. In 1316 the then owner and founder of the family fortified it, digging around it the moat which still re-

mains. From this date until the reign of Queen Elizabeth the owners seem to have lived peacefully at Markenfield, the eldest sons going up to Oxford, and returning to succeed uninterruptedly to the family estate. It appears, however, that trustees were not always unimpeachable even in Mediæval days. One for breach of trusteeship was actually excommunicated; he was imprudent enough to tamper with trust funds left by a churchman. A Markenfield was concerned in a rising against Queen Elizabeth, for which he was attainted, and fled to France. On his death the attainder was reversed, and the old hall remained in the possession of his descendants until the last century, when it was bought by an ancestor of the present owner, Lord Grantley, who was Lord Chief Justice of the Common Pleas. The ancient chapel and the solar (or Lord's retiring-room) were visited, and, despite the rain, many of the guests climbed the winding stairs leading to the roof and peeped through the cross-bow embrasures at the surrounding country. The old buttery in the basement, which remains just the same as in 1300, was also worth a visit. During the stay at the Hall, Mr. C. C. Hodges, of Hexham, competent authority, described the architectural features of the building. After a hearty vote of thanks to Mr. and Mrs. Foster, Ripon Minster was visited, the Society being received by the Dean (the Hon. W. H. Fremantle) who kindly gave an interesting sketch of the building. Mr. Hodges described its architectural features and the visitors then explored the Minster, inspected the mural tablets and effigies, the carving of the stalls of the canons and admired the beautiful east and west windows. The Anglo-Saxon crypt, sole relic of the church built by St. Wilfrid, was inspected, being lit for the nonce by candles, that the narrow steps, worn by the feet of countless penitents, might not be responsible for any accidents. The Norman crypt, constructed with the main body of the church by Roger, the great building Archbishop of York (1154-81), was likewise visited. After a stay of an hour and a half in the Minster, a move was made to the chapel of the Hospital of St. Mary Magdalen. This building, which is now disused, is one of the most venerable in Ripon. It owes its erection to Thurstan, an Archbishop of York, and amongst the objects of interest may be mentioned a fine old oak Perpendicular chancel screen and an ancient plate chest. With this visit ended the excursion to Ripon, and while general regret was felt and expressed that the weather had been so unpropitious, the opinion was shared by one and all that the day had been by no means unpleasantly or unprofitably spent.

#### EDINBURGH ARCHITECTURAL ASSOCIATION.

THE Edinburgh Architectural Association, on the occasion of its annual excursion on Saturday, visited Linlithgow. Mr. Thomas Ross, president of the Association, conducted the party over the Palace in the unavoidable absence of Mr. W. W. Robertson, and described the plan and the manner and periods of the erection, and drew attention to the means which have been taken by Her Majesty's Board of Works to preserve the building from further decay. Mr. John Honeyman, R.S.A., architect for the restoration of St. Michael's Church, described the condition of the church before the work of restoration was begun, pointed out what had been done, and showed on drawings the proposed additional work. After luncheon at the Star and Garter Hotel, the President read letters of apology for absence from Provost Gilmour, Mr. W. W. Robertson and Mr. T. Fairbairn. Dr. Rowand Anderson moved a vote of thanks to Mr. Honeyman for the interesting description of the restoration of St. Michael's Church, and expressed the appreciation of the members of the Association for the manner in which the work had been carried out. Mr. W. Horn Henderson, Linlithgow, moved a vote of thanks to Mr. Ross for his explanatory description of the Palace, and Mr. Honeyman and Mr. Ross having replied, the President said it would be an unpardonable omission if the Association allowed this visit to the royal and ancient burgh, so long and intimately connected with the kings and queens of Scotland, to pass without one toast—that of Her Majesty the Queen. The toast having been duly honoured, the party drove to Bonhard House and Kinneil House, which were carefully examined under the leadership of Mr. Ross, who drew attention to the fine plaster ceilings at the former, and described the erection of the latter as two houses joined together by wings in the reign of Charles II. An examination was also made of the ruins of a chapel at Kinneil, which is being carefully cleared under the direction of Mr. Macaulay, factor for the Duke of Hamilton, of the rubbish which has accumulated over the foundations.

The Alexander II. Bridge, the foundation-stone of which was laid by the Czar during his visit to Paris, will, owing to the cost, be reduced in width from 60 to 40 metres, and instead of the decorative work being done in marble, ordinary stone will be used.

\* Attention has been drawn to the fact that the subjects represented on these dishes are so few in number, "Adam and Eve" being the only scriptural design; but I do not think that it has been noticed, except by Mr. Downman in his *English Pottery and Porcelain*, published last year, that floral decorations, generally tulips, and fruit (grapes and apples) and leaves also occur. The "Adam and Eve" is much the most common of the designs, but the floral and fruit patterns are not infrequently met with, at all events in the eastern counties. I have myself eight or nine specimens, and there are nearly as many more in the Saffron Walden Museum. It is to be noticed, however, that the dishes with kings and queens are well known, and have been figured in Church's *English Earthenware*, and Solon's *Art of the Old English Potter*, so that a good many of the existing specimens have already found their places in museums and collections. Several of the tulip designs are very effective and well coloured, but on some of the dishes the colouring is extremely bad and even painful. It is noticeable that green is much more freely used than in the contemporary Dutch work; sometimes it is very good, suggesting the green of Brussels delft, but it is often muddy. The red seems to have been painted above the glaze with a kind of dissolved sealing-wax. This method of applying the red was employed on other pieces of Early English delft, and I have specimens in which it has all been worn off except a few specks which just serve to show that it once existed. I believe that many early pieces which now show no trace of red were originally painted in this way. Returning to the "blue-dash" dishes, I may mention that several of mine have been obtained directly from cottages and small farmhouses, and that they seem to have been always used for mere decoration. I have long suspected, what Mr. Downman has suggested, that there must have been a very early delft factory on the eastern side of the country. These dishes show on their fronts the marks of the three spurs by which the dish above was supported during the firing, the flange of one dish resting upon spurs placed in the one below. In other kinds of English delft-ware the plates and dishes were supported from underneath the edge by three projections from the side of the seggar, as in the case of the Dutch wares.



## NOTES AND COMMENTS.

THE council of the Architects' Benevolent Society are able to announce that its progress was maintained during the past year. But the sum received is still inadequate to the applications for assistance. Last year's subscriptions amounted to 460*l.* 15*s.*, while the sum expended on grants was 604*l.* 15*s.*, exclusive of 70*l.* dispensed in pensions. As at the beginning of the year there was a balance to the credit of the capital account of 117*l.* 15*s.* 8*d.*, and during the year the sum of 333*l.* 12*s.* was received in donations, it was, therefore, thought well to increase the investments of the Society by the purchase of 250*l.* Caledonian Railway 4 per cent. debenture stock, at a cost of 386*l.* 17*s.* 6*d.*, thus leaving a balance in the hands of the bankers on December 31 of 64*l.* 10*s.* 2*d.* This purchase increases the value of the Society's holdings of stock to (at cost) 9,893*l.* 0*s.* 4*d.*, which, with the balance at the bankers, leaves the total capital at 9,957*l.* 10*s.* 6*d.* Successive councils who have administered the affairs of the Society have for many years made efforts to increase the capital of the Society to 10,000*l.*, and it is a matter of satisfaction that the investments have now practically attained this point of stability, their value, indeed, at market quotations being in excess of this sum. Architectural practice does not tend to foster benevolence, for it is a constant fight in which everyone must rely on himself alone. But as in modern warfare succour is not withheld from a wounded enemy, so it is not generous to look on every broken-down architect as a possible rival and to leave him in distress. For a profession which counts so many members 460*l.* is not a creditable offering, especially when it is known that architects, unlike painters and actors, cannot rely on the generosity of the public.

IF architects have not shared in the Jubilee honours, they have at least the satisfaction of knowing that the two representatives of art selected for knighthood are to some extent connected with architecture. The reputation of Mr. WYKE BAYLISS has been gained by representing buildings, and especially by interior views. Paintings and drawings prove that he is not an artist who gives little time to the selection of a point of view. Nor does he depend for his detail on photographs. He endeavours to discover what is most impressive and characteristic in a building. If his success has not been equal to his merits that may be owing to his prominence in the unlucky Society of British Artists. Mr. WYKE BAYLISS has been the most loyal of presidents, and has endeavoured to keep the discordant elements together, but we are afraid he has had to pay for his solicitude. Mr. W. B. RICHMOND, R.A., is known by his mosaics in St. Paul's Cathedral, but he has painted portraits and has modelled one statue. He has also held a Slade professorship. The two knights are competent artists, but on such an occasion some of the survivors of the artists of 1837 would appear to be more fitting representatives, viz. Mr. HOOK, Mr. HORSLEY or Mr. COOPER.

ATTACHED to the American Navy is a Civil Engineers corps. Although the property under their control is valued at 50,000,000 dols., and new architectural and engineering works have to be undertaken every year, there are only twelve members of the corps. As one of them has retired, a new appointment will have to be made after a competitive examination. Americans between twenty-five and thirty-five years are eligible. Each candidate must produce evidence of having pursued a course of civil engineering at some professional institution of good repute, and of having had at least two years' practical experience as a civil engineer. Candidates who pass a satisfactory examination will be arranged by the board in the order of their relative merit. Examinations will be in writing. Candidates will be examined in the following subjects:—English grammar and composition, elementary physics, elementary geology, drawing, arithmetic, general knowledge of algebra, geometry, trigonometry, analytical geometry, differential and integral calculus. Also applied mathematics, including mechanics of solids and fluids and strains in structures, constructional materials, engineering constructions including workshops, chimneys, quay walls, wharves, dry docks, sewers, yard railways, pavements, water distribution, foundations, &c., surveying, topographical, trigonometrical and hydrographical,

and mapping same; instruments, their use and adjustments.

MANY documents in architects, surveyors and contractors' offices have to be carefully conserved, for years after their preparation they may become important evidence. Care should be taken that they are drawn or written on paper which can endure. A Cantor lecture by Mr. C. F. CROSS reveals that many modern varieties of the material that is called paper are most fleeting. He describes a valuable set of actuaries' tables which after a year or two of office use was in such a condition that it had to be mounted with varnish, leaf by leaf, upon cloth, at a cost of 3*l.* 10*s.* Apparently the transactions of societies have the least chance of any printed matter of a survival, for the paper employed is selected on account of its showy appearance, which is merely superficial, and when it loses its lustre, what is printed on it vanishes. The Germans, who are giving attention to the subject, lately analysed ninety-seven standard publications from various countries. Only four were found to have less than 5 per cent. mineral stuff, and sixty-two were composed of inferior stuff and mechanical wood. It is known that drawing papers have become liable to attacks of micro-organisms. One of the causes is the employment of gelatine as a sizing agent. When the papers become moist, as happens when colour is applied, bacterial life is stimulated and rapid growth follows. It is proposed as a remedy to add antiseptics to the size, but they bring disadvantages of another sort. It may be assumed that the deterioration of water-colour drawings is as often produced by the use of paper containing unsafe materials as by inferior colours.

THE Dean of St. Paul's has utilised the commemoration festival as an opportunity to plead for funds, which will enable the authorities to continue the adornment of the cathedral with mosaics. Through the liberality of four City companies the half domes at the corners of the great dome will be filled with mosaics before the end of the year. This and other work that is in progress will exhaust the funds at the disposal of the Dean and Chapter. They are very anxious to carry on what has been so well begun whilst they can have the invaluable help of Mr. or rather Sir W. B. RICHMOND. There are two parts which are pressing. One is the space between the whispering gallery and the bottom of the windows in the dome. To cover this with mosaics will cost not less than 10,000*l.* The other is to decorate the roof of the aisles of the choir, where there are six small shallow domes, with a place for the arms of any donor who would kindly give 1,000*l.* for the completion of one of them. The authorities are anxious to make arrangements with the artist so that there may be no stoppage in the work. The money will not be wanted until next year, and therefore a promise to be fulfilled next year would suffice. Unless there is a certainty that the money will be forthcoming the Dean and Chapter cannot undertake the risk of continuing the mosaic decoration.

It is occasionally said that the best time to advocate costly building projects is when engagements are entered into for the execution of similar undertakings. M. CHARLES NORMAND, who is known to all Paris as the president of the Société des Amis des Monuments, as well as by his architectural works, is evidently of that opinion. He wants the French Government to rebuild the Tuileries. M. NORMAND does not mean a rebuilding of a similar character to the old historic buildings which so often figure in the grounds of exhibitions, but a reproduction which will be at least as costly as the original, though the money will be measured by a different standard. There is a necessity for the restoration, as at present the garden with its statues is an inadequate substitute for the building in which PHILBERT DE L'ORME, JEAN BULLANT and DU CERCEAU co-operated. Paris wants a palace for imperial and royal visitors, and the new Tuileries would serve that purpose.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—ST. PAUL'S: DETAILS OF CHOIR STALLS.—ENTRANCE TO CHOIR STALLS.—GATES IN SOUTH CHOIR AISLE.







*The Architect, June 25<sup>th</sup> 1897.*







PHOTOGRAPHED BY S. B. BILES & CO. 11, LUDGATE HILL, E.C.

INK- PHOTO. SPRAGUE & CO. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CATHEDRAL SERIES, No. 47.—ST. PAUL'S: DETAILS OF CHOIR STALLS.







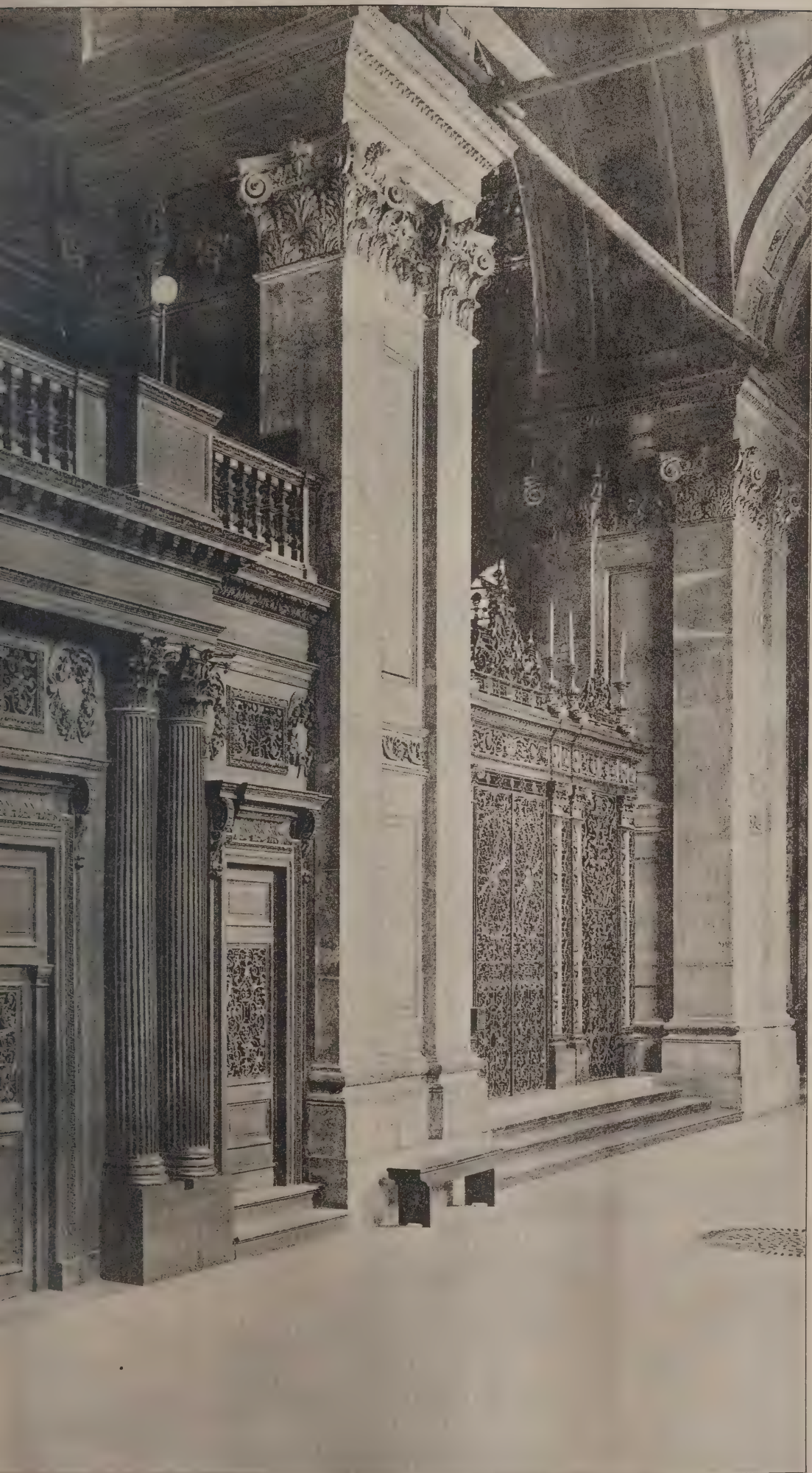






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3: ENTRANCE TO CHOIR STALLS.













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GATES IN SOUTH CHOIR AISLE.







## SIR C. WREN'S BUILDINGS.

THE cathedral of St. Paul is the most important of Sir Christopher Wren's buildings, and by itself is enough to insure his reputation as an architect. But he designed many other buildings. The most complete list of them was prepared by James Elmes, and is as follows. With very few exceptions the date only of the finishing of each building is given:—

1. Sir Christopher Wren's first architectural appointment was that of deputy surveyor-general of the Royal Works and Buildings in September 1661, and his first works the reparation of old St. Paul's, the restoration of Windsor Castle and the King's new palace at Greenwich, &c.

2. [1663] Fitted up the choir of old St. Paul's for divine service, and designed the new fortifications of Tangier, which had been given to Charles II. as part of the dower of Catherine, Infanta of Portugal, whom he had recently married.

3. [1663] Made plans, elevations and sections of old St. Paul's for the purpose of the proposed alterations and repairs. He also began the Sheldonian Theatre, which will be enumerated when finished, and is only mentioned as being his first executed building.

4. [1663] The chapel of Pembroke College, Cambridge, built at the sole cost of his uncle, Bishop Wren.

[1666] The great fire of London.

5. [1666] Made a design and laid it before Parliament for rebuilding the City of London, and a detailed estimate of the damage sustained, which amounted to 10,780,500*l.* He was appointed this year architect to St. Paul's and for rebuilding the whole city.

6. [1666] Fitted up a portion of the old cathedral for divine service.

7. [1668] Finished the Sheldonian Theatre, Oxford, which was opened with much ceremony in the following year.

8. [1669] Reported on the state of St. Paul's Cathedral.

9. [1669] The new Royal Exchange opened by Sir William Turner, the Lord Mayor and the Gresham committee, ninety-nine years after its opening by Queen Elizabeth.

10. [1672] Temple Bar finished.

11. [1677] The Doric column, commemorative of the fire of London, finished.

12. [1677] The parish church of St. Mary-le-Bow, in Cheapside, and its fine steeple finished.

13. [1677] Finished the chapel of Emanuel College, under the auspices of Archbishop Sancroft.

14. [1678] Finished the Custom House, London.

15. [1678] Restored and enlarged the parish church of St. Mary-at-Hill, Tower Street, called in ancient records "St. Maria ad Montem," to suit the purpose of the united parishes of St. Mary-at-Hill and St. Andrew Hubbard, the latter church having been destroyed, whilst the walls and ancient tower of the former were not much injured.

16. [1679] The parish church of St. Michael-on-Cornhill, to which the lofty tower, a humble imitation of that at Magdalen College, Oxford, was added, from Wren's designs, in 1722.

17. [1679] The parish church of St. Olave Jewry, on the western side of the street called the Old Jewry, finished about this time.

18. [1679] The beautiful little elliptical church of St. Benedict or Bene't Fink, Threadneedle Street, a free imitation of the twin churches by the Piazza del Popolo, Rome. It was taken down after the rebuilding of the present Royal Exchange, to make room for the row of houses on its eastern side, which reach from Threadneedle Street to Cornhill.

19. [1679] About this time he finished the parish church of St. Dionis-back-church, in Fenchurch Street and Lime Street, and added the tower and steeple in 1684.

20. [1679] Also the parish church of St. George Botolph, on the western side of Botolph Lane, near Billingsgate.

21. [1679] The parish church of St. Sepulchre, opposite the north end of the Old Bailey, about this time; the tower is the ancient one repaired.

22. [1679] Flamsteed House finished about this time.

23. [1680] The parish church of St. Magnus, London Bridge, to which he added the tower and spire in 1705.

24. [1680] The parish church of St. Mildred, in the Poultry.

25. [1680] About this time the parish church of St. Stephen, Coleman Street.

26. [1680] The parish church of St. Lawrence Jewry, at the corner of Gresham Street and Guildhall Yard. In this church lie the remains of Archbishop Tillotson.

27. [1680] About this time also the parish church of St. Mary, Aldermanbury, and also

28. [1680] That of St. Nicholas, Cole Abbey, on the south side of Fish Street, Doctors' Commons.

28. [1680 or rather earlier] Repaired that of St. Mary-Woolnoth, Lombard Street, which was afterwards rebuilt on a larger scale, to serve two parishes, in 1719, by Nicholas Hawksmoor, a worthy pupil of Wren, in a singularly bold, solid and original style.

29. [1680] Also the parish church of St. Michael-le-Quern,

Queenhithe, formerly Quern or Cornhithe, Upper Thames Street.

30. [1681] Design, estimate, &c., for a mausoleum for Charles I. The House of Commons voted 70,000*l.* for the expense.

31. [1680] Designed the pedestal and superintended the erection of Le Sueur's fine equestrian statue of Charles I. at Charing Cross.

32. [1680] The parish church of St. Michael, Bassishaw, or Basinghall Street, so named after an opulent mercantile family of that name which resided there.

33. [1680] The parish church of St. Swithin, London Stone, Cannon Street, the interior and construction of which are worthy the attention of the architectural student. It was repaired in or about the year 1826. The London Stone, enshrined in a stone case, is the remains of the ancient Roman miliarium, from which the distances from the Metropolis were measured, and upon which the rebel, Jack Cade, laid his sword, when he proclaimed himself King of England in the reign of Richard II.

34. [1680] The parish church of St. Bartholomew, in Threadneedle Street, except its ancient tower. It was taken down to enlarge the area round the Royal Exchange, and its site occupied by the Sun Fire and Life Assurance Office.

35. [1681] The parish church of St. Stephen, Walbrook.

36. [1681] The parish church and its fine but now diminished spire of St. Bridget or St. Bride, Fleet Street, which was further embellished by its architect in 1699.

37. [1681] The church and incomparable steeple of St. Mary-le-Bow, Cheapside.

38. [1681] The parish church of St. Clement Dane, in the Strand, to which the present tower and steeple were added in 1719, by James Gibbs, the architect of the churches of St. Mary-le-Strand, St. Martin-in-the-Fields, the Ratcliffe Library, Oxford, &c.

39. [1681] The parish church of St. Anne and St. Agnes, in St. Anne's Lane, at the northern end of the General Post Office, St. Martin's-le-Grand.

40. [1681] Rebuilding the part of the Temple destroyed by the great fire.

41. [1682] The parish church of St. Peter, on Cornhill.

42. [1682] The parish church of St. Antholin, Watling Street.

43. [1683 *et seq.*] The episcopal palace, Winchester, for and at the sole expense of Bishop Morley.

43. [1683] The royal palace at Winchester, for Charles II.

44. [1683] The parish church of St. Allhallows the Great, Upper Thames Street, near the Steel Yard,

45. [1683] The Ashmolean Museum, Oxford.

46. [1683] The parish church and tower of St. Augustin and St. Faith; the elegant spire, which has been spoiled by some modern Goths, was added in 1699. The united parishes being unable to agree upon an architect to superintend the reparation of Wren's work, each employed their own "Surveyor;" one whitewashed the interior and the other ruined the spire.

47. [1683] The parish church of St. Bene't, Paul's Wharf, on the north side of Upper Thames Street, and near to its western end. This parish is distinguished as the birth and burying-place of Inigo Jones.

48. [1683] The parish church of St. James, Westminster, situated between Piccadilly and Jermyn Street, built at the expense of Henry Jermyn, Earl of St. Albans, and other of the principal inhabitants of that district, which was before that time a precinct of St. Martin-in-the-Fields, and made parochial by Act of Parliament, the third, James II.

49. [1683] The parish church of St. Mildred, Bread Street, was also finished this year. In this parish John Milton was born, which event is commemorated on a tablet outside the church.

50. [1684] The entrance and frontispiece to the Inner Temple was began this year and finished, according to the inscription, in 1688.

51. [1684] The church of the united parishes of St. Allhallows and St. John the Evangelist, Bread Street.

51. [1684] The parish church of St. Martin, Ludgate, on the north side of Ludgate Hill, just inside the side whereon stood Lud Gate, in the western wall of the original City of London.

52. [1684] The chapter-house of the Dean and Chapter of St. Paul's.

53. [1685] Finished the parish church of St. Alban, on the east side of Wood Street, Cheapside; an indifferent attempt, as far as style, of the ancient Pointed mode.

54. [1685] The handsome, capacious and conspicuous parish church of St. Bene't Gracechurch, at the corner of Fenchurch Street and Gracechurch Street. The interior is a double cube of 60 feet by 30.

55. [1685] Archbishop Tennison's Library, near St. Martin's Lane, Westminster, in conjunction with his friend John Evelyn.

56. [1685] The handsome, well-proportioned parish church of St. Mary Magdalen, Old Fish Street, Doctors' Commons, near St. Paul's.



57. [1685] The parish church of St. Matthew, Friday Street.  
 58. [1685] St. Clement, Eastcheap.  
 59. [1685] St. Mary Abchurch, near Cannon Street.  
 60. [1686] The handsome capacious parish church of St. Andrew, Holborn, one of the finest and most appropriate churches for the service of the reformed Church of England that has yet been built. The tower, which was not destroyed by the great fire, was repaired and faced with stone in 1704.  
 61. [1687] The parish church of St. Margaret Pattens, at the corner of Rood Lane and Tower Street. In ancient times this part of the city was the principal residence of the patten makers, hence its second name.  
 62. [1687] Repaired the banqueting house, Whitehall.  
 63. [1687] Finished the parish church of St. Michael, Crooked Lane. It was taken down by the authority of an Act of Parliament in 1830 to widen the approach to London Bridge.  
 64. [1689] Finished the College of Physicians, in Ivy Lane, Newgate Street. The gilt globe on its summit, intended, perhaps, to intimate the universality of the healing art, gave occasion to Garth in his "Dispensary," the scene of which is laid in this building, to say:—

"A golden globe, placed high with artful skill,  
 Seems, to the distant sight, a gilded pill."

65. [1690] Finished the Royal Military Hospital, Chelsea.  
 66. [1690] The parish church of St. Edmund the King, on the north side of Lombard Street, near the eastern end.  
 67. [1690] St. Margaret, Lothbury, opposite the north front of the Bank of England. It is one of Wren's best works.  
 68. [1690] Began the modern part of Hampton Court Palace, part of which was finished and occupied by King William and Queen Mary in 1694.  
 69. [1691] Surveyed and repaired the buildings used for the sittings of the House of Commons.  
 70. [1691] Built the Mint, or Moneyers' Hall in the Tower of London.  
 71. [1691] Finished the parish church of St. Andrew in the Wardrobe, near Doctors' Commons, where the Royal Wardrobe formerly stood, and so much spoken of in Pepys's Diary, when his kinsman and patron, Admiral Montague, first Earl of Sandwich, resided there as keeper of the Royal Wardrobe.  
 72. [1692] Finished the library, the quadrangle called Nevile's Court and other new buildings at Trinity College, Cambridge.  
 73. [1692] Made the new road from Hyde Park Corner to Kensington Palace, which was then becoming a favourite residence of King William III.  
 74 to 77. [1694] Morden College, Blackheath; Dartmouth Chapel, in the same village; Bohun's, or Boone's, Chapel, &c.  
 78. [1694] Finished the parish church of St. Allhallows, Lombard Street, a handsome spacious building, with an entrance only from the street, the church itself being in Ball Alley.  
 79. [1694] Also the spacious and well-proportioned parish church of St. Michael Royal, on the eastern side of College Hill, near Queen Street, Cheapside. In this church is Hilton's fine picture of Mary Magdalene washing Christ's feet, presented to the parish by the directors of the British Institution.  
 In this year the choir of St. Paul's was finished as far as the stone-work and vaulting, and the scaffolding, both inside and out, removed. Evelyn, who was a profound critic in architecture, as well as in the other branches of the fine arts, declared it to be a piece of architecture without reproach.  
 80. [1694] Converted the Benedictine Convent in the Savoy into a prison for state prisoners, who were then about to be tried, and as barracks for troops.  
 81. [1694] Built apartments for state prisoners of higher rank in the Tower of London.  
 82. [1695] Finished the plain substantial parish church of St. Mary Somerset, on the north side of Upper Thames Street, near Broken Wharf. It received its second name from the ancient church being built near to a small haven called Somers' Hut or Hithe.  
 83. [1695] Also the parish church of St. Vedast Foster, with its original and somewhat beautiful steeple, on the eastern side of Foster Lane, Cheapside.  
 84. [1695] Repaired the celebrated old English mansion of Audley End, in the county of Essex, about which a correspondence passed as to its dilapidated state between the Earl of Suffolk, who then occupied it as tenant under the Crown, having been purchased by King Charles I., and Wren, as surveyor-general.  
 85. [1696 *et seq.*] Began the completion of Charles II.'s unfinished palace at Greenwich, and built the additional wings, &c., to adapt it for a Royal Naval Hospital, by command of Queen Mary II.  
 86. [1696 *et seq.*] The parish church of St. Christopher, Threadneedle Street, taken down for Sir Robert Taylor's western wing of the Bank of England; its churchyard is now the garden in front of the directors' parlour, and visible on the western side of the first court from Threadneedle Street.

87. [1696 *et seq.*] St. Paul's Cathedral. The choir of St. Paul being finished, was opened for divine service on December 2, 1696, the day appointed for public thanksgiving for the victory and treaty of Ryswick.

1699. The beautiful chapel near the north-west corner of St. Paul's Cathedral, called the Morning Prayer Chapel, was opened for public worship, with appropriate ceremony.

88. [1699] The church of St. Allhallows, Barking, repaired.

89. [1699] Finished his exquisitely beautiful and geometrical tower and steeple of the ancient parish church of St. Dunstan-in-the-East, the body of which, not being much damaged by the great fire, was repaired by Wren, but the present body was built by Mr. Laing.

90. [1705] Finished the parish church of Isleworth, Middlesex.

In 1708 the outer cupola of St. Paul's was covered with lead.

91. [1708] Appointed one of the commissioners for building the fifty new churches ordered by Act of Parliament, and wrote his opinions as an architect thereon.

In 1710, when Wren had attained the seventy-eighth year of his age, the highest stone of the lantern on the cupola of St. Paul's was laid with masonic ceremony by Mr. Christopher Wren, the architect's son, attended by his venerable father, Mr. Strong, the master-mason of the cathedral, and the lodge of Freemasons, of which Sir Christopher was for so many years the acting and active master.

92. [From 1698 to 1723] The reparations and additions to Westminster Abbey.

93. [1711] The spacious and handsome church of St. Mary Aldermary, on the east side of Bow Lane, Cheapside, built at the expense of Mr. Henry Rogers, a pious and munificent citizen. The interior, although bold in design and ingenious in construction, is a defective imitation of the ancient Pointed style, with the additional defect of an altar-piece of the Roman composite order.

94. [1711] St. Thomas's Hospital, Southwark, began in 1692 and finished about this time.

95. [1711] Sion College, Aldermanbury, for the use of the collegiate body of "the President and fellows of the College of Sion, within the City of London," consisting of the parochial clergy of the city, with the Bishop of London as visitor. The ancient building was destroyed by the great fire, the present edifice began about two years afterwards, subsequently enlarged, and the new library added.

96. [1711] The building for the Royal Society on a site of ground presented by Mr. Howard, afterwards Duke of Norfolk, on his estate on the south side of the Strand.

PUBLIC HALLS. [1668 to about 1700] All the public halls of the Livery Companies of the Corporation of London, which, according to the second report of the Commissioners appointed to inquire into the Municipal Corporations in England and Wales, as regards the London Companies, printed by order of the House of Commons, April 25, 1837, amount now to eighty-nine, as the Commissioners excluded from their list several Companies which were practically extinct, or nearly so.

They consist of twelve chief Companies, whose arms are emblazoned, in their rotation, on shields over the capitals of the attached pillars in Guildhall, where the Livery meet in Common Hall. Of these halls Wren built the following between 1668 and about 1700.

97. [No. 1 of the twelve chief Companies] Mercers' Hall, on the north side of Cheapside, extending behind the houses from Ironmonger Lane to Frederick's Place, Old Jewry, in each of which streets it has an entrance. This fine and substantial building consists of the hall, court-room and offices, a handsome chapel, clerk's, architect's and beadle's offices, and residences for the clerk and beadle.

98. [No. 2] Grocers' Hall, in Grocers' Hall Court, on the north side of the Poultry. Wren's building was so capacious that a portion of it served for the use of the Bank of England when first established. It was taken down, and the present commodious building erected by Thomas Leverton. By the enlargement of the Bank, and the continuation of Prince's Street from Mansion House Street into Lothbury, the rear front of the hall now opens into that street, and gives the Company an entrance for carriages.

98. [No. 3] Drapers' Hall, on the north side of Throgmorton Street, a short distance westward of Austin Friars, Old Broad Street. It is a spacious and commodious building, replete with every accommodation for so wealthy a corporation. They are built on the site of the ancient palace of Thomas Cromwell, Earl of Essex, in Henry VIII.'s reign. It has been since repaired and a new street front, before Wren's quadrangle, by Robert Adam, the architect of the Adelphi Buildings, and other edifices of that mixed Greek and lower Roman style which stamps his works.

99. [No. 4] Fishmongers' Hall, well remembered by ancient citizens for its wine-cellars, wherein they drank their genuine old port and sherry, drawn from the casks, and viewed the bridge shooters and boat racers. It has given its name "Shades" to many others. Wren's buildings have given way



to the new bridge and the present plain, substantial and commodious building, by H. Roberts.

100. [No. 5] Goldsmiths' Hall, in Foster Lane, eastward of the General Post Office, St. Martin's-le-Grand. Wren's building was taken down about 1831, and the present larger, splendid, substantial, ornate building erected by Philip Hardwick, R.A. &c., soon afterwards.

101. [No. 6] Skinners' Hall, Dowgate Hill, Cannon Street. A spacious and commodious pile of building fit for this opulent Company and its officers. Like that of the Drapers, it has been substantially renovated, and a new street front added by Robert Adam, of Adelphi celebrity.

102. [No. 7] Merchant Taylors' Hall, on the south side of Threadneedle Street, nearly opposite the South Sea House. The hall or banqueting room of this building is reckoned to be one of the finest in Europe, and has been the scene of some of the most distinguished banquets ever held in the City of London.

103. Merchant Taylors' School, on the east side of Suffolk Lane, consisting of a large hall or schoolroom, with studies for the junior masters, a colonnade and courtyard for the pupils, a library, headmaster's study, and spacious residence for the same reverend officers.

104. [No. 8] Haberdashers' Hall, on the north side of Gresham Street West, at the corner of Staining Lane. This pile of buildings consists of the hall or banqueting-room, the fine foliated ceiling of which was destroyed a few years since, and a commonplace piece of vulgar lath and plaster put up in its stead. There are also houses and offices for the clerk, beadle, &c., next Gresham Street, and a chapel down Staining Lane.

105. [No. 9] Salters' Hall, on the western side of St. Swithin's Lane, Cannon Street. Wren's buildings were taken down, and a new hall and offices on a larger scale were erected by George Smith.

106. [No. 10] Ironmongers' Hall, on the north side of Fenchurch Street, nearly opposite Mark Lane. The street front is in a bold Italian style of a more recent date.

107. [No. 11] Vintners' Hall, on the south of Upper Thames Street and the approach to Southwark Bridge. The front court and gardens at the back of the hall, which looked on to the Thames, was a minor Campus Martius at the beginning of the French revolutionary war for the Vintry Ward volunteers to drill and practise their military exercises.

108 [No. 12] Clothworkers' Hall, on the eastern side of Mincing Lane, Fenchurch Street. It was not entirely consumed in the great fire, and some ancient wainscoting, with figures of James I. and Charles I., and a window of stained-glass, decorate the dining-hall.

Other halls of the minor companies, many of which are of great wealth, although the first twelve have had precedence and certain privileges and estates in the province of Ulster, in the kingdom of Ireland, given them by James I. for aiding him with funds for establishing a Protestant plantation or colony in that portion of the sister island.

109. [No. 13] Dyers' Hall, on the north side of Great College Street, Dowgate Hill, rebuilt on a larger scale.

110. [No. 14] Brewers' Hall, on the north side of Addle Street, Aldermanbury, a spacious, commodious hall and offices.

111. [No. 15] Leathersellers' Hall, at the bottom of St. Helen's Place, taken down and rebuilt on a larger scale by W. F. Pocock.

112 [No. 18] Cutlers' Hall, on the south side of Cloak Lane, Dowgate Hill.

113. [No. 19] Bakers' Hall, on the eastern side of Harp Lane, Great Tower Street.

114. [No. 21] Tallow Chandlers' Hall, on the west side of Dowgate Hill, a handsome and spacious building with an interior colonnade of the Tuscan order, and for London the singular addition of a circular basin and a fountain throwing up a jet of water from a conch shell blown by a cupid.

115. [No. 23] Girdlers' Hall, on the eastern side of Basinghall Street. Although the business of a girdle-maker is no longer extant among City trades, yet the ancient and worshipful Master and Wardens of the art and mystery of the girdlers of London are trustees for several very excellent charities.

116. [No. 25] Saddlers' Hall, on the north side of Cheapside, between Gutter Lane and Foster Lane.

117. [No. 27] Cordwainers' Hall, on the north side of Distaff Lane, Doctors' Commons. The hall has been remodelled and thoroughly repaired, and a handsome stone-fronted building for offices, &c., added to it by Robert Adam.

118. [No. 28] Painter-Stainers' Hall, on the western side of Little Trinity Lane, Upper Thames Street. The livery-hall or refectory is a handsome, well-proportioned apartment, with a plaster-modelled ceiling, painted with allegorical subjects by Fuller. This hall is worthy of notice for the fine collection of pictures by Palmatier, Brull, Hungis, Houseman, Reynolds, &c., many of whom were members of the Company.

119. [No. 29] Curriers' Hall, on the south side of London Wall, near Wood Street.

120. [No. 30] Masons' Hall, in Masons' Alley, between

Basinghall Street and Coleman Street; a small but commodious structure formerly used by the Grand Lodge of Freemasons; since that time for various other purposes, as for auctions, debating societies, and more recently for a tavern and public dining-rooms.

121. [No. 31] Plumbers' Hall, on the eastern side of Great Bush Lane, Cannon Street. It was pulled down and its site covered by lofty warehouses.

122. [No. 32] Innholders' Hall, at the corners of Great and Little College Streets, Dowgate Hill.

123. [No. 33] Founders' Hall, in Founders' Hall Court, Lothbury, taken down for the improvements between that street and Moorfields.

124. [No. 36] Coopers' Hall, on the western side of Basinghall Street, near to the eastern entrance of Guildhall. It is a large, substantial building, the banqueting-room of which, wainscotted to the height of 14 feet, and paved with marble, was formerly used for drawing the state lotteries. It has commodious offices, and residences for the clerk, beadle and other officers of the Company.

125. [No. 37] Tilers and Bricklayers' Hall, on the south side of Leadenhall Street. It was formerly let as the synagogue of the Dutch Jews in London, but is now occupied by a literary and scientific institution and called Sussex Hall, after His Royal Highness the late Duke of Sussex.

126. [No. 41] Joiners' Hall, on the east side of Joiners' Hall Buildings, Upper Thames Street, near Dowgate Dock, but has been let to a packer and used as extensive warehouses.

127. [No. 42] Weavers' Hall, on the eastern side of Basinghall Street.

128. [No. 46] Plasterers' Hall, Addle Street, Aldermanbury. A substantial and spacious hall, court-room and offices.

129. [No. 47] Stationers' Hall, on the western side of Stationers' Hall Court, Ludgate Hill. A spacious and well-proportioned hall, with court-rooms, clerk's and beadle's dwelling-houses, warehouses for their stock, &c. The hall and offices underwent a thorough repair, the eastern front cased with stone, and the roofs new guttered and slated by Robert Milne in 1805. There are some excellent pictures of the English school in the court-room, presented by Alderman Boydel, who was a past master of the Company.

130. [No. 38] Apothecaries' Hall, on the eastern side of Water Lane, Bridge Street, Blackfriars, one of the largest halls in the City, with elegant court-room, spacious dining-hall for the members of the Society, pictures and busts of benefactors. The warehouses, drug mills, laboratories, &c., are of more recent date.

131. [No. 68] Pinmakers or Pinners' Hall, on the north side of Old Broad Street, near Winchester Street. The livery hall was for some years used as a Dissenting meeting-house, and subsequently the whole building as commercial chambers and offices.

132. [No. 79] Coachmakers' Hall, Noble Street, Foster Lane, Cheapside, is a spacious and was a handsome hall, with court-room, offices, &c., built originally for the worshipful Company of Scriveners, which, falling into poverty, sold it to the wealthier Company of Coach and Coach Harness Makers. They, in their turn, went downwards in the wheel of fortune, let it for balls, concerts, a dancing school, and during the first years of the French revolution to the less harmonious purpose of a political debating society, in which many demagogues and some orators of after distinction made their earliest rhetorical essays.

To these authenticated and enumerated works may be added many of the almshouses of these companies, humble, but like those of the Merchant Taylors' Company, at Lee, founded by Mr. Bohun, or Boone, bearing the hall-mark of a master in his art; many fine mansions in the City, as the Deanery House of St. Paul's, and its entrance from St. Paul's Churchyard; one on Laurence Pountney Hill, Cannon Street; two on College Hill, with their sculptured pediments; one in the Old Jewry, formerly used by the London Institution till it was removed to their new building in Finsbury Circus; and many others, which have been pulled down; two in Chichester, besides repairing the cathedral, which would fairly raise the number of Wren's public works to an average of at least 150—an unprecedented number for one man.

Nearly all these great works can be surveyed from one spot, the stone gallery of the cupola of St. Paul's, whence they may be viewed as in a panorama. "Circumspice."

## THE ANTIQUITIES OF CULLEN.

IN an article in the *Glasgow Herald*, Mr. J. M. Mackinlay writes:—

Cullen has a unique position among Royal burghs, as it is the only one that has changed its site. It once stood close to Cullen House. Newte, who was there in 1785, described the place as "a small, poor town, without one good house in it." About thirty-seven years later the town was demolished to



allow the grounds of Cullen House to be extended, and was rebuilt a short distance further to the north-east, nearer the sea. With the exception of the parish church in the midst of its burying-ground, and a portion of the factor's house, nothing now remains of the old town. The new town has a population of about 2,000. It is regular in plan and has a spacious square, where stands the burgh cross, the shaft dating from the time of William and Mary. The cross bears the town's arms, the Virgin and Child, the same as those of the Border burgh of Selkirk. It stood in the old town till about 1822, when it was removed to the Castlehill. There it remained overlooking the sea till 1872, and was then transferred to its present site. A plan of the old town of Cullen, dating from 1762, serves to show its appearance. Much light has been thrown on its bygone ways by Dr. Cramond, whose painstaking researches have made all antiquaries his debtors. Cullen House, already referred to, is the Banffshire seat of the Dowager Countess of Seafield, by whose courtesy visitors are admitted to the beautiful grounds. The mansion is a picturesque structure, built about 1602, but considerably altered since then. It stands on the brink of the narrow ravine where flows Cullen Burn 50 or 60 feet below. The house contains many curious and valuable specimens of tapestry, woodwork and china, as well as paintings. The library is most attractive both as regards its contents and the apartments where the books are housed. Outside a couple of large stone lions guard the entrance, while on the walls are carved representations of the three theological virtues, Faith, Hope and Charity, with the mottoes:—

- (1) FAYTH YE GRVND OF AL.
- (2) HOPE YR ANKER OF FAITH.
- (3) CHARITIE COVERETH MANIE SINS.

These are believed to date from about 1668. Cullen House suffered during the second Stuart rising, having been plundered by some of Prince Charlie's followers on April 8, 1746. Close to the house is a substantial one-arched bridge spanning the burn, and a little higher up the stream is another bridge, also of one arch, but considerably older and more picturesque, called the Lady's Bridge. The grounds abound in splendid trees of different kinds, and a good road leads by a tolerably gradual ascent to the top of the Bin of Cullen, whence a magnificent view over sea and land can be had on a clear day. A building much older than Cullen House once stood not far from it, and served as the occasional residence of royalty. A fragment of the building was to be seen at the end of last century, but nothing of it is now visible. It is believed to have been occupied by Alexander II. and Alexander III., who visited Cullen probably to enjoy the pleasures of the chase in the then extensive forests of Boyne and Enzie. Elizabeth de Burgh, daughter of the Earl of Ulster and second wife of King Robert the Bruce, is believed to have died within its walls. Part of her body was buried within the church of Cullen, and the remainder was interred in Dunfermline Abbey. Her husband bequeathed a sum of money for the support of a chaplain in the church of Cullen to pray for the repose of her soul.

No one can fail to be attracted by that noteworthy relic of old Cullen, its parish church, dedicated to St. Mary. In the year 1236 we hear of the chapel of "Inverculan" in connection with a dispute as to jurisdiction between the Bishops of Aberdeen and Moray. The term "ecclesia parochialis de Cullan" was used in the sixteenth century as pointing probably to the possession of baptismal rights, but Cullen did not attain to the dignity of a separate parish till early in the seventeenth century. An important change was made in the condition of the church in 1543. Not only was the structure rebuilt on a larger scale, and joined to St. Anne's Chapel erected a few years before, but the whole was made a collegiate church for a provost, six prebendaries and two singing boys. The prebends created were those of St. Anne, Holy Cross, St. Mary, St. John the Baptist, St. Andrew and St. Mary Magdalene. The holder of St. Anne's prebend was to be the precentor of the college, and had to teach daily a song-school for boys within the church. The prebendaries had their duties clearly stated in the foundation charter. They were required, *inter alia*, to reside near the college, and to officiate daily within its walls. On feast days they were to be dressed in clean linen surplices with hoods of red fur, and, thus attired, to say matins, high mass, vespers and compline at the great altar in the choir, and after compline to repeat nightly the *Salve Regina* in the chapel of St. Anne. There were burials within the church both before and after the Reformation. The last interment was that of the Dowager Countess of Findlater, who died in 1795. The church contains some fine monuments. The best is that of its founder, Sir Alexander Ogilvy (founder also, it is believed, of the ancient bedehouse of Cullen, and ancestor of the Earls of Findlater and Seafield). It is in the form of an arched recess, containing elaborate carvings. In the recess is seen a stone figure of the knight, with his hands folded on his breast as if in prayer. The late Andrew Jervise, of Brechin, an authority in such matters, speaks of this sepulchral monument as possibly one

of the finest in the North of Scotland. There are some marble monuments in the church. One of these is to James, fourth Earl of Findlater, the chancellor earl, as he has been called, who did much to bring about the Union of the two kingdoms in 1707. It is related of him that when the Scottish Parliament rose for the last time he exclaimed, "There's the end o' an auld sang." When rebuking his brother, the Hon. Patrick Ogilvy, of Inchmartin, who was no friend of the Union, for being a cattle dealer, he was met with the retort, "Better sell nowt than sell nations." Till 1877 his monument stood beside the north wall of the church and completely concealed an interesting relic of pre-Reformation times in the form of an aumbry or sacrament-house for holding the consecrated elements. This sacrament-house is constructed of freestone and is 8 feet high and 3 feet broad. The small recess, or aumbry proper, had formerly a door and lock. Above it are carved representations of two angels with uplifted wings, holding in their hands a monstrance or vessel wherein was placed the consecrated wafer. Above the angels is an appropriate inscription in Latin. About the year 1800 the present north aisle of the church was built. Some forty-two years later the old seats in the south aisle were removed, and their carved wood was preserved by being fixed to the pillars of the Seafield gallery. The churchyard is surrounded by high walls, and contains some fine trees and a number of venerable lichen-clad tombstones. About half a mile from the graveyard to the west is St. Mary's Well. Water from the spring is said to have been used in the services of the church. Till comparatively recent times, Mary Fair was held in the town on the third day of September, a survival of the festival commemorating the nativity of the Virgin.

## THE PHYSIOLOGY OF TASTE.

PLEASURE and pain are ultimate facts in the animal economy. To perceive and to judge them is the same act, and simply to name them is to define their character. To the percipient their quality is matter of absolute certainty, and their nature cannot be made clearer by reasoning. But this distinctness of our sensations is confined to the being in whom they exist. No language can explain to the inexperienced bystander what is passing within or convey to him the remotest idea of the impression in question. He must have felt the affection himself before he can understand it. The sensorium of each individual is therefore at once its own world and its own law, and all judgments of external nature in its relations to sensation can have no other standard. This truth is embodied in the familiar adage, "*De gustibus non est disputandum*."

But this very intensity of our own sensations, the certainty we feel of what passes within us, creates a disposition at every instant to dispute the tastes of others, and to assert the supremacy of our own judgments in matters of feeling. The constant operation of this tendency has led to inquiries into the nature and causes of our sensations, and to an attempt to discover some general and abstract type of beauty and of good by which the particular sensations of individuals may be safely compared.

Experience, however, exhibits a marked and rather extensive range of differences in the results of sensitive impression, when made by the same object on several individuals. If a picture, for example, be presented to the consideration of a mixed company, the judgments passed upon it will be widely different: "*quot homines, tot sententiæ*." In some, perhaps, it will excite no sensation of pleasure or pain whatever, and scarcely any idea beyond that of a variously-coloured canvas. The greater number will, in all likelihood, praise or censure it in the gross, thereby proving that their sensations concerning it are vague and indistinct. A few, more discriminating, will each seize upon some specialty for remark—its colouring, grouping, drawing, design or execution; and, judging the picture exclusively on that ground, prove that their pleasure is of a different origin from that of their neighbour.

On the other hand, there are, confessedly, certain points on which most sane men agree; there are particular forms, colours and sounds in nature and art which generally please, and the manner in which their combinations affect mankind at large is visibly subordinated to general laws. The more any art is cultivated, the greater is the tendency in its professors to lay down certain rules for governing their designs, and to believe that there exists in nature something absolute and definable by which individual taste may be estimated and corrected. It is, however, chiefly by the contemplation of generalities that the mind is led to this conclusion, for the more it descends to particulars the greater is the evidence of innate and acquired differences of feeling between man and man and the greater the difficulty of getting society to agree on specific truths.

Pressed upon by two orders of facts thus contradictory, philosophy has hitherto been unable to arrive at any universally admitted opinions concerning abstract beauty or the possibility



of arriving at certainty in matters of taste. This obscurity, overhanging a subject after the lapse of so many ages of dispute, is clearly referable to the mode in which it has been treated and to the bad metaphysics in which it has been involved. The doctrines of taste lie not in that imaginary world yclept "the eternal nature of things," nor do they depend merely upon the physical properties of external nature. Taste is altogether an affair of sensation, and its laws are, and can be, no other than those of the living machines of which sensation is the attribute. The theory of taste is part of the natural history of man; and, if its doctrines are of uncertain application, it is only in as far as that history is incomplete, or is ill-understood by the æsthetic philosopher.

If there be any physiological truth more clearly ascertained than another it is this: that nature is made up of individuals, that species and genus are the figments of the human brain, and that their common identity is obtained by the ideal abstraction of an infinity of particulars. The sensitive susceptibilities of individual men, like their minute organisation, are strictly personal; and they differ as to a multitude of nameless phenomena, not only in different persons, but in the same individual at different epochs of his existence. This may be affirmed generally of all our pleasures and pains; but it is more exquisitely true with respect to the more refined and delicate sensations, to which the term taste is more especially confined.

In respect to these sensations, mankind may be roughly divided into three classes—the intellectual, the sensitive and the sensual. The first class embraces those in whom the reflective faculties predominate over the organs of sense; their vitality is internal, and is habitually concentrated on the operations of their own minds, almost to the exclusion of the phenomena of the external world, where these are not immediately concerned in the preservation of life. In the second class, on the contrary, the intellect is all abroad; all the external impressions are vivid, and, the parties being occupied but little with reflection, they exist almost entirely in their sensations. The third class contains those whose moral existence is of the lowest order—whose nature is most purely animal—and whose being is principally wrapped up in the gratification of their appetites. The types of these classes are sometimes found in considerable accuracy and perfection: more usually it is a simple predominance of one set of faculties over the others that constitutes the sub-genus. The predominance exists under an infinity of shades and gradations, and each shade is accompanied by its own especial range of sensibility and affection from external objects. The devotees of the fine arts belong principally to the second class, for the qualities of objects must be distinctly perceived before they can become the causes of pleasure or of pain. The intensity of that pleasure or pain, however, seems to depend on some other peculiarity of the constitution. The power of perceiving, though essential to a susceptibility to emotion, does not always awaken it. There are men in whom deformity, when rendered an object of distinct cognisance, excites no disgust, and who behold the most admirable works of art and nature with a stupid indifference.

Besides these broader distinctions between man and man, which may be designated as temperaments of the sentient complex, there are personal idiosyncrasies as to minuter particulars too numerous for arrangement. Some persons exhibit in their observation of the arts a peculiar sensibility to form, others to colour; others, again, uninfluenced by form or colour, are especially alive to the pleasures of sound. There are men exclusively affected by sequent sounds, on whom the combinations of harmony produce no definite effect; and there are exquisite harmonists who are little touched by the effects of melody. There are also those who (probably through defect of the organ of sense) dislike music of all sorts. Descending to more minute particulars, there are persons exclusively attached to vocal music, others requiring the stimulus of powerful bands, some touched by martial, others by plaintive melodies. Savage nations appear generally to affect the minor keys.

The amateurs of painting may, in like manner, be divided into three distinct classes—those most touched by the ideal, those chiefly curious as to the mechanical departments of art, and, lastly, the lovers of nature, who are the most powerfully affected by the beautiful in landscape. The determination to any one of these preferences, whether it be considered as innate or acquired, is a fact which detracts from the universality of the principles of taste. The preference is a phenomenon natural to the being in which it is manifested; and, as it is a natural, so it is a true taste. Between the several schools of painting, therefore, there can be no common beau ideal to which to appeal; on the contrary, each has its own laws, its own canons of criticism; and the same picture may be perfection to one man, without exciting an emotion of pleasure in another. Who then shall decide between them?

Another great physiological truth that bears against the certainty of taste is, that the specific pleasures and pains attached to externals in any one organisation are liable to be

loosened from the causes by which they were originally excited. It is a law of the animal economy that use shall blunt the force of sensitive impression, while it develops the intellectual clearness of the idea excited by an external. Thus, experience in the arts, by diminishing enthusiasm, abates the sum of pleasure derivable from that source, and a greater degree of merit becomes requisite to produce an equal sum of agreeable effect; at the same time, the increasing accuracy of perception opens a new range of ideas for comparison, and that which formerly excited pleasure as a merit may be afterwards a source of pain as a defect. Every new sensation that we receive may be rendered a means of modifying the range of pleasures and pains; and there is, consequently, an education both of the organs of sense and of the intellect that unsettles taste, and subjects it to a perpetually progressive refinement. Under the influence of habitual exercise, the eye sees more and more of its object, and the mind judges with greater finesse. The observer thus arrives at a more exquisite perception of beauty, and rejects with disgust the objects of his previous admiration. It is by these means that a single artist, dissatisfied with the works of his predecessors and with his own progress, may be driven to look beyond what actually exists in art, and to go in search of hidden sources of beauty, by which, when attained, he creates new standards of excellence, to influence the general sentiments of an entire nation. Each age thus acquires a taste of its own; and the hard lines and unreal flatness of Giotto, which were, to Dante, the perfection of painting, were thus rendered intolerable when Raphael and Domenichino had taught Italy a better style. Dante's criticism on Cimabue,

Credette Cimabue nella pintura  
Tener lo campo, ed ora ha Giotto il grido,

contains the whole history of the arts. "Le mieux est l'ennemi du bon;" and, for aught we can tell, a future race of artists may lay open a new series of beauties that will discredit all that has hitherto been effected in painting and sculpture. In judging, therefore, of any specific work of art, the learned critic makes reference to the age in which it was produced; and, by a curious particularity in the phenomena of sensation, not only does the intellect decide in favour of any work which exceeds the average merit of its own time, but the sensorium derives pleasure from it when so judged; whereas, if viewed without reference to such a principle, pain might be the only result.

Connected with this law of the economy is an uncertainty in taste of an opposite tendency. The liability to satiety, leading to the pursuit of novelty, produces from time to time a conventional and vitiated love of certain mere extravagances by which the arts are degraded.

Such caprices, indeed, are seldom permanent, nor are they even for the time largely participated by those who feel or who think for themselves. Still, while the fashion lasts the pleasure excited is real, and it detracts *pro tanto* from the universality of principles. Occasionally, however, traces of such ephemeral judgments may remain to after times and modify to a certain extent the sensibility of future generations.

In enthusiastic temperaments it is the sensation of pleasure or pain which a work of art excites that fixes the attention upon it and provokes criticism. Such persons judge because they feel. There are others in whom this process is reversed. The love of the arts as marking a finer organisation is regarded as a distinction, and many are drawn to their study by vanity, ambition and the instinct of imitation. This class, if they really feel, feel because they judge. Their pleasures pass through their understanding, and are founded on the perception of fitness rather than on mere physical sensation. The certainty of their judgments does not extend beyond the sphere of their experience, and is confined usually to some particular school or master beyond which their notions are vague, vacillating and undirected by general principle or by sentiment. These stop-watch critics, as Sterne has called the brotherhood, form a school of taste apart, and their judgments follow a different law from that which directs the opinions of the man of feeling. Their "Correggio and stuff" disgusts the genuine enthusiast, but still it is their taste.

A large part of the pleasures of taste arises from association of ideas, a circumstance powerfully tending to vary men's affections by works of art. The simplest sensations we receive involve a judgment; we judge that we are changed in our own being by the sensation; and we judge something concerning its external cause. In our ordinary existence there are very few sensations that do not excite several such judgments; and such judgments, when of frequent occurrence, become so closely associated with the sensation as to be mistaken for a part of itself. Thus, to take a familiar instance, the unlearned think they see distance. There are certain particular forms which, by a very obvious causation, provoke judgments concerning the utility of the object, and this judgment powerfully influences our sense of its beauty. A high-blooded racer and a strong bony cart-horse are diametrically opposed to each other in the



details of their form. There is in each of these animals, however, a certain symmetry of parts which fits it especially for a specific purpose, and the specimen that possesses these distinctives in an exquisite degree is in both cases deemed beautiful. It is true that, as far as natural objects are concerned, there may be a necessary harmony in the parts whose organisation all tends to one given end, so that the perfection of function and beauty may go together; but we apply the epithet of beautiful to artificial machinery and speak even of a beautiful experiment in chemistry. In these cases the pleasure derived from a sense of the utility connected with a form seems to the percipient to flow from the form itself and to be really a physical quality. By a similar mental process moral antipathies engender the idea of ugliness, while physical deformity sometimes excites moral aversion. Hogarth's waving line of beauty is to many persons odious in a serpent and in all serpentine movements; and it is likely that the popular reputation of the toad for possessing poisonous qualities is derived from the unpleasant aspect of the animal. The influence of this association is strong in our perceptions of physiognomy. A sinister expression of countenance destroys the effect of beauty of feature, while an expression of benevolence redeems a face decidedly plain. If by time or accident such associations become dis severed, the judgments also respecting beauty are changed. A spider is considered beautiful by those whose nursery notions are superseded by juster impressions of the industry, sagacity and harmlessness (to ourselves) of the animal. The story of "Beauty and the Beast" is an illustration of this law.

It is a matter of surprise to many that objects in themselves ugly may become agreeable in imitation. A trim architectural drawing of a commodious house is less pleasing than the picture of a dilapidated cabin; a soldier in regimentals makes a less effective picture than a beggar in rags, and a park is not so picturesque as a wild forest. This seems to result from an association of ideas. The idea of utility is in this case totally dis severed from the sensation and is superseded by another. The pleasure excited by picturesque objects consists in a certain exaltation and poetic enthusiasm, and experience abundantly shows that the organisation is the most susceptible of this condition when the frame is braced by exercise and by the pure air of the country. It is then that visible objects produce their strongest effect, and that the senses go as it were abroad, in search of the sources of this species of pleasure. The escape, too, from the trammels of society and from the low cares of business favours this predisposition. It would seem, then, that those objects which habitually present themselves to contemplation in such moments of exaltation have a tendency to reproduce the state when seen in imitation, while the familiar objects of our artificial life in cities tend, when painted, to chill and to narrow the feelings. In the works of man, also, straight lines (the shortest in statistics as in geometry) predominate; their beauty, therefore, is naturally small, consisting principally in utility, and it disappears when that utility becomes too obviously a secondary consideration. In these works also all is violence and restraint; they are indications of difficulties surmounted, of labour exerted, and of a mind painfully fixed on a few disgracious ideas. In nature, on the contrary, the productions seem more spontaneous; its pleasures appear a free gift of Providence to man, inviting the mind to repose, to reverie, and to tranquil enjoyment. Almost every natural object, therefore, pleases in painting, from its power of producing an associated reminiscence of the excitement which that or similar objects have occasioned in the original. One almost fancies the cool breath of the wind passes over one's face in viewing a well-painted piece of forest scenery, and all the pleasing reverie of "the melancholy Jacques" seizes on the mind as the contemplation lingers over it.

What the picturesque is in art the noble is in poetry. A recurrence to the miserable necessities of humanity destroys alike the sublime of both, and it is the moral association that makes the beauty of either. Whatever tends to disturb this association of ideas destroys the picturesque; a group of modern hunting squires in red coats would assuredly spoil the effect of forest scenery as far as this beauty is concerned, whereas a boar hunt conducted by persons habited in the costume of a remote and poetic age would enhance it. Further, it may be remarked, that any other association capable of producing the same tone of mind creates picturesque beauty. A fine piece of Greek architecture recently constructed, however beautiful, will not be deemed picturesque, but the same forms and proportions partially overthrown and ruined become picturesque by the grandeur of the historic ideas they are calculated to recall. Certain forms not improbably receive this quality through an exaltation of mind, produced by a mere sense of the art bestowed on their representation. All broken forms creating minute diversities of lights and shades, the fluttering rags of the beggar, the lichen on the stone, the diversity of rock, &c., require a far higher exercise of imitative power to reproduce than smoother, and in themselves more elegant, forms. The

pleasure which the knowledge of this fact creates and the feeling it excites constitute the charm of the accurate imitations of the Dutch school.

Inappropriateness, by interfering with association, destroys picturesque effects. The ass, which paints so well in a woodland scene, has no such charm if placed in a garden; nor would the peasant's cottage be picturesque as part of a street of palaces.

To the sense of picturesque beauty, education and a cultivated enlargement of mind powerfully contribute. In proportion to the variety of the beholder's knowledge is the sphere of his possible associations. A work of art, acting upon the *elegans formarum spectator*, the accomplished amateur and scholar, excites long trains of reflection, embracing numerous analogies in the physical and ideal world, comparisons with former experience, poetic illustrations, historical remembrances, speculations on cause and effect, &c., by which an enthusiastic elevation or ecstasy of the mind is begotten—an exaltation of which the ruder intellect is not susceptible. This pleasure, though reflective, is ultimately referred to the senses, with whose impressions it is so intimately connected, and to the external objects by which they are excited. In this vast and extended field circumstances are all-powerful to determine specific tastes. The Dutch, who, by nature and social position, were cut off from the access of such enthusiasm, had little feeling for ideal beauty. They saw in the arts nothing that was not imitative, and they had no taste for anything in representation but the naked matter of fact. Whatever transcends the ordinary aspect of ordinary nature was lost upon them, and their minds, preoccupied with the positive ideas of commerce, were excited by the metallic lustre of a brass pot, or an effect of light on a glass bottle, well represented, more than by all the splendour of a landscape by Claude, or the beauty of a Madonna of Murillo.

Inasmuch, then, as every man is born with his own peculiar temperament, and is exposed by the accidents of life to his own specific moral and intellectual education, he is liable to be affected in his own peculiar manner by external objects. The same is true, also, respecting nations; inasmuch that each separate community has its own specific taste in literature and the arts, and cannot be brought to acknowledge beauties which do not harmonise with it. But amidst the infinite varieties of idiosyncrasy, temperament and education, there is a general tendency in the human organisation towards a middle term or common character which lies equally distant from all extremes. To this middle term no man perhaps has ever absolutely attained, yet all approach it in some particulars. To it, as Quetelet has well observed, all general reasonings on man, whether physiological, moral, political, statistic or æsthetic, should be referred. It is the universal scope of all abstract reasoning on our nature. It is by the contemplation of the largest number of individuals that the most accurate notion of this middle man is derived, and by abstracting from each all that is personal and exceptional we arrive at what is embraced by the term human nature.

By the study of this middle man the philosophical artist is enabled to arrive at certain general truths or principles of taste which are susceptible of a more or less happy application in his attempts to captivate the applause of society by his labours. To this middle nature alone is any abstract doctrine at all applicable. But the tendency of society and civilisation is to bring all men nearer to such a type, and the cultivation of the intellectual powers consequently produces a closer agreement of opinion as to the sources of pleasurable sensation. What thus takes place among individuals occurs equally among nations. The steps by which society in one country advances in civilisation may differ in many particulars from those of others. The "middle man," or ideal type of humanity, therefore differs in each. The Frenchman differs in his tastes, as in his prejudices, from him of Germany or of England as to almost everything not derived from the common fountains of classical antiquity or of the Christian religion. The Italian, Flemish, French, and English schools of painting stand upon distinct canons of criticism derived from distinct habits respecting pain and pleasure, and they are perfect incommensurably. But from the moment when the printing press and improvements in communication brought the nations of Europe into a closer contact these national peculiarities began to give way, and a continual approach has been making towards a middle nature which will eventually constitute the common type of civilised man. The French under this progress have abandoned their ancient tastes in tragedy. Shakespeare is esteemed in Paris, and Goethe has his admirers in London.

But if the doctrines of taste are calculated upon this middle nature it is obvious that, as in every individual, there is a more or less near approach to that condition, and as there is a large mass of particulars which are common to all, the susceptibilities to pleasure and pain (however they may differ in different persons) must be governed by one common law in every man. There are, accordingly, some principles of taste arising out of these universals which are equally universal, and upon which



every sane man is agreed. The certainty of these principles is absolute. Next in order to these are the points on which all large communities are agreed. The maxims of taste governing any great national school of art are certain with respect to all the individuals rigorously bred in that school, and the individual who presumes to impugn them on the spot will infallibly lose his character there for taste and judgment. After such national peculiarities follow the peculiarities of taste arising from differences of temperament and idiosyncrasy. These respectively are sufficiently common to be acknowledged as part and parcel of humanity; and a man is not sent to Coventry or to Bedlam for confessing that he indulges them. There are other less common deviations of feeling and judgment which are laughed at as eccentricities and oddities, or haply repudiated as affectations, while the lowest degree of toleration only is given to the still less frequent peculiarities which are attributed to vicious or defective organisation.

Good taste therefore stands upon the same foundation as orthodoxy in religion: it exists only by the suffrage of the majority. To each man his own affections are the standards of taste, as his opinions are the standards of orthodoxy, and it is only when he meets with a formidable opposition from a numerous body differently constituted from himself that he can be persuaded to tolerate any deviations from these standards; an isolated individual necessarily knows no others. Experience alone can teach us that other men are differently affected and that their affections are entitled to an equal respect with our own. Thus it is that knowledge of the world cures men of arrogance and intolerance, and enlarges their sympathies. The steps of this progress are distinct. We first sympathise only in the affections which we have ourselves experienced; afterwards we learn to tolerate those the most analogous to our own; and finally, we are patient of feelings which, not sharing ourselves, we yet perceive to be common to many sane and worthy fellow creatures.

In proportion as our idea of human nature is extended by the aspect of man under a greater variety of circumstances, the field of taste is enlarged, and the tolerance of other forms than those which the individual has been accustomed to regard as pleasing insensibly leads to a change in his own sensations.

In proportion, then, as a judgment or sentiment is divergent from the feelings common to society, it is censured as bad in morals, erroneous in opinion or false in taste. We do not insist on our friends liking the same meats as ourselves, because diversity on this point is of every day's experience; so society tolerates the forms of religion with which it is familiar, while it refuses liberty of conscience in favour of opinions which are new and strange. Whatever, on the contrary, is common to the majority, passes for truth, rectitude and good taste. The preference of one art or one school over another is sufficiently common to exempt it from the imputation of bad taste, but if we should meet with an individual delighted with the music of a penny trumpet, in ecstasies over a drawing on a Chinese saucer, or preferring a Nuremberg doll to a statue by Thorncroft, it would be a great stretch of charity not to set him down as utterly mad.

A feeling for the fine arts being, however, the result of a peculiar organisation, common only to a few individuals, and the sensitive faculties being capable of great development by exercise, it has come to pass that the civilised world has taken its judgments very much at second-hand. *Cuilibet in arte sua credendum* is here a maxim of especial applicability. The rules of taste are generally adopted from the professors of art, and, in proportion as the arts are cultivated, a greater certainty is given to such rules, and the more safely may bad taste be inferred from their violation. But rules, after all, are only the means to an end; the great fundamental consideration is the effect produced. If that be consonant to the feelings of the sensitive and the educated, the main end of art is obtained. In all, therefore, that is not merely mechanical, rules are conventional chains, and genius is right in neglecting them. Still, to violate a rule without obtaining a redeeming excellence is bad taste—to obtain new beauties, no matter how, is good taste. In modern music discords are used which would have startled and shocked the ancient theorists; in these cases success alone justifies, and public opinion, consequently, is the sole criterion of right and wrong.

If due consideration be given to what is universal in the nature of man, and what is divergent and particular to individuals, there can be little difficulty in determining the bounds of taste as a science, and of deciding what is and what is not within its domain.

There are objects which confessedly affect all mankind alike—the murmuring of waters, the singing of birds, the freshness of the morning, the still repose of evening, the majestic spectacle of the starry heavens, the refreshing verdure of the earth, produce their common influence upon the well-organised of all natures and ages. With respect to these, and to other such generalities of our nature, general reasonings may be indulged, and a corps of doctrine laid down which, as a theory, may be made to throw valuable light on the subject of art.

But even within this limit the application to specific instances is difficult and fallacious.

The comparison of such archetypal ideas with individual works of art is a pure operation of judgment, and the judgment of the individual is the result of his personal tastes, of the degree of culture his senses have received, of his associations and his prejudices; while rules thus obtained are worth nearly nothing when applied to what is absolutely new in art. The most experienced critics often err, and but seldom agree with each other, if not as to the specific merits of a master or a work, at least as to the relative degree in which these merits are predicable. With respect to the mass of mankind, the little unity of opinion subsisting among them may, after all, arise as much out of deference for established authorities as from a want of common feeling.

It is, however, on the ideal points that this difficulty is chiefly felt. With respect to the mechanical departments, decision is more easy. Errors of drawing or of perspective are matters of demonstration; a false insertion of a muscle can be compared with the human subject; a displaced line can be detected by a diagram; even defects of drawing and aerial perspective may be shown by comparison. It is on these little matters that little critics are great; but when the more transcendent order of ideas and sensations comes in question, there is no criterion but feeling, which in each individual is a definite fact *sui generis*, from which there is no appeal but to the feelings of another observer, and whatever is so circumstanced remains an object of endless and unsatisfactory debate.

## TESSERÆ.

### The Public and Art.

THE artist and the public are ever in the strictest reciprocity; if the arts flourished nowhere as in Greece, no other nation ever interested itself with motives so pure in their establishment and progress, or allowed them so ample a compass. As long as their march was marked with such dignity, whilst their union excited admiration, commanded attachment and led the public, they grew, they rose; but when individually to please, the artist attempted to monopolise the interest due to art, to abstract by novelty and to flatter the multitude, ruin followed. To prosper, art not only must feel itself free, it ought to reign; if it be domineered over, if it follow the dictate of fashion or a patron's whims, then is its dissolution at hand. To attain the height of the ancient was impossible for modern art, circumscribed by narrower limits, forced to form itself rapidly, and on borrowed principles; still it owes its origin and support to nearly similar causes. During the fourteenth, and still more in the course of the fifteenth century, so much activity, so general a predilection for art spread themselves over the greater part of Italy, that we are astonished at the farrago of various imagery produced at those periods. The artist and the art were indeed considered as little more than craftsmen and a craft; but they were indemnified for the want of honours by the dignity of their employment, by commissions to decorate churches, convents and public buildings.

### Inigo Jones on Stonehenge.

Inigo Jones, with a boldness which rivalled the most intrepid antiquarians, declared Stonehenge to be a temple of the Tuscan order, raised by the Romans some time between Agricola and Constantine, and consecrated to the god *Cœlus*—the origin of all things. To support this theory he had learning at command, some skill in illustration, and, more than all, that scientific knowledge which commands respect in such an inquiry. It is wonderful with what plausibility he gradually smooths those rude and colossal masses of scabbled stone into a work of the Tuscan order. First, he alleges that no other people save the Romans were capable in those times of erecting such a work. The magnificence of the conception, the order of which it was composed, the science displayed in its construction, the double portico in the greater circle of stones, a similar portico in the cell or hexagon, the manner and position of the columns and the Roman reliques found in the neighbourhood, all pointed to that people. Secondly, he concludes it to be a temple, from the interval or spacious court round about, the cell and its porticoes, the altar and its position eastward, the aspect of the whole fabric and the skulls of beasts found in the surrounding soil. And thirdly, he contends that the temple was dedicated to the god *Cœlus* because of the situation, the decorum of the structure, the pyramidal figure of the stones and the nature of the sacrifices. The knowledge of architecture which he squanders upon this subject is immense. It was evident that Stonehenge never had a roof—but then the Eleans had one temple and the Thracians another of open columns and without covering—the architraves of Stonehenge were laid without cement—so were several structures of Classic times—the portico of Stonehenge is double—so was the temple of Jove built by Augustus Cæsar, and so was the Pantheon at Athens—



the square and tapering columns of Stonehenge, could be nothing save Tuscan, for any one might see they were neither Ionic nor Corinthian—and then the Italians of old were the sole inventors of the Tuscan order, and consequently the Romans could not well do otherwise than use it in a structure consecrated to the chief god. "Furthermore," says Inigo, "if we cast an eye upon the Roman artifice and manner of workmanship, Stonehenge appears built directly agreeable to those rules which they observed in great works; for the Roman architects in distinguishing the manner of their temples always observed, as Vitruvius in his third book teaches us, the greater the columns were the closer they set them together; so in this antiquity, the stones being great, the spaces between them are likewise narrow. I suppose I have now," he continues, "proved from authentic authors and the rules of art, Stonehenge anciently a temple dedicated to Coelus and built by the Romans, the magnificence of whose stately empire is this day clearly visible in nothing more than in the ruins of their temples, palaces, arches, triumphals, aqueducts, thermæ, theatres, amphitheatres and cirques, and other secular and sacred structures. As I have delivered my own judgment freely, all reason other men should enjoy theirs; but those who sail in the vast ocean of time, steering their course betwixt anciently approved customs and convincing arguments, guided by good authority and sound judgment, arrive much safer and with better repute in the secure haven of undoubted truth than those who listen to traditions and fables and take vulgar belief for certainty." That an architect of such natural genius and good sense as Jones should see in Stonehenge the visible remains of a magnificent Roman temple of the Tuscan order seems almost incredible. But in his day we had had no opportunity to observe, as India has since enabled us to do, the processes whereby comparatively rude nations are able to heap up enormous structures, which modern eyes would at once pronounce to have demanded all the appliances of art; and this may account for the incapacity of such men even as Inigo to recognise on Salisbury Plain the primeval efforts of some populous horde of barbarians—on whom the light of science was beginning to dawn, who were not without natural aspirations after grandeur, and the raw germ of whose rude structures and marauding ballads was predestined to find complete development in the York Minsters and the Marmions of some distant age.

#### Egyptian Sepulchral Tablets.

These tablets, "huta," were used for the same purpose as tombstones and sepulchral monuments at the present day, but distinguished by having been placed inside the tombs and not outside and in the open air. They are different materials, as granite, sandstone, alabaster and limestone, and of different sizes and shapes, square, rectangular, and either pointed or rounded at the top; those of square shape often representing the entrance or cornice. At a later period (about the twenty-second dynasty, or in the ninth and eighth centuries B.C.) wooden tablets made of sycamore were substituted. These tablets are generally rounded above, and surmounted by a wooden figure of the baieth, or soul, and stand on a pedestal of two small flights of steps, into which they are inserted. They have been covered with linen, coated with plaster, on which have been painted in tempera the vignettes, or pictures, and inscriptions. The principal subjects represent the deceased attended by his mother, wife, sister, or brethren standing in adoration to the boat of the Sun, or to the solar deities Ra, Sekar or Socharis Tum, Atum or Tomos, and Osiris, either alone or accompanied by his wife Isis; Nephthys, Anubis, Amset, Hapi, Tuautmutf and Kabhsenuf, and other sepulchral deities. The texts accompanying these scenes are the names and titles of the deities and of the deceased, usually placed in the scene along with them, and a larger inscription in horizontal lines of hieroglyphics, placed under the scene, being a proscynema or act of adoration to the principal deities to confer the usual benefit of food, permission to pass from Hades or off the earth, and for the soul to go to heaven or the empyreal regions. Some inscriptions are adorations or hymns to the sun. The name of the deceased on these tablets is preceded by the title of Osiris, in whose condition he was supposed to pass after death; but about 100 B.C. females began to have the title of Athor, or the goddess of beauty, prefixed to their names. Some of these tablets were surmounted on the rounded top by the figure of a human-headed hawk, emblem of the bai or soul, fixed by a plug into the upper rim of the tablet.

#### The Olympic Games.

There is a difference between the moral basis on which Greek antiquity rests, and our modes of life and thought in modern times. We men of to-day can hardly even conceive how the Greeks, the most intellectual nation the world has seen, could make their highest national festival a gymnastic one, far less can we sympathise with or imagine ourselves taking actual part in this truly Bacchic enthusiasm for the Olympic victor. We have lost all living and immediate sympathetic relation to

the Olympic games, because gymnastics with us no longer occupy that position which they held in so eminent a degree among the Greeks. It is not by any means mere bodily strength and agility which forms the basis of the Olympic games. The coarser, merely mechanical and one-sided species of gymnastics which aims solely at an athletic development of the corporeal frame, and was in later times so greatly in vogue among the Romans, was, in the Greek estimation, contemptible; they looked on it as "banausian," that is, unworthy of a freeman. Gymnastics among the Greeks had a highly ideal basis. They were the source of central interest in the Olympic festival, simply because they were in reality the focus in which all the rays of the moral, artistic and political life of the Greeks converged. The Greeks were so thoroughly artists by nature that they could not think of beauty of soul except as co-existent with beauty of body. Aristocracy of mind was with them at the same time essentially an aristocracy of personal beauty. Even an Aristotle could give utterance to the famous sentiment that it was a faulty arrangement in nature to bestow, as she frequently does, on slaves the beauty of freemen, and that if there existed men surpassing all others in beauty, as much as the statues of the gods surpass mortals, all men would of necessity and of right be subject to them. For the Greeks, the beautiful was the good and the good was the beautiful; their highest moral idea was the good and beautiful man. The practice of gymnastics, therefore, of which the end and aim was the beauty of the body in carriage and movement, was at once the privilege and the duty of the freeman. Gymnastic education was the essentially necessary and natural complement of the "musical," i.e. whatever fell within the region where the muses presided. It educates, not only for physical, but for physical and moral availability. It was worth, at once physical and moral, that the Greeks so highly admired in the Olympic victor. He was for them, par excellence, the good and true man.

#### Tan Chet Qua.

Roubilliac was very greatly esteemed. His kindness and liberality towards the students in his own department endeared him particularly to the rising school of sculptors. Amongst others who derived advantage from his tuition and advice was Tan Chet Qua. This ingenious native of the "celestial empire" was the first who studied the fine arts in England. His talents were multifarious, as he not only practised sculpture and portrait painting in oil and miniature—admitting that light and shadow were not incompatible with painting, which was against the doctrine of Chinese practice—but also studied other arts and sciences. He read a paper of his own writing on the subject of oriental gardening, and it is said afforded useful hints to Sir William Chambers in his celebrated treatise on the same subject.

#### GENERAL.

**The Superintendent of Buildings** of New York reports that in 1896 plans were filed for 3,144 new buildings, of an estimated cost of 73,781,945 dols. Three thousand three hundred and eight buildings were completed during the year.

**The Wallace Collection**, which now belongs to the nation, has been valued, it is said, at 4,000,000/. To contain such a gift the upholding of Hertford House as a museum will not be considered as a waste of public money.

**The Annual Excursion** of the members of the Northern Architectural Association will be made to Bamburgh on July 3.

**Messrs. James & Sweet-Escott**, architects, Cardiff, have been successful in the competition for the best design for the new law courts in Halifax. The second and third prizes were awarded to local architects.

**The Treasurers** of the St. George's Hospital have received from the executors of the late Mr. David Brandon, architect, the sum of 10,000/., being a payment on account of the residue of his estate, one-sixth share of which he had bequeathed to this hospital, in addition to a specific bequest of 3,000/., already received.

**The Sandell Photographic Exhibition** will open on or before July 12; at the Modern Gallery, 175 Bond Street, and will consist of over 400 subjects, the majority never before photographed, including the City Companies' Halls, the Guildhall and Mansion House, Lincoln's Inn, Gray's Inn, Lambeth Palace, Westminster Abbey, Windsor Castle, the Monuments in St. George's Chapel, and the Albert Memorial Chapel, Windsor; the Royal Mausoleums, Frogmore; St. Peter's, Rome; St. Mark's, Venice, &c.

**Messrs. Waller**, architects, of Gloucester, have received instructions to prepare drawings and superintend the erection of the Free Library on the south side of the Science and Art School in that city.



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# THE Architect and Contract Reporter.

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*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## CONTRACTS OPEN.

ALNWICK.—Jan. 16.—For erection of new choir vestry and other works at St. Paul's Church. Messrs. Forster & Paynter, Fenkle Street, Alnwick.

ALVERTHORPE.—Jan. 4.—For extension of shed, for Messrs. Colbeck Bros. Messrs. C. S. Nelson & R. W. Savage, architects, Sun Buildings, 15 Park Row, Leeds.

ANTRIM.—Jan. 4.—For erection of a school at Whitehead. Mr. N. Fitzsimons, architect, 82 Royal Avenue, Belfast.

BAILDON.—Jan. 4.—For erection of two semi-detached houses in Trench Wood. Mr. Charles E. Marsden, architect, 3 John Street, Bradford.

BIRKENHEAD.—Jan. 4.—For alterations to the public baths, Argyle Street South. Mr. Chas. Brownridge, borough engineer, Town Hall, Birkenhead.

BIRKENHEAD.—Jan. 18.—For erection of an additional ward pavilion in connection with the infectious diseases hospital at Flaybrick Hill. Mr. Charles Brownridge, borough engineer, Town Hall, Birkenhead.

BOLTON-ON-DEARNE.—Jan. 6.—For erection of new Board schools and master's house at Goldthorpe Lane Ends. Mr. H. L. Tacon, architect, 11 Westgate, Rotherham.

BRADLEY.—Jan. 13.—For erection of Primitive Methodist chapel and school. Mr. Jas. Hartley, architect, Exchange Buildings, Skipton.

BRISTOL.—Jan. 4.—For the erection of cold stores, Avonmouth, for the docks committee of the Council. The buildings will cover a space measuring about 150 feet by 90 feet, and are to be of brick with timber and tiled roofs. The Secretary of the docks committee, 19 Queen Square, Bristol.

BROADHAMPSTON.—Jan. 16.—For restoration of the roofs, &c., of Broadhampston Church. Mr. Edmund Sedding, architect, 12 Athenæum Street, Plymouth.

BURY.—Jan. 11.—For erection, construction and completion of proposed Baptist chapel and school, Manchester Road. Mr. Thos. Nuttall, architect, 20 Market Street, Bury.

CARDIFF.—Jan. 6.—For erection of a custom-house at Cardiff, for the Commissioners of H.M. Works and Public Buildings. Messrs. Hunt & Steward, 45 Parliament Street, S.W.

CHRISTCHURCH.—Jan. 14.—For alterations and extensions to the engine and boiler-houses at Knapp Mill and building new filter-beds, building a water-tower at Southbourne, delivery of cast-iron pipes at Christchurch, delivery of valves, &c., at Christchurch. Mr. R. St. Geo. Moore, 17 Victoria Street, S.W.

COCKERMOUTH.—Jan. 13.—For erection of new banking premises and manager's house, for the Carlisle and Cumberland Banking Company, Limited. Mr. Geo. Dale Oliver, architect, Carlisle.

COLCHESTER.—Jan. 4.—For enlarging the boiler-house at the workhouse. Mr. G. H. Page, architect and surveyor, Trinity Chambers, Colchester.

CORK.—Jan. 9.—For new fixtures for the premises of Messrs. A. Grant & Co., Patrick Street and Grand Parade. Mr. James F. M'Mullen, architect, 30 South Mall, Cork.

DENGEMARSH.—Jan. 22.—For erection of an officer's house and outbuildings for men at the coastguard station at Dengemars, near Dungeness, Kent. Director of Works Department, Admiralty, 21 Craven Street, Charing Cross, W.C.

DERBY.—Jan. 1.—For erection of premises, East Street. Messrs. Coulthurst & Booty, 4 Albert Street.

DERBY.—Jan. 1.—For the following works for the Midland Railway Co.:—Derby, additions to bonded stores; Leicester, stabling for thirty horses, &c.; Leeds, stabling for twenty-three horses, &c.; Wellingborough, additions to engine-drivers' lodgings. The Secretary of the way and works committee, Midland Railway, Derby.

DERBY.—Jan. 8.—For rebuilding the branch post office and sorting office at Midland Road, Derby, for the Commissioners of H.M. Works and Public Buildings. Messrs. Welch & Atkinson, 10 Lancaster Place, Strand.

DUNOON.—Jan. 5.—For erection of waiting-rooms, pay offices and entrance gateways at Dunoon Pier, for the Dunoon Burgh Pier Commissioners. Mr. W. R. Copland, 145 West Regent Street, Glasgow.

DURHAM.—Jan. 1.—For alterations and additions to the hospital, washhouse, laundry and corridor, and for building a new bakehouse, a small itch hospital, and new blocks of bath-rooms at the workhouse. Mr. H. T. Gradon, architect, Market Place, Durham.

EXETER.—Jan. 9.—For rebuilding St. David's Church, including the tower, close to the Great Western and South-Western stations, Exeter. Mr. W. D. Caroe, architect, 8A Whitehall Place, London, S.W.

EXETER.—Jan. 9.—For demolition of the existing structure of St. David's Church, Exeter. Rev. C. J. V. French, vicar.

GLASGOW.—Jan. 6.—For erection of a drying-house and supplying and erecting of iron curved roof, shafting, gearing, feed elevator, crusher with elevator, &c., at the sewage purification works, Swanston Street. Mr. Thomas Melvin, manager of works.

HALIFAX.—Jan. 6.—For Erection of twelve dwelling-houses near Pellon Station. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

HALIFAX.—Jan. 8.—For erection of additions to Holy Trinity Boys' School, West Parade. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HANDSWORTH.—Jan. 6.—For erection of piers, dwarf walls, &c., at the Victoria Park, Handsworth. Mr. E. Kenworthy, surveyor, Council House, Handsworth.

HINCKLEY.—Jan. 7.—For erection of schools and assembly-room. Mr. George Punshon, architect, Winsleydale House, Barwell, Hinckley, Leicestershire.

IDLE.—Jan. 7.—For erection of ten classrooms and other works at Upper Independent Schools. Messrs. W. & J. B. Bailey, architects, 9 Market Street, Bradford.

ILFRACOMBE.—Jan. 4.—For erection of business premises in Fore Street. Mr. G. C. Smyth-Richards, surveyor, Barnstaple.

IRELAND.—Jan. 5.—For erection of six three-storey and nine one-storey houses for the working classes off Temple Road, Blackrock. Messrs. Millar & Symes, 186 Great Brunswick Street, Dublin.

KENDAL.—For erection of stable, coachhouse, &c., in the rear of shop premises, 22 Highgate. Mr. John Hutton, architect, Kendal.

KNOCK.—Jan. 9.—For erection of a creamery on the lands of Mr. Ml. Behan, at Tarmon, Knock, co. Clare. Mr. W. L. Stokes, Mulgrave Street, Limerick.

LEICESTER.—Jan. 11.—For erection of a branch free library on the Belgrave Road Recreation Ground. Mr. Arthur H. Hind, architect, 3 Greyfriars, Leicester.

LIVERPOOL.—Jan. 12.—For erection of a warehouse at Liverpool, for the Manchester, Sheffield & Lincolnshire Railway Company. Mr. Oliver S. Holt, secretary, London Road Station, Manchester.

LONDON.—Jan. 4.—For construction of underground conveniences, Charing Cross Road, for the Vestry of St. Martin-in-the-Fields. Mr. Charles Mason, Town Hall, Charing Cross Road, W.C.

MARYPORT.—Jan. 8.—For erection of two shops and dwelling-house. Mr. C. Eaglesfield, architect, Maryport.



MERTHYR TYDFIL.—Jan. 1.—For erection at the workhouse infirmary of a corrugated iron building. Mr. Frank T. James, clerk, 134 High Street, Merthyr Tydfil.

MEXBOROUGH.—Jan. 16.—For levelling and draining two school playgrounds, also for erection of wall and alterations, for the School Board. Mr. H. J. C. Reed, clerk, High Street, Mexborough.

MORLEY.—For erection of premises for the London and Yorkshire Bank, Limited. Mr. William Bakewell, architect, 38 Park Square.

NEWARK.—Jan. 8.—For erection of additional buildings to farms situate at North Muskham, erection of fencing on the farms at Muskham and part in Bathley. Mr. Fredk. B. Footitt, clerk and receiver, Newark.

NORTH SHIELDS.—Jan. 22.—For erection of new schools in Coach Lane. Messrs. Marshall & Dick, architects, 4 Northumberland Street, Newcastle-on-Tyne.

NOTTINGHAM.—For re-erection of the Dunkirk Board school. Mr. A. N. Bromley, architect, Prudential Buildings, Queen Street.

SOUTHEND-ON-SEA.—Jan. 7.—For enlarging the men's urinals and conveniences on Royal Hill, for the Corporation. Mr. Harold Harlock, borough surveyor, Clarence Road, Southend.

STOCKPORT.—Jan. 5.—For erection of industrial school buildings at Offerton Lane, Stockport. Mr. T. H. Allen, architect, 39 St. Petersgate, Stockport.

STRATFORD.—Jan. 26.—For erection of a block of school buildings and appurtenances, to be known as the Whalebone Lane schools. Mr. William Jacques, 2 Fen Court, E.C.

SUTTON BRIDGE.—Jan. 2.—For erection of station buildings and awnings at Sutton Bridge, for the Midland and Great Northern Joint Railways. Secretary of the joint committee, Midland Railway Station, Derby.

TANGE.—Jan. 4.—For erection of two bridges over the fords at Tange. Mr. W. Beaumont Smith, county surveyor, 7 Friar Lane, Leicester.

THORNBURY.—Jan. 9.—For erection of a chapel, &c., in the burial ground. Mr. Samuel Fudge, architect, Thornbury, Gloucestershire.

WALES.—Jan. 18.—For erection of an infants' school at Bedlinog. Messrs. James & Morgan, architects, Charles Street Chambers, Cardiff.

WESTON-SUPER-MARE.—Jan. 4.—For erection of market house, dwelling-houses and lock-up shops, for the Urban District Council. Messrs. Price & Wooler, architects, Weston-super-Mare.

WIMBLEDON.—Jan. 14.—For erection of five cottages in Hubert Road. Mr. Wm. Cooper, architect, 21 Havelock Road, Hastings.

WINCHESTER.—Jan. 25.—For additions, alterations and repairs at the prebendal house, 4 The Close, and for the conversion of the same into judges' lodgings, for the Very Rev. the Dean and Chapter. Mr. J. B. Colson, architect, 46 Jewry Street, Winchester.

WINCHFIELD.—Jan. 29.—For erection of additional vagrant wards at the union house. Mr. F. S. Chandler, clerk, Oldham.

## TENDERS.

### BARKING.

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#### New Road.

J. Burrill	£463	15	0
J. Smith	315	0	0
T. C. Thompson	312	10	7
D. T. JACKSON, Barking (accepted)	295	0	0

#### Bridge Street.

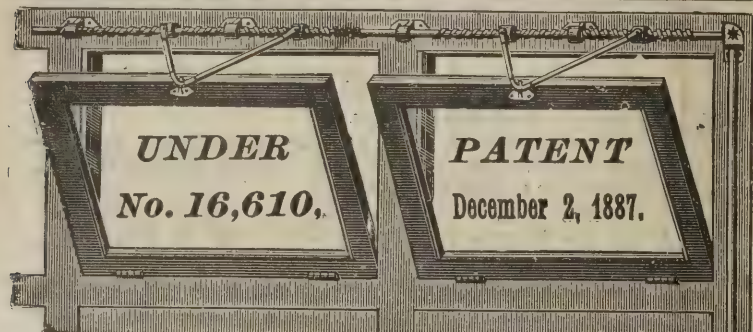
J. Burrill	95	5	0
D. T. JACKSON (accepted)	80	0	0
T. C. Thompson	69	8	4
J. Smith	62	0	0

#### Axe Street.

J. Burrill	257	14	0
T. C. Thompson	227	14	4
J. Smith	175	10	0
D. T. JACKSON (accepted)	155	0	0

For the levelling, kerbing, paving, metalling, channelling, lighting and completing of Bridge Street.

J. Burrill	£192	6	0
T. C. Thompson	99	11	0
J. Smith	97	0	0
D. T. JACKSON, Barking (accepted)	95	0	0



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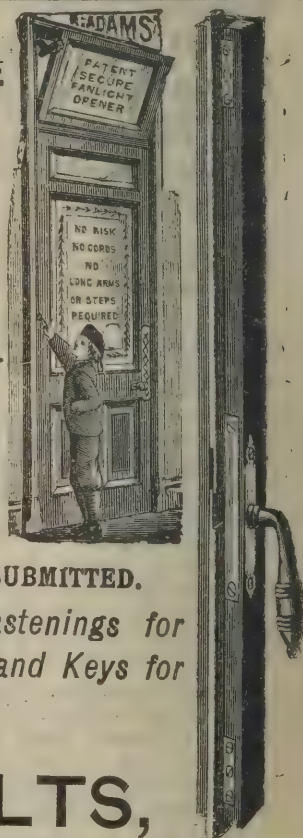
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For widening new road at Abernant Bridge, Nelson. Mr.  
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W. Davis . . . . .196 2 0  
W. Jones . . . . .134 14 4  
H. Bowden . . . . .132 17 2  
T. Davis . . . . .131 17 0  
E. H. Page . . . . .110 17 6  
W. Morgan . . . . .99 4 3  
T. HARRIS, Cardiff (*accepted*) . . . . .71 13 0

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H. Bowden . . . . .174 15 0  
Barnes, Chaplin & Co. . . . .160 5 0  
W. Davis . . . . .160 2 6  
J. Jones . . . . .155 10 8  
E. H. Page . . . . .143 13 9  
T. Harris . . . . .138 13 7  
W. Davis . . . . .133 2 6  
W. MORGAN, Quaker's Yard (*accepted*) . . . . .114 19 5

**CROYDON.**

For erection of detached house, Lark Lane, for Mr. Bruce  
Johnstone. Mr. A. BROAD, architect, 3 High Street,  
Croydon. Quantities by architect.

E. J. Burnand . . . . .£1,722 0 0  
W. Smith & Son . . . . .1,688 0 0  
S. Hart . . . . .1,681 0 0  
S. Page . . . . .1,664 0 0  
D. W. Barker . . . . .1,635 0 0  
G. E. Bryan & Son . . . . .1,610 0 0  
E. P. Bulled & Co. . . . .1,594 0 0  
W. Marriage & Co. . . . .1,528 0 0  
E. J. Saunders . . . . .1,498 0 0  
J. Smith & Sons . . . . .1,468 0 0  
A. BULLOCK (*accepted*) . . . . .1,394 0 0

**DENBIGH.**

For erection of North Wales Counties' Lunatic Asylum, Den-  
bigh. Messrs. C. O. ELLISON & SON, architects, 22 Sir  
Thomas Street, Liverpool. Quantities by the architects.

J. Henshaw & Sons, Liverpool . . . . .£62,319 0 0  
S. Webster, Bootle . . . . .57,890 0 0  
Jones and Sons, Liverpool (exclusive of ad-  
denda) . . . . .57,000 0 0  
J. Parnell & Son, Rugby . . . . .56,859 0 0  
H. Willcock & Co., Wolverhampton . . . . .53,435 0 0  
S. WARBURTON, Manchester (*accepted*) . . . . .50,382 0 0  
Architect's estimate (exclusive of £1,408 ad-  
denda) . . . . .49,800 0 0

**DURHAM.**

For erection of iron hospital for infectious diseases.

W. HARBROW, South Bermondsey (*accepted*) .£631 17 0

**GOLCAR.**

For erection of a residence at Scarhouse, Golcar. Mr. ARTHUR  
SHAW, architect, Golcar.

**Accepted tenders.**

Hirst, Firth & Co., mason . . . . .£350 0 0  
J. Garside, joiner . . . . .140 0 0  
T. Allisons, Limited, plumbing, &c. . . . .65 0 0  
D. Shaw, plasterer, &c. . . . .63 0 0  
T. Allisons, Limited, slater . . . . .40 0 0

**HAMPSTEAD.**

For alterations and additions to Langwathby, Belsize Lane.  
J. WILLIAM STEVENS, architect, 21 New Bridge Street,  
City, E.C.

E. Wheeler . . . . .£1,274 0 0  
W. Hudson . . . . .1,190 0 0  
W. Pearce . . . . .1,121 10 0  
A. J. Brown . . . . .1,105 0 0  
Pease & Kentish . . . . .1,050 0 0  
W. THOMPSON (*accepted*) . . . . .1,017 0 0

**LONDON.**

For erection of iron church, for the Rev. Percy M. Bayne, at  
Manor Park, E.

W. HARBROW, South Bermondsey (*accepted*) .£327 5 0

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For erection of a building to contain additional staff accommodation for the Metropolitan Asylums Board (seventy-seven bedrooms and two sitting-rooms) at the North-Western Hospital. Messrs. PENNINGTON & SON, architects.

J. P. White, Bedford	£11,150	0	0
J. Allen & Sons, Kilburn	10,150	0	0
McCormick & Sons, Essex Road	9,829	0	0
R. A. Yerbury & Sons, Kilburn	9,755	0	0
J. Bentley, Waltham Abbey	9,726	0	0
W. Shurmur, Upper Clapton	9,540	0	0
Kilby & Gayford, Finsbury	9,325	0	0
C. Wall, Chelsea	9,275	0	0
J. Chessum & Sons, Haggerston	9,255	0	0
Kirk & Randall, Woolwich	9,156	0	0
H. WALL & CO., Kentish Town (accepted)	8,900	0	0
Architects' estimate.	9,000	0	0

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## Sleaford Street.

H. Brown	£225	0	0
R. E. Williams & Sons	221	0	0
Holloway Bros.	185	0	0
Iathey Bros.	169	0	0
E. P. Bulled & Co.	165	0	0
G. Foxley	155	0	0
J. & M. PATRICK (accepted)	115	0	0
C. Gurling	105	0	0
E. B. Tucker	104	0	0

## Walnut Tree Walk.

Maxwell Bros., Limited	£255	0	0
Rice & Son	210	0	0
R. Harding & Son	167	0	0
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Star & Son	160	12	0
J. F. Ford	158	0	0
H. J. Williams	149	0	0
B. E. Nightingale	144	0	0
J. & M. PATRICK (accepted)	126	0	0

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Jones & Groves	121	3	0
W. Holding & Son	119	0	0
S. Musgrove	118	5	0
HOLLIDAY & GREENWOOD (accepted)	106	0	0
W. Banks	104	15	6

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For erection of Cambrian Hotel. Messrs. LAMBERT & REES, Architects, Metropolitan Bank Chambers, Neath, and Bridgend.

D. Evans, Sons & Co.	£3,253	0	0
W. T. Morgan	3,088	0	0
D. Rees	2,742	0	0
W. J. Bloxham	2,598	0	0
E. Thomas	2,562	0	0
W. Lissamann	2,549	0	0
Walters & Johns	2,450	0	0
W. Williams	2,380	0	0
Gustavus Bros.	2,347	0	0
T. Watkins & Co.	2,299	0	0
T. Walters	2,264	0	0
Bennett Bros.	2,250	0	0
D. Jenkins	2,238	0	0
G. ABRAHAM, Neath (accepted)	2,208	0	0
T. Davies	1,950	0	0

## PECKHAM.

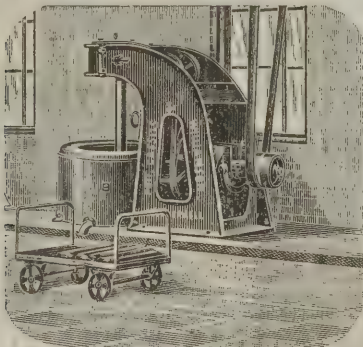
For alterations and additions to 29 Gordon Road, for Dr. Hague. J. WILLIAM STEVENS, architect, 21 New Bridge Street, City, E.C.

G. Parker	£457	0	0
J. Bowyer & Co.	437	0	0
A. White & Co.	435	0	0
A. J. Browne	397	15	0
W. & H. Castle	345	0	0
H. KING (accepted)	330	0	0

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SMITH & SONS (accepted)	£178	10	0
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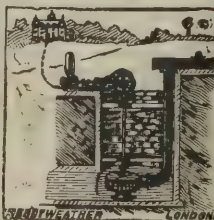
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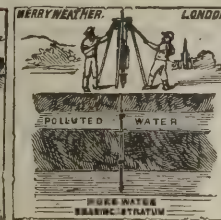
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J. Snelling	£2,843	0	0
D. C. Jones & Co.	2,684	0	0
W. Lissaman, jun.	2,490	0	0
M. Julian	2,345	0	0
J. C. Richards, Pontypridd *	2,130	0	0
A. J. Colborn	2,090	0	0

\* Recommended for acceptance.

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BIGGS, Section A £1,889, A1 £399, B £501, B1 £100 (accepted).  
Lowest tender received.

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For erection of a school to accommodate 350 children, out-offices, master's house, boundaries and yards at Cross Keys. Mr. GEORGE ROSSER, architect, Victoria Chambers, Abercarn. Quantities by Mr. R. L. ROBERTS, Holly House, Newbridge.

Lawson & Co., Newport	£3,761	0	0
C. Lock, Newport	3,650	0	0
T. Westcott, Newport	3,499	0	0
J. Moules & Co., Newport	3,485	0	0
J. Jenkins, Newport	3,403	0	0
C. H. Reed, Newport	3,459	0	0
A. S. Morgan & Co., Newport	3,435	0	0
Davies Bros., Abercarn	3,405	0	0
J. PRITCHARD, Pontymister (accepted)	3,400	0	0
E. Mainwaring, Llanbradach	3,295	0	0
J. Charles, Newport	2,803	0	0

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R. Higson & Sons, West Liverpool Street Girls' School	59	10	0
W. Walton, Pendleton Higher Grade School	21	10	0
F. Steggles & Son, St. George's Infants' School	10	10	0

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S. P. Miller & Son, St. Leonards	401	0	0
Padgham & Co., St. Leonards	395	0	0
H. E. Cruttenden, St. Leonards	385	0	0
A. H. White, St. Leonards	382	0	0
ELDRIDGE & CRUTTENDEN, St. Leonards (accepted)	378	0	0

For alterations and additions to stabling and cottage at Tileworth, Silverhill, St. Leonards, for Mr. W. Knighton, LL.D. Mr. W. COOPER, architect, 21 Havelock Road, Hastings.

A. H. White, St. Leonards	£700	0	0
G. Vigor & Co., Hastings	512	0	0
Sims & Olney, St. Leonards	498	10	0
Padgham & Co., St. Leonards	495	0	0
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H. Ashdown's amended tender for rebuilding accepted at	£515		

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For heating the co-operative stores (three floors), high-pressure system. Messrs. GRIFFITHS & JONES, architects, Pontypridd and Tonymandy.

MUSGRAVE & Co., Belfast (accepted).

**WALSALL.**

For improvements at the Wolverhampton Board schools.

S. WOOTTON, Bloxwich (accepted) £240 0 0

**WATFORD.**

For erection of additional premises for the Acme Tone Engraving Co.

W. HARBROW, South Bermondsey (accepted) £262 10 0

**THE WOOD CARVING CO.,**

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The Bonds of this Company are accepted by the several Government Departments.

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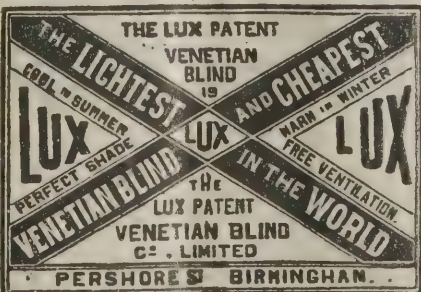
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**CROWN TUBE WORKS,**  
**WEDNESBURY.**

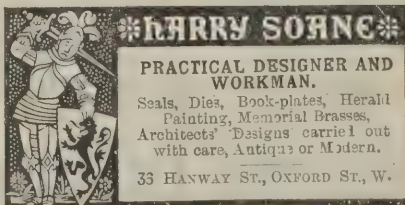
WAREHOUSES:—

London: 108 Southwark St., S.E.

Manchester: 33 King Street West.

Birmingham: 114 Colmore Row.

Leeds: 6 Mark Lane, Briggate.





**TENDERS FOR THE YEAR 1896.**

THE following are a few of the more important works that were estimated for during 1896, and which appeared in our columns last year:—

**BELFAST.**

For erection of extensions of the present goods sheds on the east and west quays respectively of the branch dock at the south end of Spencer Dock, co. Antrim, for the Belfast Harbour Commissioners. Mr. G. F. L. GILES, engineer.

*Shed, West Quay.*

McBain & Co.	£15,792	7	7
Gradwell & Co.	11,500	0	0
Courtney & Co.	11,396	0	0
Fitzpatrick Bros.	11,392	19	9
J. Lysaght & Co., Limited	10,920	0	0
Workman & Co.	10,882	0	0
J. Lester	10,680	0	0
H. & J. MARTIN (accepted)	10,450	0	0
Engineer's estimate	11,000	0	0

*Shed, East Quay.*

McBain & Co.	12,976	0	0
Courtney & Co.	9,856	0	0
Fitzpatrick Bros.	9,844	9	0
Gradwell & Co.	9,520	0	0
Workman & Co.	9,498	0	0
J. Lysaght & Co., Limited	9,130	0	0
H. & J. Martin	9,050	0	0
J. LESTER (accepted)	8,960	0	0
Engineer's estimate	9,900	0	0

**CAMBRIDGE.**

For erection of a Presbyterian Theological College. Mr. HENRY T. HARE, architect. Quantities by Mr. GEORGE FLEETWOOD.

Higgs & Hill	£30,740	0	0
S. F. Halliday	27,458	0	0
G. Grimwood & Son	26,687	0	0
Colls & Sons	26,474	0	0
H. Lovatt	26,052	0	0
J. Parnell & Son	25,706	0	0
W. Sindall	24,553	0	0
W. Bell & Sons	24,426	0	0
W. Saint	23,373	0	0

**BRIGHTON.**

For alterations to the Town Hall

P. Peters & Son, Horsham	£33,500	0	0
J. Martin, Eastbourne	32,300	0	0
Longley & Co., Crawley	31,939	0	0
W. A. Field & Co., Brighton *	30,291	0	0

\* Recommended for acceptance.

**CARDIFF.**

For erection of Lansdowne Road Schools for 1,484 children, with cookery school and caretaker's cottage, and including boundary walls and playground formation, for the Cardiff School Board. Messrs. VEALL & SANT, architects. Quantities by the architects.

	Gross.	Reductions.	Net.
Hirst, Barry	£19,841	£792	£19,049
David Davies	17,918	780	17,138
Edgar Groom, Llandovery	17,960	863	17,097
E. R. Evans & Brothers	17,869	841	17,021
W. Symonds & Co.	18,164	1,226	16,938
W. Lissaman	17,900	1,131	16,769
Newby & Co.	17,552	1,052	16,500
Owen Lewis	17,918	1,565	16,453
Turner & Sons	17,162	802	16,360
A. J. Howell & Co.	16,895	711	16,184
Watkin Williams, Pontypriid	16,931	749	16,182
Shepton & Son	17,462	1,313	16,149
James Allan	17,056	973	16,083
C. C. Dunn	16,767	775	15,992
Lattey & Co.	16,666	1,000	15,666
Cadwallader & Hockridge	16,075	793	15,282
G. RUTTER, Barry (accepted)	15,928	1,055	14,873

All of Cardiff, except otherwise mentioned.

**COOMBE AND MALDEN.**

For main drainage of Coombe and Old Malden and alterations and extensions of sewage-disposal works, at New Malden. Mr. WM. H. HOPE, engineer.

G. Double	£34,272	0	0
J. Morecroft	31,000	0	0
E. Iles	23,238	0	0
S. Kavanagh	22,607	0	0
B. Cooke & Co.	22,494	0	0
W. CUNLIFFE, Kingston-on-Thames (accepted)	22,233	0	0

**EASTON, ANDERSON & GOOLDEN, Ltd.,**

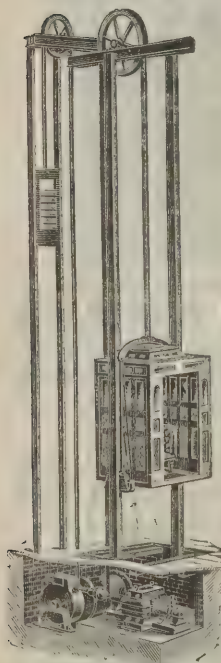
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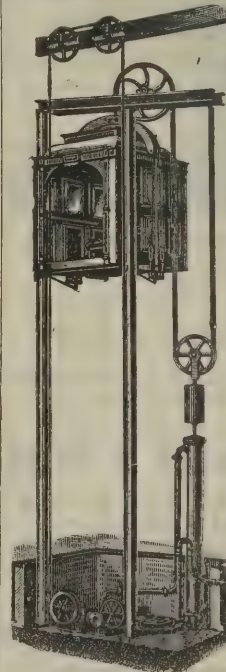
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With Lifting Fire.  
**WORKS, ROTHERHAM. Estab. 1854.**

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GOODS.  
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Glasgow: J. Monkhouse Cartmell, 87 Maxwell St.

CASES for BINDING THE ARCHITECT.  
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**EPSOM.**

For works of water supply for the Epsom Urban District Council. Messrs. GEORGE & FREDERIC W. HODSON, engineers, Loughborough.

Cornes, Martin & Co.	£17,403	0	0
J. F. Price, Nottingham	13,700	0	0
J. Tomlinson, Derby	13,625	0	0
S. Kavanagh, Surbiton	13,196	0	0
H. Weldon, Birmingham	12,426	0	0
W. CUNLIFFE, Kingston-on-Thames (accepted)	12,080	0	0

**FULHAM.**

For erection of three diphtheria blocks, six isolation blocks, two staff blocks, coal and clothes stores, material shed, and additions to kitchen, &c., at the Western Hospital, Seagrave Road, Fulham, for the Metropolitan Asylums Board. Messrs. A. & C. HARSTON, architects, 15 Leadenhall Street, E.C. Quantities by Mr. W. T. FARTHING.

Shillitoe & Son	£57,000	0	0
McCormick & Sons	54,445	0	0
Leslie & Co., Limited	54,419	0	0
Gregory & Co.	51,141	0	0
SLATERS, LIMITED, Kensington (accepted)	48,206	0	0

**HORNSEY.**

For erection of a new school at Campsbourne, Hornsey, for the Hornsey School Board. Mr. HOWARD CHATFIELD CLARKE, architect, 63 Bishopsgate Street Within. Quantities by Messrs. H. H. LEONARD & CLARKE.

Leslie & Co., Limited	£22,970	0	0
J. & M. Patrick	21,500	0	0
Lawrance & Sons	21,240	0	0
McCormick & Sons	20,950	0	0
Brown, Son & Blomfield	20,760	0	0
KIRK & RANDALL (accepted)	20,344	0	0

**KENSAL TOWN.**

For erection of new baths at Kensal Town, W., for the Commissioners for Public Baths and Wash-houses for the parish of Chelsea. Messrs. EDWARD HARNER & FREDERICK PINCHES, architects, 5 John Street, Adelphi.

Pattinson & Sons	£18,926	0	0
Young & Co.	18,850	0	0
Kirk & Randall	18,627	0	0
Scharien	18,547	0	0
Nightingale	18,277	0	0
C. WALL (accepted)	17,425	0	0

**LONDON.**

For supply and erection of girders, &c., for the temporary bridge at Vauxhall.

Teeside Iron & Engine Co.	£16,843	15	6
Thames Ironworks Co., Limited	16,518	3	7
Phoenix Foundry Co.	15,479	10	4
Sir William Arrol	14,897	19	7
A. Handyside & Co., Limited	14,012	7	7
Braithwaite & Kirk	13,917	18	7
Somervail & Co.	13,646	1	10
Cochrane & Co. (supply only)	7,695	18	5
J. Lysaght (supply only)	5,521	8	11

For erection of the new administrative block at the work-house, Northumberland Street, W., for the Guardians of St. Marylebone Parish. Mr. A. SAXON SNELL, architect. Quantities by Messrs. NORTHCROFT, SON & NEIGHBOUR.

H. L. Holloway	£51,000	0	0
Gregory & Co.	50,879	0	0
G. Bird Stanley	50,395	0	0
Stimpson & Co.	50,125	0	0
Yerbury & Sons	49,900	0	0
H. Wall & Co.	49,171	0	0
Chessum & Sons	48,950	0	0
C. WALL (accepted)	48,500	0	0

For completion of the substructure and erection of the superstructure of new buildings for residential flats, for Major John A. Smith Cunningham, Storey's Gate, S.W. Mr. BASIL SLADE, architect, 3 Grosvenor Street, W. Quantities by Messrs. DUNK & BOUSFIELD, surveyors, Billiter Square Buildings, E.C.

Messom	£32,757	0	0
Woodward & Co.	32,430	0	0
Simpson & Son	32,108	0	0
Lawrance & Son	30,992	0	0
Holland & Hannen	30,415	0	0
Munday & Sons	30,293	0	0
Lovatt	30,080	0	0
Perry & Co.	29,455	0	0
Mowlem & Co.	28,852	0	0
Howell Williams	28,248	0	0
Holloway	28,200	0	0
Bywaters & Sons	27,850	0	0

Foundations and substructure are being built by Mr. N. Fortescue, of Mare Street, Hackney.

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**LONDON—continued.**

For additional pavilion at Infirmary, High Street, Homerton,  
for the Guardians of Hackney Union.

W. J. Davenport, Clapton	£34,900	0	0
B. E. Nightingale, Albert Embankment	34,735	0	0
A. E. Symes, Stratford	34,640	0	0
W. Shurmur, Upper Clapton	32,877	0	0
J. Chessum & Sons, Haggerston	32,099	0	0
W. Holt & Sons, Croydon	31,229	10	0
Kirk & Randall, Woolwich	30,461	0	0
H. Wall & Co., Kentish Town	29,956	0	0
F. Thoday & Co., Limited, Cambridge	29,852	0	0
S. R. LAMBLE, Kentish Town (accepted)	28,731	0	0

For erection of a post-office for the West Central District.

A. J. Thompson	£36,350	0	0
M. M. Reason	35,540	0	0
H. Leney	35,525	0	0
J. Shillitoe	34,500	0	0
G. E. Wallis & Sons	33,989	0	0
G. Munday & Sons	32,976	0	0
Treasure & Son	32,900	0	0
T. L. Green	32,567	0	0
H. M. Patrick	31,988	0	0
McCormick & Sons	31,600	0	0
Kirk & Randall	31,584	0	0
Scharien & Co.	30,493	0	0
C. Wall	29,955	0	0
B. E. NIGHTINGALE (accepted)	29,185	0	0

*If Craigleith stone is used for steps, &c., instead of  
York stone.*

A. J. Thompson	36,610	0	0
M. M. Reason	35,940	0	0
H. Leney	35,650	0	0
G. E. Wallis & Sons	34,545	0	0
J. Shillitoe	34,500	0	0
Treasure & Son	33,887	0	0
G. Munday & Sons	33,437	0	0
T. L. Green	33,002	0	0
H. M. Patrick	32,674	0	0
McCormick & Sons	32,500	0	0
Kirk & Randall	32,125	0	0
Scharien & Co.	30,698	0	0
C. Wall	30,566	0	0
B. E. Nightingale	29,985	0	0

**LONDON—continued.**

For erection of a block of four warehouses on the site of  
Nos. 102 to 122 Tabernacle Street, E.C., for Mr. W. R.  
Sutton. Mr. JOHN GROOM, architect. Quantities pre-  
pared by Mr. HENRY THEOBALD, 48 Finsbury Pavement.

B. E. Nightingale	£20,670	0	0
Holloway Bros.	20,500	0	0
Mowlem & Burt	20,297	0	0
Bywaters	20,000	0	0
Lawrance & Son	19,904	0	0
Downs	19,904	0	0
Patman & Co.	19,826	0	0
H. L. Holloway	19,774	0	0
Greenwood & Sons	19,489	0	0
Simpson & Co.	19,400	0	0
Mattock Bros.	18,991	0	0
GROVER & SON (accepted)	18,948	0	0

**LONDON SCHOOL BOARD.**

For building new school—boys, 160; girls, 160; infants, 160;  
total, 480, including a schoolkeeper's house on arches, with  
playground for boys on roof, St. George's Row, West-  
minster.

J. Longley & Co.	£20,958	0	0
Hart Bros.	20,905	0	0
Holloway Bros.	20,741	0	0
Lathey Bros.	17,718	0	0
Killby & Gayford	17,536	0	0
J. Grover & Son	17,373	0	0
T. Boyce	17,046	0	0
Atherton & Dolman	16,818	0	0
Treasure & Son	16,783	0	0
J. Marsland	16,749	0	0
D. Charteris	16,660	0	0
J. & M. Patrick	16,464	0	0
W. King & Son	15,066	0	0
R. A. Yerbury & Sons *	14,365	0	0

For erection of a Board school, Cormont Road, Camberwell  
Park.

R. A. Yerbury & Sons	£24,817	0	0
Lathey Bros.	21,482	0	0
B. E. Nightingale	21,150	0	0
J. Grover & Son	21,040	0	0
W. Pattinson & Sons	20,700	0	0
D. Charteris	20,657	0	0

**MCNEILL'S FELTS** (Roofing, Inodorous, Sarking, Dry Hair, Damp Course, &c.).

**MCNEILL'S SLAG WOOL** (Silicate Cotton), for Fireproofing and  
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## LONDON SCHOOL BOARD—continued.

T. L. Green	£20,208	o	o
J. Longley & Co.	19,965	o	o
C. Cox	19,542	o	o
E. Lawrance & Sons	19,363	o	o
Hart Bros.	19,122	o	o
Treasure & Son	18,909	o	o
W. Downs	18,841	o	o
G. E. Wallis & Sons	18,834	o	o
Holliday & Greenwood	18,601	o	o

For enlargement of Board school, Hargreave Park, Upper Holloway.

T. L. Green	£18,520	o	o
R. A. Yerbury & Sons	18,042	o	o
C. Miskin	17,269	o	o
Killby & Gayford	17,180	o	o
G. E. Wallis & Sons	16,880	o	o
W. M. Dabbs	16,658	o	o
J. & M. Patrick	16,544	o	o
Dove Bros.	16,520	o	o
W. Shurmur	16,470	o	o
E. Lawrance & Sons	16,382	o	o
L. H. & R. Roberts	16,334	o	o
C. Cox	16,263	o	o
J. Grover & Son	16,237	o	o
Treasure & Son	16,121	o	o
J. Shillitoe & Son	15,945	o	o

For erection of Board school, Conway Road, Plumstead.

Lathey Bros.	£24,973	o	o
B. E. Nightingale	24,809	o	o
Hart Bros.	24,536	o	o
W. Pattinson & Sons	24,010	o	o
L. H. & R. Roberts	23,500	o	o
W. M. Dabbs	23,292	o	o
J. & M. Patrick	23,137	o	o
J. Longley & Co.	23,098	o	o
Kirk & Randall	22,643	o	o
E. Lawrance & Sons	22,542	o	o
J. Shillitoe & Son	22,352	o	o
G. E. Wallis & Sons	21,967	o	o
Holliday & Greenwood	21,577	o	o

## LONDON SCHOOL BOARD—continued.

For Institution for deaf children at Anerley.

J. F. Collinson	£46,001	o	o
Atherton & Dolman	45,894	o	o
D. Charteris	44,929	o	o
J. Grover & Son	43,865	o	o
B. E. Nightingale	43,684	o	o
L. H. & R. Roberts	43,557	o	o
J. & M. Patrick	42,998	o	o
J. Shillitoe & Son	42,916	o	o
E. Lawrance & Sons	42,636	o	o
Lathey Brothers	42,602	o	o
W. Downs	41,658	o	o
W. Pattinson & Sons	41,550	o	o
G. E. Wallis & Sons	40,967	o	o
H. Lovatt	40,943	o	o
S. Hart	40,874	o	o
Stimpson & Co.	40,737	o	o
Treasure & Son	39,883	o	o
Kirk & Randall	38,920	o	o

## NEW BRIGHTON.

For tower and buildings at New Brighton. Messrs. MAXWELL & TUKE, architects, Manchester.

## Concrete.

Hindley & Co., Manchester	£11,557	9	0
Stuart's Granolithic Co., London	9,642	12	0
H. LOCKWOOD, Manchester (accepted)	8,516	2	5
B. Moreton, Manchester	7,836	0	0

## Steel and ironwork in tower and buildings.

Pearson & Knowles, Warrington	40,000	o	o
Heenan & Froude, Manchester	39,000	o	o
Patent Shaft, Wednesbury	38,920	o	o
HANDYSIDE & CO., Limited, Derby (accepted)	38,809	o	o
Maudsley, Sons & Field, Limited, London	37,703	15	0

## Main buildings surrounding the tower.

Holme & Green, Liverpool	53,750	o	o
Haigh & Co., Liverpool	48,500	o	o
W. Tomkinson & Sons, Liverpool	47,000	o	o
J. Henshaw & Sons, Liverpool	46,635	o	o
S. & J. Whitehead, Oldham	45,750	o	o
T. & W. Meadows, Stockport	45,298	11	8
J. Gourley, Liverpool	45,055	o	o
W. Brown & Sons, Salford	39,060	o	o
W. A. PETERS & SONS, Rochdale (accepted)	38,681	o	o

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Blue Cape Asbestos Covering, the Lightest, most Durable, and most Effective Removable Covering extant, to prevent Freezing of Pipes, Cisterns, &c., &c., in Private Houses and Public Buildings.

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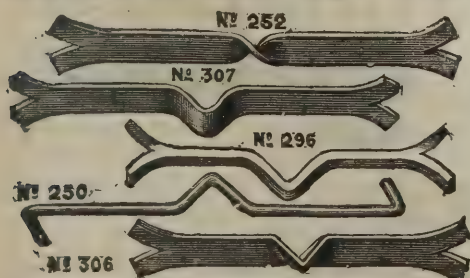
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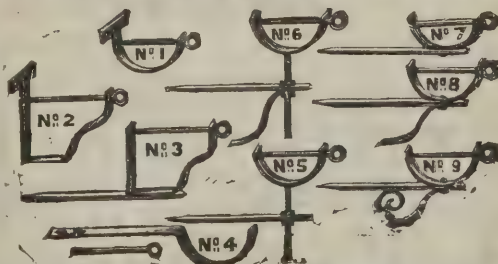
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## NEW BRIGHTON—continued.

## Terra-cotta.

Leeds Fireclay Co., Leeds	£5,934	4	0
Ruabon Brick & Terra-cotta Co., Ruabon	5,274	0	0
Ruabon Coal & Coke Co.	4,732	5	6
J. C. Edwards, Ruabon	4,542	0	0
A. Whitehead, Leeds	4,258	0	0
Monk & Newell, Ruabon	4,215	0	0
Ruabon Brick & Terra-cotta Co., Ruabon	4,180	0	0
DOULTON & Co., London (accepted)	4,100	0	0
Accrington Brick & Tile Co.	3,802	0	0
J. Thompson, Northwich	3,095	0	0

## NEWPORT.

For construction of a 12-inch cast-iron suction main about 2,658 yards long, together with all branches, mains, valves and appendages, the sinking of wells and the driving of adits, in connection with the Newport Waterworks, Carisbrooke, for the Corporation of Newport, Isle of Wight. Mr. BALDWIN LATHAM, engineer, 13 Victoria Street, Westminster.

T. Tilley & Sons, Walbrook	£20,182	12	1
J. H. Vickers, Limited, Nottingham	15,000	0	0
W. Hill & Co., Gosport	13,404	0	0
B. Cooke & Co., Battersea	11,185	0	0
H. HILL, Maidenhead (accepted)	7,799	0	0

## NOTTINGHAM.

For erection of a higher grade Board school on the Clifton Estate Site, Meadows. Mr. R. C. CLARKE, architect, Prudential Buildings, Queen Street, Nottingham.

J. F. Price	£20,832	0	0
T. Cuthbert	19,516	15	0
Gilbert & Gabbitass	19,350	0	0
J. Hutchinson	18,940	0	0
Appleby & Lambert	18,795	0	0
F. Messom	18,773	0	0
J. H. Vickers, Limited	18,388	14	9
H. Vickers	18,353	0	0
J. Oscroft	18,326	0	0
Hodson & Son	18,300	0	0
W. Maule	18,230	0	0
G. A. Pillatt	18,197	0	0
T. Barlow	18,096	0	0
Dennett & Ingle	17,860	0	0
E. HIND (accepted)	17,146	0	0

## POOLE.

For supplying and laying cast-iron pipe-sewers, together with manholes, lampholes, flushing syphons, ventilators, &c., being Section No. 2, Contract No. 4, of the Borough Sewerage Scheme, for the Urban Sanitary Authority. Mr. JOHN ELFORD, borough engineer, and Mr. JAMES LEMON, consulting engineer.

Pedrette & Co.	£66,900	0	0
T. Adams	49,000	0	0
G. Osenton	45,050	0	0
T. C. Rigler	35,269	0	0
B. Cooke & Co.	33,658	0	0
F. REEKS, Lymington (accepted)	33,200	0	0
H. Saunders & Co.	33,178	0	0

## PURLEY.

For erection of new wing containing hall, classrooms and cloisters to the Warehousemen, Clerks and Drapers' Schools, Russell Hill, Purley, Surrey. Mr. J. KINGWELL COLE, Architect, 17 Hart Street, Bloomsbury, W.C.

Harris & Wardrop	£13,432	0	0
T. Osborne & Son	12,810	0	0
Killby & Gayford	12,340	0	0
E. Lawrance & Son	12,189	0	0
F. & H. F. Higgs	12,100	0	0
Holloway Brothers	12,000	0	0
W. King & Son	11,925	0	0
H. L. Holloway	11,830	0	0
Thos. Gregory & Co.	11,300	0	0
Samuel J. Scott	11,037	0	0
James Smith & Son	10,896	0	0
W. Johnson & Co.	10,470	0	0

## SCARBOROUGH.

For projected marine drive and sea-wall round the Castle Hill, for the Corporation.

J. Dixon	£120,200	0	0
Parker & Sharpe	102,976	0	0
J. Moffatt	88,730	0	0
Howe & Co.	88,500	0	0
A. Kellett	82,489	0	0
G. Lawson	81,000	0	0
J. Young	80,000	0	0
Winnard & Weston	77,300	0	0
E. Tempest	77,130	0	0
Cooke & Co., Battersea	69,270	0	0

\* Recommended for acceptance.

**TOTAL ASSETS, £9,708,495.**

HEAD OFFICE, LIVERPOOL,  
1 Dale Street,

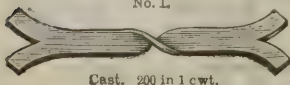


HEAD OFFICE, LONDON,  
7 Cornhill.

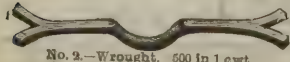
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## A. THORNDIKE,

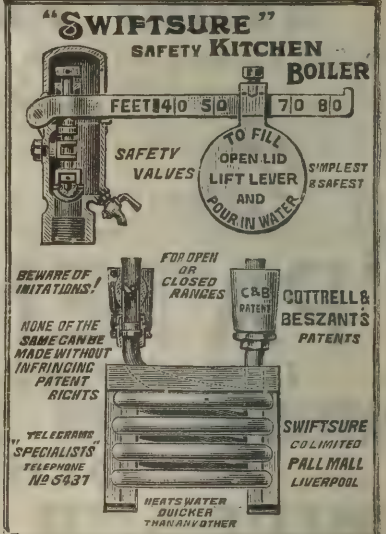
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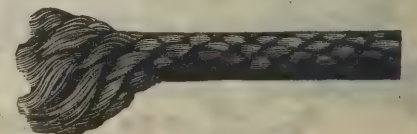
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and twisted lines in com-  
mon use, at practically  
the same price. . . .

Samples and full particulars of—  
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London, E.C.



## WILLESDEN.

For extension of the Brent District sewerage system. Mr. O. CLAUDE ROBSON, engineer.

Nowell & Robson	£24,846	0	0
R. Ballard, Limited	24,748	0	0
Neave & Son	23,873	0	0
J. Dickson	22,940	0	0
T. Adams	22,705	0	0
G. Bell	21,501	0	0
COOKE & CO., Battersea (accepted)	19,863	0	0

## WICK.

For improvement of harbour. Mr. JAMES BARRON, engineer.

Pedrette & Co.	£29,371	12	6
J. Watson	28,242	12	9
G. Lawson	20,809	10	8
J. Adam & Co.	18,631	17	0
G. Rhind	16,479	16	3
W. Oliver	15,585	10	6
T. Munro	14,251	7	10
W. TILBURN, Glasgow (accepted)	14,188	6	9

## WHISTON.

For erection of infirmary buildings at Whiston Workhouse, for the Guardians of Prescott Union. Mr. JAMES GANDY, architect, Masonic Buildings, Hall Street, St. Helens. Quantities by architect.

I. Dilworth, Liverpool	£23,000	0	0
Sayce & Randle, Widnes	22,885	10	0
Morrison & Son, Liverpool	22,500	0	0
Waizbom & Son, St. Helens	22,498	0	0
Kelley Bros., Walton	21,802	14	0
J. Fisher & Co., Sutton	21,800	0	0
Preston & Hurst, Wigan	21,689	0	0
W. Molyneux, St. Helens	21,590	0	0
J. Roberts, St. Helens	21,378	0	0
Patterson & Sons, Liverpool	20,999	0	0
R. Ellison, St. Helens	20,928	10	0
S. Warburton, Miles Platting	20,910	0	0
E. Gabbutt, Liverpool	20,875	0	0
J. Ellison, St. Helens	20,500	0	0
J. Lucas, Prescott	20,545	0	0
P. Tickle, St. Helens	20,493	10	0
Rothwell & Sons, St. Helens	19,954	0	0
F. BROWN, St. Helens (accepted)	19,745	0	0

## VARIETIES.

MR. J. T. PASSMORE, the well-known estate agent of West Kensington, has taken into partnership Mr. H. J. Cookes, who for eight years has been with Messrs. Debenham, Tewson, Farmer & Bridgewater. The style of the firm will be "Passmore & Cookes," and they will carry on their business as auctioneers, estate agents and valuers at Avon Lodge, West Kensington, W. (two doors from the railway station).

AT St. Mary's, High Crompton, a stained-glass west window has been unveiled. The window represents eight scenes in the life of St. John the Evangelist. The cost is 332*l.* 14*s.*

AN important feature of the improvements now being carried on in St. George's Church, Edinburgh, is the filling with stained-glass of the large window of three divisions looking to the west. By somewhat enlarging the height of the central opening sufficient space has been obtained for the representation of the subject of the Ascension. The composition divides itself into two important groups. The upper one, elliptical in its main lines, consists of our Lord, in the act of blessing, surrounded by a group of angels, whose wings of varied colour, mostly blue, become a background emphasising the principal figure. A band of cherubs and cloud forms of varied rubies separate the upper from the lower group, which latter consists of Apostles and the Virgin Mary, some kneeling, others standing, but all with upturned faces concentrated on the ascending figure. The deep full colour-scheme of the lower group, especially those of two kneeling figures in the foreground—the one of a rich blue passing into purple, and the other of a golden yellow passing into the deepest ruby—have been much admired. The side spaces are filled with classic ornament upon a coloured ground, the emblem of the burning bush and a shield bearing the cross of St. George forming central features. The whites used are all of an especial thick character, with the object of breaking up and diffusing the direct rays of the sun, and yet allowing of sufficient light tints being introduced, which the nature of the subjects requires. The window was executed under the direction of the architect, Mr. Leadbetter.

MR. T. BATTERBURY, F.R.I.B.A., F.S.I., hitherto practising at 29 John Street, Bedford Row, has removed his offices to Imperial Chambers, 47 Chancery Lane.

A NEW theatre is to be erected in Aberdeen on a site which has been recently acquired for the purpose on Rosemount Viaduct.

# HAM HILL STONE. DOULTING STONE.

THE HAM HILL AND DOULTING STONE CO.

(Incorporating The Ham Hill Stone Co. and C. Trask & Sons, The Doulting Stone Co.)

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Leading Architects.

**WOOD BLOCK FLOORING**

ANY SIZE BLOCK.

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Beautifully Smooth Surface for Dancng, &c.

SANITARY—NOISELESS—ROTPROOF—FIRE RESISTING—DURABLE  
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PLAIN OR ORNAMENTAL WORK OF EVERY DESCRIPTION.

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ESTIMATES FREE FOR WORK FIXED COMPLETE IN ANY PART OF GREAT BRITAIN.

For CHEAPNESS in Price and PROMPTNESS in the execution of our Work, WE FEAR NO COMPETITION.

YOUR INQUIRIES WILL BE ESTEEMED BY

L. LICHTWITZ & CO., The Metropolitan Zinc Works, Carlton Bridge, Westbourne Park, London.



It has been decided to build a seaside home for delicate children in connection with Mr. Spurgeon's orphanage. About 10,000*l.* will be required to purchase the land and complete the home.

A NEW Moravian church has been formally opened at Bristol, which has been erected on the site of the old chapel in Maudlin Street, at a cost of 2,000*l.*

THE name of papyrolith is given to a novelty in flooring material which has lately been invented by Otto Kraner, of Chemnitz, the article being a special preparation of paper pulp, which is in the form of a dry powder; when mixed with water it may be spread like mortar over stone, cement or wood, where it dries quickly and may be smoothly planed, besides which it may be tinted almost any colour, in this way adapting it for parquetry with variegated borders, or for panels and mosaics. Among the various advantages claimed by the inventor for the use of this product are freedom from crevices, deadening of noises and poor conduction of heat, also considerable elasticity, safety from fire and remarkable durability. It may be employed, too, for wainscoting and other architectural purposes, as well as for flooring.

ON the occasion of the fiftieth anniversary of its foundation, the Russian Archaeological Society has received the congratulations of a special deputation of the Royal Historical Society of London. Congratulations were also received from many other learned associations.

IT has been found necessary to put Great Paul under repair. It appears that the metal of the bearings by which the big bell is suspended from the supporting beam above expanded alarmingly during the very hot weather, and the chilly weather that followed caused these bearings to subside an inch or two into the socket.

THE work of extension at the Prince's Landing Stage, Liverpool, was practically completed last week by the connection of the stage with the high-level jetty by an iron bridge 150 feet in length.

THE Dibble memorial window, erected by cyclists in Ripley Church, was unveiled at a special service.

EARL RUSSELL'S attractive little residence, Amberley Cottage, close to Boulter's Lock, Maidenhead, was last week almost totally destroyed by fire. The bedrooms and downstairs apartments were gutted and the furniture totally destroyed. The Earl's valuable collection of books was fortunately saved,

and the electric-light installation adjoining the house was not damaged in any way. A new wing had only recently been added to the building and it was thought that the flames originated here.

OWING to heavy rains a new sewer in course of construction near Sefton Park, Liverpool, to cost 20,000*l.*, having burst, the further rainfall caused lands and houses adjoining the park to be inundated. Aigburth Road neighbourhood was covered with debris and sludge from the culvert; walls have been knocked down and barricades swept away. In some parts there has been considerable subsidence, the foundations of a few villas being rendered insecure.

A NEW district fever hospital, which has been erected near Camelon by the eastern district committee of the Stirling County Council, was formally opened on the 22nd ult. The hospital, which is situated on the Edinburgh and Glasgow Road, a little to the west of Camelon, is built on a site covering three acres. It consists of four blocks of buildings, viz. administrative block, scarlet fever block, enteric fever block and laundry block. The hospital has been fitted up with all latest and most approved appliances and conveniences, and in connection with it there is a patent disinfector, and an ambulance waggon has been specially constructed for the conveyance of patients. The architects were Messrs. A. & W. Black, Falkirk, and the total cost of the hospital, including furnishing, is estimated at about 7,500*l.*

ABOUT one o'clock on Christmas morning the inhabitants of Bank Buildings, Bank Street, Clydebank, and vicinity were greatly startled by a loud noise, as of cannonading. The people rushed to their doors to discover the cause, when it was ascertained that a three-storey red sandstone building, now in course of erection at the corner of South Bank Street and Dumbarton Road, had collapsed, leaving only a part of the wall next the latter road intact. The primary cause of the disaster it is difficult to ascertain—whether it was in the nature of the soil or the details of the construction. The building, however, is said to have shown signs of instability recently, and the workmen took the precaution to leave the job and attempt to shore up the premises.

AN incredible story has got abroad to the effect that the Capitol of Washington State is built upon a reef which contains deposits of gold, and may have to be removed.

THE "District and Parish Councillors' Diary and Guardians' Manual" for 1897, published by Hazell, Watson & Viney,

# KETTON FREESTONE.

THIS STONE HAS NO EQUAL FOR BUILDING AND MONUMENTAL PURPOSES, AND BLOCKS OF ANY SIZE CAN NOW BE SUPPLIED. SAMPLES AND FURTHER PARTICULARS WILL BE SUPPLIED ON APPLICATION TO

## T. C. MOLESWORTH & CO., KETTON, RUTLAND.

Extract from a Paper on Masonry read before the Architectural Association at 9 Conduit Street, Regent Street, London, on March 6, 1896, by Mr. HERVEY FLINT, Teacher of Masonry to the Worshipful Company of Carpenters and the Battersea Polytechnic.

"Ketton Stone is one of the best weather stones we have, but it is one that is rather neglected by the Architect. The oolite formation of this stone is very perceptible. We have examples of it at St. Dunstan's Church, Fleet Street, St. Pancras Station, and I was much impressed recently on a visit to the Jews' Cemetery at Willesden by a large balustrade full of good detail, round Baron Rothschild's enclosure; it has been standing some twenty-five years and is in a perfect condition, the carving and arrises are as sharp as when executed, and I would strongly commend this stone, as it combines the essentials of durability with a nice warm cream colour."



HEATH AND REACH PIT SAND

## LEIGHTON BUZZARD CEMENT AND BUILDING SAND.

ALL PURE GRIT. NO SCREENING OR WASHING REQUIRED.  
ALL LABOUR SAVED. FIT FOR IMMEDIATE USE.  
A VERY SUPERIOR QUALITY.

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### JOSEPH ARNOLD,

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Special Sand for Water and Sewage Filtration.

Established nearly 40 years.

Telegrams, "SANDBAGS, LONDON."

Prices on Application.



Limited, contains much information about local government, and the memoranda printed in the diary should be enough to prevent any neglect of public duties.

THE Rugby Cement Company, Rugby, are sending out a very handsome calendar. It is substantially mounted, well varnished, and is made ornamental by means of several well-executed chromo-litho views of quarries, factories, &c. The Limmer Asphalte Company, of 2 Moorgate Street, have one on similar lines, but in this case the views are in black and white.

THE Belgian Minister of Public Works has decided to increase the accommodation at Antwerp Docks by extending the quays 3,000 feet to the south, at a cost of four million francs. A channel 200 feet wide and 24 feet deep is to be constructed. The present works are only part of a scheme for a still greater extension of the port, surveys having been made further down the Scheldt.

Two beautiful monuments have been placed in Middle Claydon Church to the memory of the late Sir Harry Verney and his second wife. The first is a bronze portrait in bas-relief, showing, almost in profile, the striking features that were endeared to many in the county. The second is a cross of black Derbyshire marble of antique form, inlaid with natural passion-flowers, mounted on a bracket bearing an engraved brass.

THE large mansion-house of Crossburn, near Troon, the property of the Duke of Portland, was on Wednesday last entirely destroyed by fire. It is supposed that the men, who had been making preparations for a new tenant, had left a fire burning during the night, and that something had become ignited.

MR. W. H. COLLIER has been appointed manager of both the Ship Canal and Bridgewater Departments of the Manchester Ship Canal Company. Mr. John C. Willson will continue to occupy the position of assistant manager. The following appointments have also been made:—Mr. John Oldfield to be superintendent, Bridgewater Department; Mr. Herbert M. Gibson, to be chief traffic agent, Ship Canal Department. Mr. Marshall Stevens has relinquished his appointment as manager, having entered into an engagement to develop the Trafford Park Estate, which adjoins the Ship Canal from the Manchester Docks to Barton.

THE church of the Immaculate Conception, Stonehaven, was reopened on the 27th ult., after having undergone extensive internal improvements. The alterations include four

beautifully stained-glass windows, embellishment of the sanctuary, &c.

THE roof of one of the annexes of the convalescent ward of East Pilton Hospital, Ferry Road, Leith, was destroyed by fire on Sunday last. By the arrival of the Leith Fire Brigade, the flames were prevented from spreading to the ward, the inmates of which were for some time in a state of considerable alarm. The fire is supposed to have originated in the overheating of a flue.

SIR HORATIO LLOYD having suggested, at a meeting in Chester a fortnight ago, the erection of a statue of the Duke of Westminster, as a mark of the esteem in which he is held and the gratitude felt for many noble works in the county and city of Chester, the proposal was taken up by the public with much enthusiasm and earnestness. The Duke, however, while feeling deeply the friendly spirit which has been so widely evinced, has communicated to Sir H. Lloyd his reasons for desiring that the movement should not go forward; and the promoters have, in deference to His Grace's strongly expressed wish, resolved, though most reluctantly, to deny themselves the proposed gratification.

### TRADE NOTES.

THE Isolation Hospital, Crewe, is being warmed and ventilated throughout by means of Shorland's patent Manchester stoves, with ornamental tiled sides and with descending smoke flues, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.

WE have been requested to announce that Messrs. Milner & Co., Limited, the well-known safe manufacturers, have had to remove their offices in Manchester, owing to want of room. They have now large and commodious show-rooms at 15 Victoria Street, where all communications should be addressed.

A *propos* of the rumoured dearth of bricks in the London market, Messrs. Eastwood & Co., Belvedere Road, write us that "In consequence of the great demand for bricks, the large orders already booked by them, and the shortness of make through the excessively wet weather in September and October, they are compelled to withdraw all quotations. They can only quote from day to day, and can only accept orders subject to their having the bricks and being able to deliver. Orders will be loaded in rotation as received, and they cannot accept any liability for delay in loading or delivering."

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TELEGRAMS,  
"OOLITE, LONDON."  
"OOLITE, BATH."

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INCORPORATING PICTOR & SONS, RANDALL, SAUNDERS & CO. Ltd., I. SUMSION, CORSHAM BATH STONE CO., Ltd.

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MONK'S PARK.  
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*Fluate,*  
FOR HARDENING,  
WATERPROOFING & PRESERVING  
BUILDING MATERIALS.  
To be  
obtained only of  
The Bath Stone Firms, Ltd.

QUARRIES.  
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Summer Dried Seasoned Stone for Winter Use.

PARQUET FLOORINGS

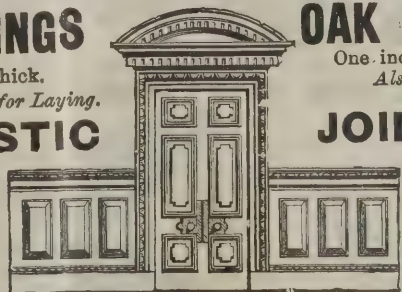
One inch and  $\frac{1}{2}$ -inch thick.

Immense Stock always ready for Laying.

ARTISTIC



Turpin's Patent  $\frac{5}{16}$  inch thick.  
Laid in Patent Composition on Concrete,  
Stone, and Deal Floors. (See section.)



MARBLE MOSAIC  
PAVEMENTS

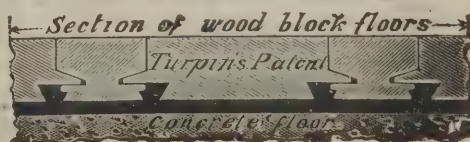
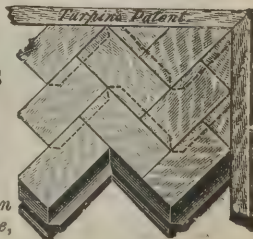
Executed in all  
Styles.

OAK BLOCK FLOORINGS

One inch thick, from  $\frac{4}{10}$  per yard super.  
Also in Pitch Pine, Teak, Deal, &c.

JOINERY.

TURPIN'S  
PATENT  
INTER-  
LOCKING  
SYSTEM  
for Laying  
Block Floor on  
Concrete, Stone,  
and Deal Floors.



ESTABLISHED 28 YEARS.

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QUEEN'S RD.,  
Bayswater,  
London.  
**TURPIN'S**  
Parquet Floor,  
Joinery and  
Wood Carving  
Co., Ltd.



MESSRS. NOYES & CO., 76 Old Street, London, E.C., have purchased the business of Messrs. Chambers & Co., the well-known makers of wall-ties, and are in a position to supply customers of the late firm with accuracy and despatch. They are just issuing a comprehensive illustrated catalogue of builders' ironmongery, which includes, amongst many other sections, cast-iron rainwater pipes, &c., register stoves, mantel registers, tiled register stoves, marble chimneypieces, ranges, kitcheners, bath and lavatory fittings, water-waste preventers, &c. We shall in an early number refer more fully to the specialties issuing from this firm.

We have been favoured with a copy of the third edition of "Notes of the Water Supply of the South of England, with Remarks on the Geological Formations Connected Therewith," by Edward Margrett, hydraulic and sanitary engineer, Reading, which contains valuable information respecting this all-important subject, particularly as regards obtaining supplies by means of artesian wells, and which will well repay perusal by members of the profession.

MESSRS. S. J. WARING & SONS, LIMITED, have taken over the old-established business of Messrs. Marler & Bennett, 175 and 176 Sloane Street, and are selling off the old stock at greatly reduced prices, previous to extensive alterations to the premises. Any of our readers who are on the look-out for bargains should take advantage of this opportunity.

MR. SAMUEL HUNTLEY ROWLEY, who was for some twenty-three years sole managing partner in the firm of James Woodward & Rowley, is now trading on his own account solely. All the old workmen, foremen and office staff remain with him, and the goods supplied by him will be of the same high quality as heretofore. His new works are situated close to Swadlincote station.

### BUILDING AND BUILDERS.

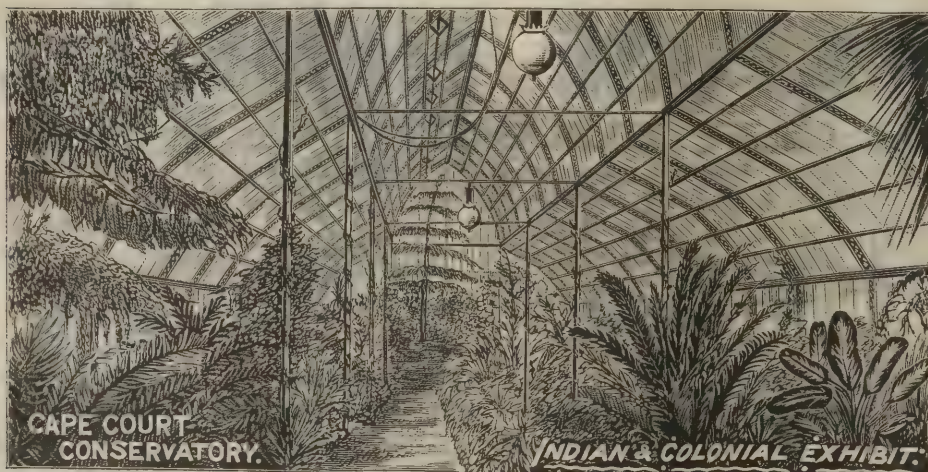
THE will of the late Sir Francis Lycett having placed a large sum of money at the disposal of the Wesleyan Metropolitan Chapel Building Fund committee, which by the decease of Lady Lycett is now available for extension purposes, the committee is prepared to give special stimulus and assistance in all new schemes that may be undertaken. For some time past a number of eligible sites have been held, in all about twenty, and others are being secured. At their recent meeting this

great connexional committee adopted the following resolution:—"That in consideration of the recent large addition to the Metropolitan Chapel Building Fund by the payment of Sir Francis Lycett's legacy, and that an impulse to chapel building, both on sites already held and unoccupied, and also on other sites that may be procured amidst neglected swarming populations, is urgently and immediately desirable, this committee is prepared to increase its usual grants by an additional sum of 500*l.* for each chapel to seat 1,000 persons, and by a proportionately smaller sum for each smaller metropolitan chapel, provided these chapels be commenced within the next two years." It is understood that some 80,000*l.* have already been received from the Lycett bequest.

### DIARIES FOR 1897.

If other reminders were not forthcoming, the appearance of diaries would be enough to suggest the coming of the new year. Among those received it is not easy to make a selection. In style there is none to surpass the "Architects, Surveyors and Auctioneers' Diary and Almanac," published by Waterlow Bros. & Leyton, Limited. The information appended would form a small volume. Messrs. Hudson & Kearns as usual have prepared several varieties of diaries which are adapted to professional practice whether large or small. They all uphold the reputation of the firm as publishers. Messrs. Finch & Co., Limited, of Lambeth, have also issued a diary, in which a good deal of memoranda relating to sanitation is introduced. Messrs. Spon have allowed extracts to be taken from their "Price Book and Surveyors' Handbook." Messrs. Crosby Lockwood & Son's "Price Book," if not a diary, is an annual which is in everyday use. This year the editor announces that he has recognised the advance in wages in calculating prices. As trade is very brisk and "the markets for many kinds of materials are rising, and there is every prospect of a busy time during the present year," it is to be hoped profits will be proportionately large. The flood is rising which leads to fortune, and they will be unwise who neglect the opportunity it offers.

MR. THOS. ELSLEY, late of Great Portland Street, notifies us that he has removed to his new premises at 28 Great Titchfield Street, W.



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### THE PLUMBERS' COMPANY.

ON Tuesday last, in accordance with a resolution passed by the Court, the freedom and livery of the Plumbers' Company were conferred, at the quarterly Court, held at the Guildhall, on ex-Bailie Crawford, late chairman of the health committee of Glasgow. The resolution, which was read by the clerk (Mr. W. R. E. Coles), set out that the honour was conferred on Mr. Crawford "in recognition of his timely aid and eminent encouragement of the movement for the national registration of plumbers by personal efforts and official influence, securing the alliance of the representatives of the health and educational authorities and plumbers of the locality with the district council for Glasgow and the west of Scotland, and the active co-operation of that body and others in promoting the higher technical training of plumbers, and the certification of qualified men, in the interests of the public health." Mr. Philip Wilkinson, master of the company, presided, and spoke of the useful work which Mr. Crawford had done as chairman of the health committee of Glasgow. Mr. C. Hudson, Alderman Sir Stuart Knill, and Mr. W. H. Bishop also bore testimony to Mr. Crawford's valuable services in the cause of sanitation. The customary oath having been administered by the clerk, Mr. Crawford was formally admitted by the Master as a freeman and liveryman of the Plumbers' Company. In thanking the Court for the honour conferred on him, Mr. Crawford referred to the progress made in sanitary matters during the past few years as being largely due to the work of the Plumbers' Company. Their efforts to impart technical instruction to plumbers had necessarily been of advantage to the community as a whole. He believed every householder was now beginning to realise that it was his business to ascertain that the plumber he employed was a fully-qualified man. The freedom of the Company was afterwards conferred on Mr. Collins (sanitary inspector to the Camberwell Vestry) and Mr. W. Moss (of Manchester), they having become entitled to it through having passed the examinations in practical workmanship and knowledge of plumbing prescribed by the company.

### ELECTRIC NOTES.

ELECTRIC lifts are now coming largely into use, and owing to their economy in working are fast superseding the hydraulic type. The new infirmary of the Halifax Union is to have six passenger lifts and two service lifts all actuated by electricity.

The whole of the work, including all motors and gear, will be made and fitted up by Messrs. Easton, Anderson & Goolden, Limited, of Erith, who are also supplying amongst other electric lifts three for passengers and one for goods at the new mansions now in course of erection at Bedford Court, W.C., and one for passengers at the Manchester Technical Schools.

AN exhaustive report, prepared at the instigation of the Douglas Town Council by Mr. Thos. H. Nesbitt, town clerk, has been issued on the electric lighting of Douglas, Isle of Man. A large quantity of information received from the town clerks of Liverpool, Manchester and other important centres has been collected and analysed, with the result that the report recommends the adoption of the electric system of lighting on grounds of cleanliness, by reason of the absence of deleterious fumes, and on grounds of purity, steadiness and safety, as compared with other methods of lighting. As a health and pleasure resort, Douglas would be incalculably benefited by the adoption of the electric light, and the beauty which already characterised Douglas Bay would be enhanced. With perhaps the exception of the Bay of Naples, the report says, no place lends itself so admirably to effective lighting as Douglas Bay. Continuing, the report is in favour of the municipalisation of all public undertakings, including electricity, workmen's dwellings, public baths and waterworks. Nearly all the more recent electric installations were being carried out by municipal authorities by means of public funds. In Douglas, however, the report states, exceptional circumstances prevail, and the Isle of Man Tramway and Electric Power Company, who are known to be favourable, should be entrusted with the work of supplying Douglas with electric light on satisfactory terms being agreed upon. This course would be the wiser, bearing in mind that the present indebtedness of Douglas is 290,000*l.*, which the estimated expenditure on necessary works would bring to 450,000*l.*

Mr. J. ST. LOE STRACHEY having offered to decorate the walls of the refreshment-room at the mansion in Brockwell Park with pictures to be painted by his brother, Mr. H. Strachey, the work has now been carried out. The pictures represent scenes of country life connected with haymaking, and are executed in oil-colours on canvas. The portions of the walls not covered by the panels have been coloured to harmonise with the paintings.

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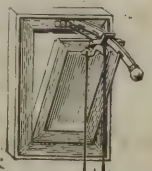
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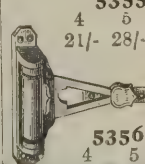
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## AMERICAN BUILDING.

A REPORT has been prepared by a committee of experts on the new City College, Baltimore. Already several dangerous defects are seen in the buildings, including settlement and shrinkage of the walls, which show large cracks; insecure foundation; the crushing of work under the iron girders; inferior mortar; arches too flat, weak and treacherous; wrought-iron bars instead of cast-iron lintels, which are not sufficient to stand the weight likely to be imposed upon them; terra-cotta work done by incompetent persons in a careless manner; ironwork not up to the standard required by the building law; bad carpenters' work, the window frames being out of plumb; old trusses and salmon, or soft bricks, in large numbers. Besides there is evidence of general incompetence in the supervision, which permitted the contractor to ignore the specifications and practically do as he pleased. The report does not attempt to fix the responsibility for so discreditable a state of affairs on individuals.

## BUILDING IN MANCHESTER.

THE extraordinary activity of all branches of the building trade in Manchester during the past twelve months cannot be paralleled, says the *Manchester Guardian*, by any more recent reference than one to the years 1876 and 1877, when many of the suburbs round the city may be said to have had their birth. In the city several very large structures have been completed and others begun, while a considerable quantity of rebuilding of warehouses, offices and shops has been in progress. In offices of all descriptions the hydraulic lift, now readily worked by the public high-pressure supply, bids fair to become universal, and an immense amount of alteration to make room for it has been carried on. Iron and glass continue to supplant heavier materials, especially in the building of shops. The attempts to give elegance as well as individuality to the designs of shop fronts have become very numerous; but it may be noted that local contractors have lagged behind the times in this special department, Birmingham and London firms being generally employed to do work of this kind of the best class. In the suburbs, the designs even of the cheapest classes of cottage property show in many cases considerable improvement upon the styles that have been too long in vogue.

Thousands of new houses have sprung up, built to let at rents usually ranging from 5s. 6d. to 7s. 6d. per week and the rule has been for them to be taken considerably before completion by bodies of tenants newly immigrated to the town. There has been practically no desertion of older property of this class, which remains fully tenanted. As may be imagined, labour has been abundant all the year, at hardening rates. Bricklayers have been better paid, and plasterers, whose numbers are, by the rules of their society, strictly limited, have often been in very urgent request. The demand for such favourite materials as Ruabon bricks has not slackened, in spite of the production of large quantities of imitations by makers of various shale bricks in Accrington and Burnley. There is every appearance of continued prosperity throughout the building industries in Manchester. The demand for house accommodation shows no sign of abatement, and in the city some enormous contracts are about to be given out.

## TALL BUILDINGS IN CANADA.

THE completion of a ten-storey building in Toronto and the proposal to erect a fourteen-storey structure on the site of the present St. Lawrence Hall Hotel, in Montreal, would, as the *Canadian Architect* points out, be evidence that the craze for tall buildings which has marked Chicago and New York for several years past, is exerting its influence upon the architecture of our Canadian cities. It may not be out of place at this juncture to point out that in the American cities we have named popular favour is being withdrawn from these abnormal specimens of nineteenth-century architecture, and legislation has been introduced for the purpose of restricting the height to which buildings may be erected in the future. Another potent influence tending to discourage this style of architecture is that the number of such structures already built so far exceeds the demand that the owners are said to have been compelled to reduce rentals by 50 per cent., while some of the high structures in Chicago which were designed for office purposes are being used as storehouses, in which capacity it will of course be impossible to obtain a fair return on the owners' investment. The unsatisfactory experience of our American neighbours in this direction, coupled with the lower land values in Canadian cities, would seem to render inadvisable the erection of structures exceeding, say, six or eight storeys in height.

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SKETCHES AT HOME AND ABROAD.

## NEW CATALOGUES.

THE new editions of Messrs. Moreland & Son's catalogues generally exemplify some of their latest constructive works. Among those shown in the new issue is the steel construction of a mansion for Mr. B. I. Barnato, in Park Lane, in which columns and beams have to be of exceptional strength. The principals of the Northampton Institute, Clerkenwell, have spans of 65 feet and are 19 feet 6 inches apart. The roof of a saw mill in Northampton has a clear span of 61 feet. In another at Tottenham the spans are 47 feet, with two of 25 feet each. The trusses for the new Shakespeare Theatre, Lavender Hill, are 56 feet span. A stanchion in Barclay, Bevan & Co.'s bank carries 250 tons. It is provided with a metal base which stands on the concrete, and thus stone bases are unnecessary. The stability is increased by the arrangement. In all cases Messrs. Moreland refer to actual examples. As usual, there are several elaborate tables of safe loads for girders, columns and stanchions, and it is guaranteed that the sections will carry the loads specified. The catalogue is, therefore, a trustworthy guide to those who require efficient construction in steel, and a record of what has been done by the firm in difficult and remarkable cases.

## SURPLUS LANDS OF MANCHESTER SHIP CANAL.

THE Bill which has been deposited by the Manchester Ship Canal Company contains three clauses relating to the surplus lands of the company. It is provided that with the previous consent in writing of the Corporation of Manchester the company

may, in addition to any moneys which they may have been authorised to borrow in pursuance of their Acts, from time to time borrow any money on the security of all or any of their surplus lands, and for the purpose of securing borrowed money and interest thereon may mortgage or charge such surplus lands to any person or company advancing such moneys. It is also provided that the company may grant leases of any lands belonging to them for any terms not exceeding ninety-nine years to any persons, corporations or companies who shall covenant to improve such lands by laying out money in the construction of docks, basins, lay-byes, shipyards, wharves, landing-places, warehouses, sheds, or other buildings calculated to promote or facilitate the business of the company, and they may grant to such lessees the use of any wharfage, quayage, or other space requisite for their trade. As regards the application of moneys it is proposed that all moneys received by the company in respect of any mortgage or charge made in pursuance of the Act and not required for any other purpose of the company shall, at the request of the Corporation of Manchester, be applied in the first instance to the redemption of the new debentures in the hands of the Corporation, and, subject to any such request, in paying off the moneys borrowed by the company on mortgage or redeeming any debentures or debenture stock now or hereafter to be issued by the company in order of their priority.

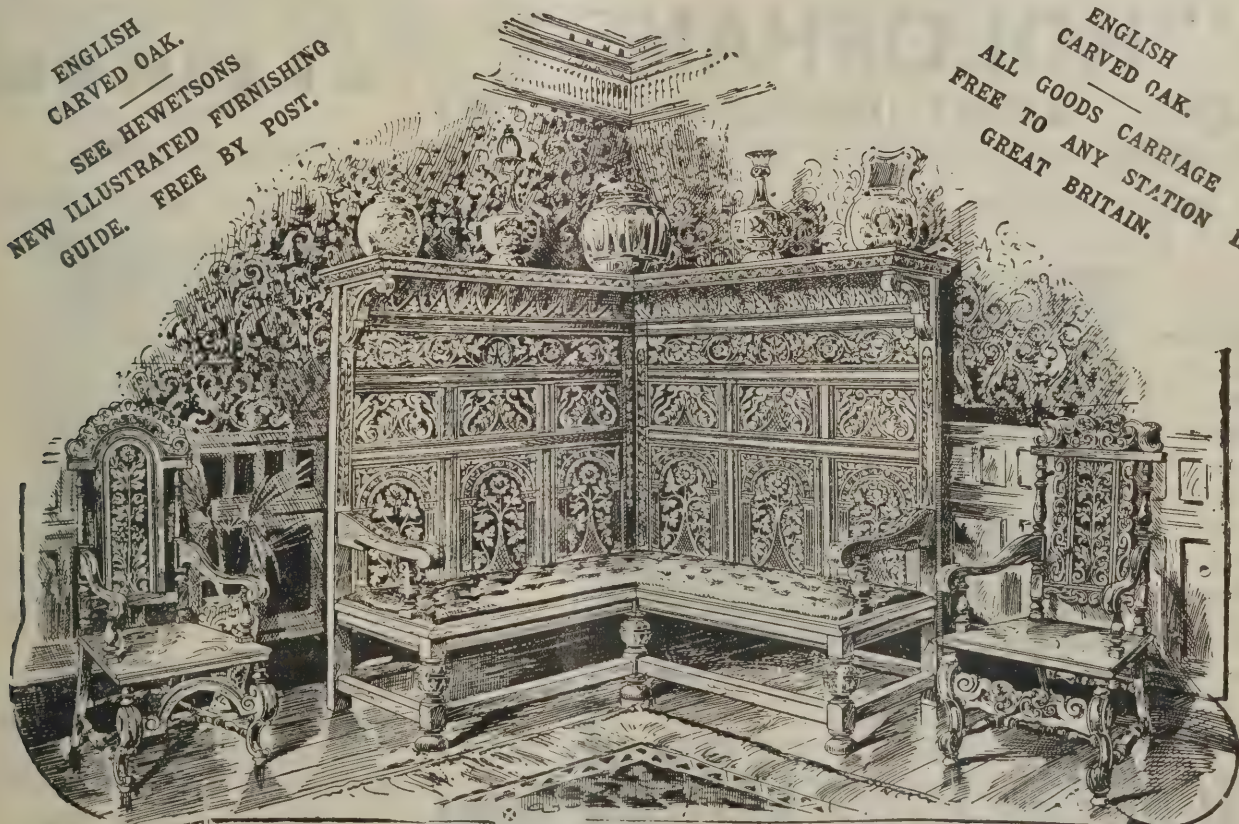
## SAND BRICKS.

A COMPANY has been incorporated in San Francisco, that proposes to expend 50,000 dols. in the purchase of a site and the erection of buildings for the manufacture of bricks from sand. The stone brick which it is proposed to make will be manufactured from powdered stone or the elements contained in stone, such as sand, clay, &c. These substances are mixed with a prepared "flux," which acts as a bond, holding together the particles of sand or other material used as a filler, the whole being thoroughly annealed by heating.

Among the advantages claimed for the bricks is the saving of time, only ten hours being needed for their manufacture instead of eight to thirty days, a much less consumption of fuel, scarcely any loss from burning, a crushing strength from 10,000 to 40,000 lbs. to the square inch instead of from 400 to 4,000 lbs., and a reduction of cost to three-fifths of that of the old style bricks.

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## THE ROYAL INFIRMARY, MANCHESTER.

THE chairman of the special committee of the Manchester City Council appointed to represent the interests of the citizens in regard to the proposed rebuilding of the Royal Infirmary, Sir John Harwood, has been waited upon by various gentlemen, who urge that the city should become the possessor of the whole of the Infirmary site in Piccadilly. The suggestion was made to Sir John Harwood that if the Infirmary Board and Trustees were now as much inclined to part with the site as they were in 1875—when it was offered to the Government for post-office purposes—wealthy citizens would come forward and subscribe a large portion of the purchase-money. The Corporation would be asked simply to complete the payment. Sir John Harwood was good enough to state to a representative of the *Manchester Guardian* the point of view from which he regarded this proposal. The Corporation, he said, had never as a corporation had this project under consideration. Certainly it had never been put before them in such a form as to elicit an expression of opinion. "I am convinced," he said, "from my long experience that, if the assistance of the Corporation were sought to maintain the present open space on Piccadilly, the matter would be considered and dealt with in a reasonable way. There is no disposition whatever to deal with the infirmary board, or, indeed, with any other responsible authority in the city, in other than a conciliatory and reasonable manner. The Corporation only desire to be considered as co-workers with others for the general good of the community."

The trustees of the Manchester Royal Infirmary have voted on the question of a rebuilding and extension on the site in Piccadilly, in accordance with the plan submitted by the grand committee. A small majority of the trustees who polled have declared in favour of the proposal. The resolution which Sir Frank Forbes Adam submitted to the special meeting of trustees held in the Memorial Hall on the 14th instant was as follows:—"That this meeting of trustees hereby sanctions the rebuilding of the Manchester Royal Infirmary on its present site, in accordance with the plan submitted by the grand committee, and authorises the board of management of the Manchester Royal Infirmary to take steps to carry out the work with such modifications in detail as may from time to time appear to them to be desirable." Mr. B. Armitage (Chomlea) seconded the resolution. An amendment in the following terms was moved by the Lord Mayor of Manchester (Mr. Alderman J. F. Roberts) and seconded

by Sir John Harwood:—"The trustees, upon consideration of the report of the grand committee, are of opinion that it is not desirable at the present time to extend the ground area of the existing infirmary buildings." Upon a show of hands the Chairman stated that the voting was so even that he was unable to declare whether there was a majority for or against the amendment, whereupon a poll of all the trustees was demanded by six trustees who were present at the meeting. On the voting paper issued the terms of the motion and amendment were set forth, and each trustee was asked to declare in favour of one or the other. The number of voting papers issued was 1,349, and of these 853 were returned. The counting took place yesterday morning, Sir Frank Forbes Adam and Mr. E. S. Heywood being scrutineers representing those in favour of the motion, and Sir John Harwood and the town clerk (Mr. W. H. Talbot) acting in the same capacity for those in favour of the amendment. The scrutineers rejected one vote as bad. It will be noticed that 496 trustees did not vote. The result of the poll was declared as follows:—

For the motion	449
For the amendment	403

This result will be submitted to a special meeting of trustees to be held in the middle of January.

## THE ORIGIN OF THE PLUMBER.

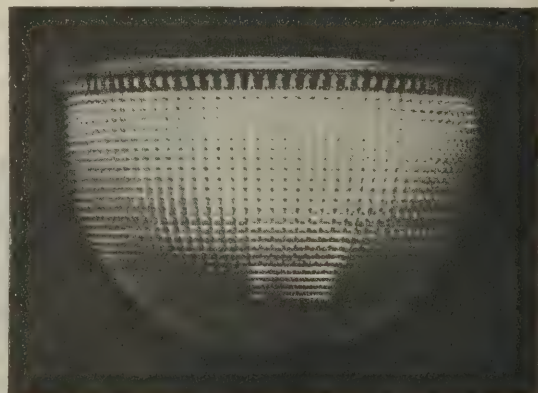
IN a paper on "The Evolution of Sanitation in Relation to the Plumber," read to the members of the Edinburgh and District Branch of the National Registration of Plumbers, Professor Glaister, of St. Mungo's College, Glasgow, discussed the origin of the plumber. An interesting study, he said, was afforded by the origin of new occupations in the advance of mankind from the primitive to the civilised, and not the least interesting aspect of the study was that presented by plumbing. Very early in the history of the world references were found to those who worked in metals—Tubal Cain was the first recorded example—and it would appear as if the ancients were particularly well acquainted with lead and its properties. The division of crafts in metals would be conjectured to begin with this metal because of its plasticity and obvious utility, and the lead-worker became literally a plumber—the Latin *plumbum* signifying lead—although as a matter of fact he was also an

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artificer in brass, iron and zinc. Probably the earliest occupation was that of the builder, but as architecture became more ambitious in its designs, and the arts of the carpenter and mason were found insufficient to make fabrics watertight, the plumber found his occupation first in laying leaden roofs, afterwards in fitting pipes in some of the principal buildings which sprang up in the palmy days of Rome, and further in connection with those giant aqueducts which, as at Lyons and Rome, attest the engineering and sanitary achievements of the ancient Romans. With these as a starting-point, Professor Glaister traced in an interesting manner the career of the plumber through the ages to the modern era of sanitation and scientific plumbing.

### THE LATE SIR JOHN BROWN.

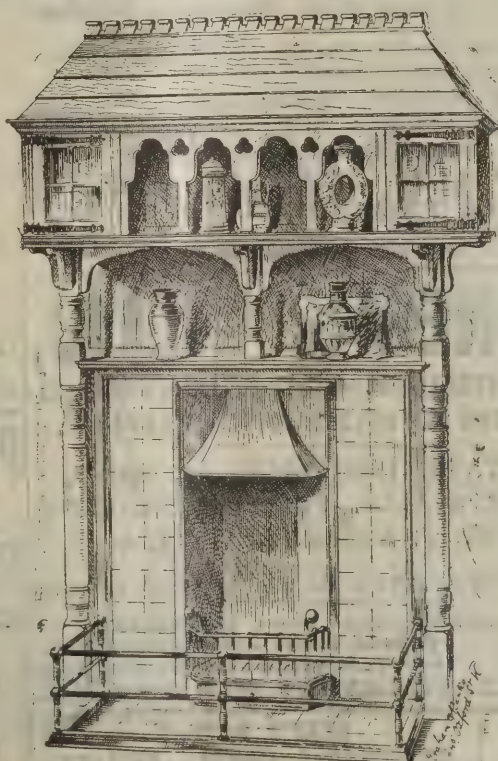
SIR JOHN BROWN, the great ironmaster and the pioneer of armour-plate manufacture for the defence of ships of war, died on Sunday at Bromley, Kent, aged eighty. His health had been failing for some years. Sir John, says the *Times*, was a native of Sheffield, and received his education at a local private school. He was first apprenticed to the factoring business, and afterwards engaged in the manufacture of files and table cutlery. The apprentice stepped so speedily to the front that on reaching his majority he was invited to become a partner, which offer he was unable to accept through lack of capital. His employer offered him his factoring business and volunteered money to carry it on. John Brown's father and uncle guaranteed 500*l.* to a local bank, and this modest credit was his start in life. In 1848 he invented the conical steel buffer spring. At the time no external buffer was used on railway lines, and for waggons there was no buffer at all. His were the first, and he was soon producing them at the rate of 150 sets a week. The first pair of conical buffers ever made went to Wales, the second to Scotland and the third to Ireland, the London and North-Western Railway leading the way in England. At this time he was engaged in various manufactures carried on in different parts of the town. In 1864 he concentrated the whole in Savile Street, where he acquired an establishment, afterwards extended and rechristened the Atlas Works, which covered 25 acres. It then occurred to the owner that the demand for iron would justify its production for steel-making purposes. He erected ten converting furnaces on the south side of the Midland Railway for supplying the wants of the town as well as of the

Atlas Works. The result of his enterprise was to make Sheffield practically almost independent of Sweden or any other country from which masses of iron for manufacturing purposes used to be drawn. This was also the beginning of the use of iron of Yorkshire quality for boilers and bridge plates, such as those used on Charing Cross bridge, which were partly supplied from the Atlas Works.

The greatest of Sir John's discoveries was in 1860. Returning from a trip on the Continent he came by way of Toulon, where the French ship *La Gloire* put into harbour. This was a timber-built 90-gun three-decker cut down into an "exaggerated corvette," with forty big guns, and hammered plate armour  $4\frac{1}{2}$  inches thick, 5 feet long and 2 feet wide. The British Admiralty were so uneasy at the action of the French Government in putting the *La Gloire* into commission that ten 90 and 100-gun timber-built ships were stopped in their progress in order to be cut down and plated like the French vessel. Sir John was not allowed on board, but after thoroughly examining the craft from the shore he came to the conclusion that the hammered-armour plates used in clothing her could be rolled. By this time he had become Mayor of Sheffield, and the fame of his works had induced Lord Palmerston, then the Premier, to visit the town as his guest. The Premier saw rolled a plate 3 feet 9 inches wide, 18 feet 6 inches long,  $5\frac{1}{2}$  inches thick and upwards of six tons weight. In the *Times* of August 11, 1862, the process was described in terms of wonderment as a great feat. In April of 1863 the Lords of the Admiralty, headed by the Duke of Somerset, visited Sheffield and witnessed the opening of a new rolling mill which the owner of the Atlas Works had put down. They saw several plates rolled from  $4\frac{1}{2}$  inches to  $5\frac{1}{2}$  inches thick and 40 feet long. At the close a plate 12 inches thick and 15 feet to 20 feet in length was rolled, and thus was practically demonstrated the great discovery which changed our ships from hearts of oak to masses of iron. The Duke of Somerset, after witnessing the operations of the new rolling mill, predicted that it would be one of the most wonderful pieces of machinery that had ever been made in this country. Armour-plates were perfected by their inventor with great enterprise. He was the first to roll plates of large dimensions, and he kept the lead to the last. In the great struggle of plates *versus* projectiles, he kept plates well to the front, and latterly they were rolled 24 inches thick. Now iron armour has been superseded by compound, *i.e.* steel-faced plates, and a new conflict has begun between English steel-faced and French all-steel armour, and these in their turn are being subjected to steel projectiles

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chrome and other. The Royal Commission on Armour-plates rewarded Sir John by ordering nearly all the plates they required from his works, and in a few years he had sheathed fully three-fourths of the entire British Navy. His productions successfully encountered the shells of English and foreign makers.

Sir John's works increased until they gave employment to 4,000 artisans in the manufacture of armour-plates, ordnance forgings, railway bars, steel springs, buffers, tires, axles, &c. He was the first successfully to develop the Bessemer process and to introduce the manufacture of steel rails which are now, owing to modern competition and high railway rates, one of Sheffield's lost industries. In the first year of his business his turnover was 3,000/. During the year previous to its being converted into a limited company it was 3,000,000/. Foreign Governments, hearing of his great armour-plates, applied to him, but he refused to supply any other Power until he had obtained the consent of the home Government. While civil war raged in America he declined on this account large orders from the Northern States. The Russian Admiralty were equally anxious that he should make plates for them, and they got a similar answer.

He was knighted in 1867, and filled every office of honour his fellow-townpeople could confer upon him except the membership for the borough, which was offered to him while serving as mayor in 1863. He was twice mayor and twice Master Cutler. He was a J.P. and deputy-lieutenant of the West Riding. For the religious welfare of his workpeople he erected All Saints Church at a cost of 12,000/. Some time after his business was converted into a limited liability company Sir John retired from active participation, residing at Endcliffe Hall, Ranmoor, Sheffield.

### FRENCH GLASS.

In a certain sense glass-making is not only one of the oldest, but also one of the newest occupations. It is as old as the earliest civilisation, says a writer in the *Optician*, for in the most ancient ruins in Egypt and Mesopotamia are to be found articles of ornament and use made of glass. The secret of their manufacture has never been rediscovered, and none like them can be made. Glass objects have been found under circumstances and in places indicating that they were in use ere men had learned to manufacture iron into useful forms, and

if glass is coeval with bronze, why may it not also have existed in the age of stone? Glass-making is also one of the newest arts, for while well known in the most ancient times, its development was arrested, and until a century and a half ago little more skill was shown than was probably displayed by the glass-blowers of Egypt 4,000 years ago. As the industry now exists it is eminently of the present, and to the nineteenth century must be assigned nearly all the improvements which have placed glass-making so high among the fine arts. This period has been called the fruition of the age of iron, but quite as appropriately could it be termed the age of glass, for never before in the world's history did this material play so important a part in the life of civilised man, and so indispensable has it become that it is difficult to understand how our forefathers lived without it. Oiled paper was a poor substitute for window glass, and the dwellings, and even the palaces, of three or four centuries ago must have been to modern ideas very dark and dreary places. It protects the flame and lamp and gas jet; it furnishes us with mirrors compared with which the silver and bronze handglasses of ancient times were but dull; it gives us a thousand kinds of receptacles of all varieties and of almost every size, and in the arts it is indispensable, for without his glass apparatus what could the chemist do to penetrate the secrets of organic and inorganic nature? Without telescope and microscope the discoveries of the astronomer and the microscopist would be unknown.

To obtain entrance to a French glass factory is no easy matter, for every glass house has its secrets; and the first thing that occurs to the owner or superintendent when a stranger applies for admission is a strong suspicion that the would-be visitor is a disguised agent from some other glass house, and that his only business is to ascertain how some particular specialty is made, then go away, at once begin its manufacture and rob the establishment of its trade. Nor is it easy to disabuse the mind of the proprietor or his agent of this suspicion, for he has previously detected such spies, is on the look-out for crooked work of this kind, and is therefore disposed to keep strangers at a respectful distance. To obtain admission at all, the stranger must be introduced and identified by a friend of the manufacturer's, and even then, though he may never learn the fact, he may assume that the proprietor of the glass house, before admitting him, applies to the police to ascertain who he is and something of his antecedents. The suspicious proprietor and superintendent being satisfied, a card of admission is issued to the visitor, and he is admitted to the establishment, and is no sooner

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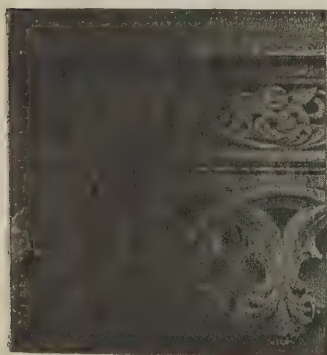
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fairly in than he is seized with an intense desire to get out again, for of all hot places upon this side of that region where the fire is not quenched a glass-house is the hottest. A foundry is an ice-house in comparison with it. A great room, with limited ventilation (for no currents of air can be allowed to pass freely through the factory where molten-glass is being handled), long rows of red-hot furnaces, the air seemingly on fire, great bursts of flame from the opening and closing doors of the kilns—the scene, especially at night, is lurid and almost terror-inspiring. An army of half-naked men, with long iron instruments, stirring the molten glass, withdrawing the bar with a ball of red hot glass, and blowing, drawing, moulding it into various shapes—the sight is appropriate to the super-heated chamber. These are the genii of the glass works, and their performances are more wonderful than those of the “Arabian Nights,” for at their touch the substance which is the very type and symbol of fragility becomes plastic, malleable, ductile. It is veritable magic, for, dipping his “canne” into the red-hot liquid, the blower quickly produces at the end a huge crystal sphere, as transparent as the purest water, and yet reflecting from its inner and outer surfaces every hue seen in the rainbow.

A pair of workmen simultaneously draw from the molten mass their instruments, with a glowing ball of double size; one walks away, carrying his “canne” over his shoulder, and between the two appears a red-hot rope of glass; longer and longer it grows, until the beholder looks for it to snap; it does not, but when drawn out many many feet, and to an equal thickness throughout, it is laid on a contrivance resembling a cross between a railroad and a ladder—and behold, a long glass tube, ready for use in the chemist’s laboratory. It is straight, but it does not need to be so; for at a touch the workman can make it a spiral of any desired length, or curve it, or twist it into fantastic shapes. These workmen earn good wages, for, although the price of their labour has fallen greatly in recent years, each can command from 15 to 20 francs a day. In the golden age of glass-blowing, ten to twenty years ago, 20 francs a day was considered poor pay, and skilled men received from 25 to 35 francs, some experts even more, but, as everyone knows, the present days are never worthy of comparison with the days gone by. The glass-blower earns every sou he receives, however, for the labour of manipulating the masses of molten glass is not only exceedingly exhausting, but the dexterity required causes a constant drain on the nervous system, to say nothing of the oppression caused by the high temperature. To endure an atmosphere where the ther-

mometer always ranges from 100 to 125 deg. Fahr. is of itself sufficiently exhausting; to perform labour requiring a high degree of dexterity and great muscular strength in such a temperature is well-nigh killing. It is not remarkable that pneumonia and pleurisy and consumption, with other diseases caused by the sudden change from the glass-house to the open air, make great ravages among the workmen. Improvements in the mechanism applied to the manufacture have resulted in the blowing of the great glass spheres by an air blast, but in most lines the machine has not yet learned the dexterity of human fingers, and so “hand-made” is still true of a considerable share of the glass product. Not all the work, however, demands strength. The great spheres must be cut up. And with the aid of a diamond-pointed cutter and a deft young lady, the transparent globes soon lose their shape and become piles of little saucer-like discs, to be afterwards moulded into various shapes as the needs of the trade demand. It is a wonderful industry. It is a sight to be remembered. From the pots, containing from 20,000 to 40,000 kilogrammes of molten transparency, come bottles, flasks, jars, vases, long transparent serpents, and cables of glass that can be twisted and tied in knots while plastic, and then grow inflexible as hardened steel. There is no end to the possibilities of glass; even fair woman has enclosed her bewitching form in glass, and robes of this material, spun and woven, have displayed the charms of more than one belle at Versailles and the Louvre. Alike in the fine arts and in the scientific industries this century is the age of glass and the genius of the glass-pot.

### THE STRIKE AT THE PENRHYN QUARRIES.

ON September 30 last the North Wales Quarrymen’s Union applied to the Board of Trade with a view to official intervention under clause 2, section C, of the Conciliation (Trades Disputes) Act, 1896. The Board of Trade accordingly entered into communication with Lord Penrhyn. It was announced that his lordship was prepared to have an interview with a deputation representing the quarrymen. On December 5 the quarrymen met and selected three members to form a deputation to wait upon Lord Penrhyn. The desire was expressed that one or more representatives of the Board of Trade should, if possible, be present at the first interview, believing that the adoption of this course would greatly facilitate the opening up of negotia-

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tions, and that the deputation should be accompanied by its own interpreter and also by its own shorthand writer, if any notes of the proceedings were to be taken.

Lord Penrhyn was officially informed by Sir Courtenay Boyle that the Board of Trade were prepared to send down such a representative, and a hope was expressed that the suggestions about a reporter and interpreter would not cause any difficulty. In reply Lord Penrhyn said that while he was willing to receive the deputation of his employés he must decline to comply with the suggestion about the official of the Board of Trade, as the acceptance of it would establish a precedent for outside interference with the management of his lordship's private affairs. He agreed to the proposal for a shorthand writer and interpreter, provided they were not among the seventy-one employés who had been suspended. Sir Courtenay Boyle then informed his lordship that the Board of Trade could not admit that the settlement of a prolonged dispute, affecting some thousands of men and their families, can be rightly regarded as a matter of private interest only.

As regards the reporter and interpreter, the Board were informed that persons suitable for the purpose were not to be found among the rank and file of the quarrymen. Lord Penrhyn's reply was that the arrangements named in his last letter for the proposed interview are exactly the same as those under which previous deputations have for many years (and up to the time of the strike) attended at his office, and the request that the deputation should bring anyone from outside as an interpreter and shorthand writer he must, for obvious reasons, decline to assent to.

Finally, Sir Courtenay Boyle wrote:—

"The Board, on the invitation of the men, placed themselves in communication with you because experience of similar difficulties led them to believe that the best prospect of terminating the present difference—a result which they assume that you, as well as the men, desire—would be by a friendly conference between yourself and your workmen at which a free exchange of views might take place on the various points to which importance is attached on each side. Under the conditions on which you insist, they would have to come to you, not only without any of their chosen leaders, but also without their own interpreter or shorthand writer, and without the presence of any impartial outsider which they desire, whilst you would have the advantage of skilled advice. Having regard to these conditions, it does not appear to the Board of Trade that

they could at present usefully take any further steps to promote the desired conference."

On Saturday last the quarrymen met and passed a resolution expressing gratitude to the Board of Trade for the patient care taken to obtain a settlement of a dispute which affected thousands of men and their families, and another resolution by which they decided to stand by one another till right was done. A correspondent of the *Times*, writing from Bangor on December 28, says:—

The Penrhyn quarries, as most persons know, are among the largest, if not actually the largest, slate quarries in the world. They are situate in the immediate vicinity of the town of Bethesda, of which they are the *raison d'être*, and they have been the property of successive owners of the Penrhyn estate. In the year 1874, in the time of the late Lord Penrhyn, the quarrymen succeeded in ousting the then manager at Bethesda, and in obtaining, through a committee, practically the entire control and management of the great quarries. This state of things lasted until 1885, and there need be no hesitation in saying that, under the rule of the committee, the men obtained, so long as affairs were regarded from a shortsighted point of view, great advantages and benefits, the like of which they will never enjoy again. The owner's interests were hardly so much as considered in the management of the quarry, no regard was paid to the future prospects of the quarry, good rock was worked extravagantly, rubbish was not cleared away in due proportion, and the wage-rate was far higher than in other and competing quarries. From the owner's point of view, however, the position became serious and even critical by the year 1885, and the present Lord Penrhyn, then the Hon. G. Douglas Pennant, came in to the assistance of his father, with a free hand and full authority, at a time when it became a question whether the quarry could be kept open at all for many months longer. The newcomer went to work in a resolute frame of mind. He abolished the quarry committee; he resumed on the part of the owner the complete control of the management of the quarry; he reduced the extravagant wages, and, in a word, reorganised the whole enterprise in a business-like spirit. The story of the next ten years was, on the whole, peaceful, and there can be no question that the quarry grew greatly in prosperity.

It was in the autumn of 1895 that signs of impending trouble began to appear, and an "organiser" was appointed to work among the quarrymen. Early in the autumn of this year things began to assume a somewhat dangerous appearance, and it is essential to a true appreciation of the situation that the precise

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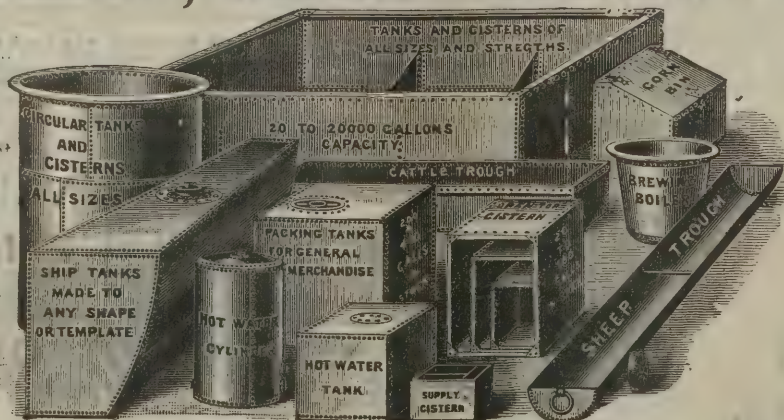
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sequence of events should be given. On August 7 a memorial of grievances, signed by seven persons, was sent to Lord Penrhyn. On August 17 Lord Penrhyn had an interview of four hours with the representatives of the men, who were distinctly informed that they were received not as a committee and that Lord Penrhyn absolutely declined to recognise a committee. At this interview the alleged grievances of the men—which are for the most part of a very technical character—were discussed at length, and a transcript of the shorthand note of the interview was published and supplied to the men within a week. On August 20 Lord Penrhyn printed a reply to the memorial and to the allegations made by the men at the interview, and that reply calls for two observations. It must, I think, be admitted on all hands that Lord Penrhyn succeeded in showing that a large number of the general allegations of the men had been made in the absence of any evidence to support them. On the other hand, there remained, and still remain a substantial number of demands which Lord Penrhyn was not prepared, and to all appearances never will be prepared, to concede, because, in his judgment, they involve the restoration of the quarry committee to the position which it occupied before 1885. On August 26 the men replied by a reiteration of their original complaints, and at this juncture comes a point of some importance. It has been stated repeatedly that Lord Penrhyn's reply to the reiterated complaints was the immediate dismissal of the seventy-one men forming the committee. The plain documentary evidence absolutely disproves this statement. Lord Penrhyn and his advisers spent weeks in investigating and considering the whole matter, and on September 25 Lord Penrhyn issued a statement in fifteen closely-printed folio pages. In this he dealt with the standard wage, which he declined to raise, on the ground that the average wages earned by quarrymen were in excess of that standard; he declined to recognise, for the usual reasons, the theory of a minimum wage; and then he proceeded to analyse some specific allegations of grievance in the case of particular individuals. He dealt also with the question of contracts and a corollary allegation of sweating. He also appended, as an answer to the men's low wage list, a table showing the earnings of the "crews" mentioned in that list for several months, and not for one month only, the object being to show that the standard wage had—"days lost" being deducted—been earned by all. Finally, he reiterated his desire to listen to all serious complaints in the usual way; but he made it

clear, not for the first time, that he would not listen to those complaints coming from a committee.

On the following day the committee resolved, and their resolution was announced publicly, to declare a strike in March next unless their demands were conceded in the meanwhile; and it was not until September 28—that is to say, after the March strike had been announced and after the committee had ordered disobedience in the case of two men who were summoned to the quarry office—that Mr. Young, the manager, suspended *sine die* seventy-one men who formed the committee. On the evening of the same day, at a mass meeting, a resolution in favour of an immediate strike was carried. That is the strike which is now going on, and the above facts prove beyond question that Lord Penrhyn's action, although resolute, was not precipitate. He is reproached, of course, with aiming a blow against combination, the sacred right of workmen; but to the plain man it is manifest that the suspensions did not take place until after the committee had ordered men to disobey commands or until after the committee had announced publicly their intention of causing a strike to begin in March. Lord Penrhyn's attitude on the matter as described by himself is that he does not object to any combination among his men, but that he is determined to remain master of his own quarry.

Meanwhile the Board of Trade had, at the request of the men, been in correspondence with Lord Penrhyn with a view to bringing the Conciliation Act of 1896 into operation, and before dealing with that correspondence it is imperative to call attention to the fact that, unless the statement of the early history of the dispute which has been given is borne in mind, the correspondence may produce a false impression. To one unacquainted with the facts it must appear from the correspondence that the suspension of the seventy-one men was the immediate, almost the direct consequence of the men's appeal to the Board of Trade; whereas, in fact, the suspension of the committee came at the end of weeks of careful inquiry, after a resolution to strike in March, and after the committee had incited men to disobey orders. Now Lord Penrhyn may be right or may be wrong—that is a matter upon which there will be many opinions—but he has certainly not been precipitate. It may be observed that, whereas the correspondence between Lord Penrhyn and the Board was supplied by the Board to the men, Lord Penrhyn had not been supplied with a copy of the correspondence between the Board and the men, and that he is inclined to regard as one-sided the treatment which has been measured out to him.

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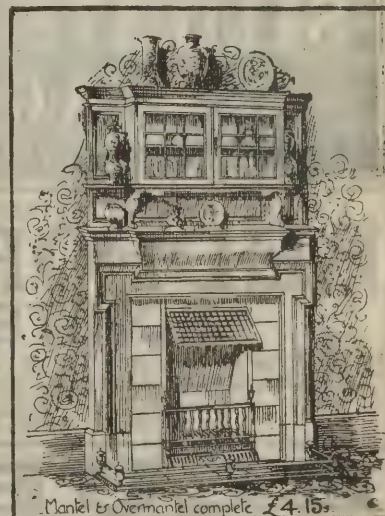
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Meanwhile, from the correspondence two points emerge. First, the Conciliation Act being optional and not compulsory, Lord Penrhyn is clearly resolved not to permit it to be applied to him, and no man can deny that he is within his legal rights in refusing to permit representatives of the Board of Trade to be present at the proposed interview. He thinks, in effect, that the presence of Board of Trade officials would tend to weaken the authority of the quarry officials in the future. My own view, which is merely personal, is that he is prudent in assuming this attitude, because this is one of those matters which are not in the least likely to be settled easily, and in which conciliation, useful when well timed, is premature, and for that reason harmful. In the matter of the shorthand writer, which is really not very important, Lord Penrhyn has not, perhaps, been wise. A competent shorthand writer is not likely to be found among the quarrymen, and a really competent interpreter is very rarely to be found anywhere in Wales. Lord Penrhyn inserted his stipulation mainly because he did not desire the presence of any outsiders in the dispute; but he might have said with equal reason that the accuracy of his own shorthand writer's note of the four-hour interview has never been questioned.

The main interest of the situation is to be found in the fact that the man who has managed a great enterprise for many years, a man who is famed for generosity and for resolute disposition, asserts in the face of an optional Act of Parliament his right to manage his own business in his own way and his right to oppose, not the principle of combination, which is one thing, but the acts of a combination, which are a very different thing, by all legal means. After all is said in favour of trade unionism, it is a strong thing to assert that a man is bound to keep in his employment the men who announce in September that they mean to cause a strike in March. Indeed, the suggestion recalls the fable of the man who nursed a viper in his bosom. If I remember rightly he paid dearly for his tenderness of heart.

#### LONDON COUNTY COUNCIL WORKS DEPARTMENT.

ON December 23 another sitting was held of the special committee appointed by the London County Council to inquire into the management and financial position of the Works

Department, when Mr. T. Blashill, superintending architect to the Council, continued his evidence.

In reply to Dr. Longstaff, Mr. Blashill said that the evidence he had already given related entirely to architectural work, which was very much more complicated than engineering work. In the Blackwall Tunnel, a work costing upwards of 800,000*l.*, there were only 935 items, whilst in the construction of a weights and measures testing station there were as many as 2,175. He could not conceive how ten men could have been employed on the lamp at the Blackheath fire-station, which he had mentioned at the last sitting. When the wages of men were charged who could not possibly have been employed it was open to the construction that it might have been a transfer from some other job or an accident. He knew of other cases where the cost charged was out of all proportion to the work done. On the repair of a lamp at the Chelsea fire-station in 1894 nine men were charged. This estimate was 1*l.* and the cost came out at 2*l.* 13*s.* 3*d.*

Dr. Longstaff: Do you consider that the Works Department has been successful in respect to small jobs?—I think seldom so. Has the quality of the work been satisfactory?—Generally satisfactory.

Better than you generally get?—I think quite good enough.

Has the cost been satisfactory?—No; but I may say that the cases I have mentioned may be open to the construction that they represent other transactions, but they are only the residuum after we have cleared away a large quantity of accounts with respect to which we agree, and a similar quantity with respect to which we might arrive at a compromise, and then there are the remainder that await investigation.

Do you think the system of doing these jobbing works by the works committee or by local contractors the most expeditious?—No doubt that of doing them by local contractors. We have had complaint of considerable delay in work done by the Works Department. I do not believe that the Works Department has ever wilfully done bad work. I have noticed bad work done by the department, but that might be owing to carelessness of the men. That shows that supervision is requisite in every case. I have heard only a little, and know less, about insubordination on the part of the workmen in the department. I have distinctly heard of workmen refusing to obey their foremen. From the information I have received from one source and another what is complained of is the avoidance of work by the men when actually on a job. The reason alleged why men have refused to obey the foreman is

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that they looked to the members of the works committee as their masters, and not to the foremen.

By Mr. Beachcroft: In the case of work done by the department for the housing committee the excess had been 9,980%, but that was largely caused by the cost of the earlier works. The reason of the excess had been attributed by the manager of the department to too stringent supervision by the architect, the use of materials of too high a standard, the excessive labour bill, and that there was interference on the part of the members of the committee. It was not a fact that materials had been demanded of too high a quality, or that he had been too stringent in his supervision. It was not within his knowledge that members of the committee attended at the works. He had heard so, and that it was particularly the case with regard to the members interested in labour. He had also heard it stated that members of the committee had relations employed on the Council's works. Considerable delay had been caused in the work by the department searching for the cheapest materials. It was impracticable and unnecessary for the department to tender with contractors. If the committee were retained, he was in favour of some work being in the future done by the committee and some by contractors. Since he last gave evidence he had heard that that was the system adopted both in the Admiralty and the Ordnance Department, who did a certain amount of work themselves and put the other out to contract. He thought the list of extras was much the same whether the work was done by contractors or the department. In justice to the department he must say that they were most pertinacious in agreeing to his notices as to extras. There were generally firms in the system of advertised tendering who did not know how to make an estimate; some would be exceedingly high and some very low. Some tendered simply to get back their deposit money and to get their names before the Council. If they struck out two or three tenders at the top and two or three at the bottom they generally got a body of tenders not very far apart. He did not make his specification with a view to the work being done specially by the Works Department or by contractors. He thought that was a great disadvantage. He had said that he would like to see the works committee abolished and the manager made supreme, but in saying that he did not mean that he should be independent of official control by the spending committees. He was unable to give any opinion as to whether 20,000% a year for establishment charges was too high. He did not know that the labour bill was now about 7,000% a week.

Mr. Beachcroft: Do you think the ratepayers are ever likely to get advantage from the municipality undertaking architectural work as distinct from engineering work?—Not a peculiar advantage. I am of the same opinion now as I have previously expressed, that the financial result is not one that would be of any importance. With regard to works generally, if it were left to me, and there were no other objections, I should think it better to deal with one set of persons than with twenty sets of people, and if the Works Department can carry out the work well and economically and with no other disadvantage, I would rather have to deal with them than with outsiders.

By Mr. Davies: He had heard of private employers making arrangements with their men as to wages in return for constant employment. He did not think the abolition of the Works Department would have any effect on the rate of wages in the building trade in London. He could not think fair progress had been made by the department; it should have made more profit. He knew that something like 100,000% had been expended by the Council in the establishment of the Works Department. He certainly would not advocate doing away with it altogether as it now stood, but in advocating the abolition of the works committee he was not considering whether the members of that committee did too much or too little, but that they might do particular things which were objectionable. He did not remember having to complain of the scaffolding and plant of contractors as being dangerous to life and limb. He did not think that painting work was the easiest of all work to scamp, but it was possible to do it too thoroughly. He had heard complaints of contractors not properly preparing the ironwork for painting, and he had also heard complaints as to certain painting jobs done by the Works Department.

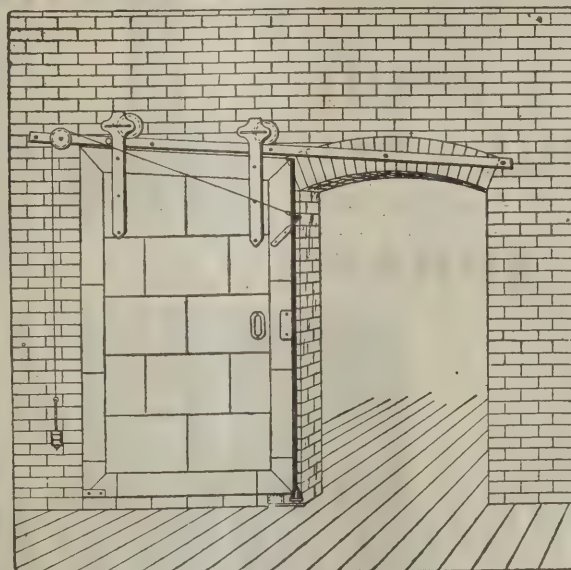
By Mr. Torrance: It was true that the works committee had suggested that small works should no longer be executed by them, but by local men. He had no real evidence of his own knowledge of any member of the works committee interfering with the internal management of a job. He thought if the committee had to look over such a large amount of work they might feel the responsibility of their position and visit the works in progress, but they should do so with the knowledge that their proceedings should be so carefully conducted that it would not lead to the mischief which it had been asserted had been caused. He had had difficulties with contractors, but sooner or later, in every case, the work had been brought up to

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the required standard. Some work was better than others, but it was all within the required standard. The quality of the work done by the Works Department had been as a rule good. He felt sure that, properly managed, the Council could do a large portion of its work better than the contractors. With regard to the rest, he might admit that they could make a trifling profit, but nothing of importance.

Mr. Torrance: In the interest of the ratepayers is it not, in your opinion, an imperative necessity that the Council should carry out the bulk of its own work?—I am not sure what interest you mean. I can only consider the financial interest.

I mean that.—I should modify it in this sense, that the Council might carry out enough of its work in order to insure contractors being fairly treated, and, if necessary, I should increase it. I think the whole thing is in an experimental state. The London County Council is the experimenter.

In answer to further questions by Mr. Torrance, the witness said he thought the Works Department had surmounted the principal difficulties which faced it at its initiation. It had learned wisdom by experience. He believed that ultimately the Council would attract superior workmen to its service. He had not been more severe in his criticism of work done by the Works Department than of that done by contractors.

By Mr. Fletcher: He was certainly against the department tendering against contractors. If it was done the result would certainly be that the best contractors would cease to tender for the Council's work. He should object to any such experiment being made, because he felt certain that it would be a failure. He thought the standing orders might give discretion to the spending committees to send their work either to the Works Department or to contractors. He had heard of considerable complaint that workmen in London did not get a fair share of the Council's work. Those complaints would continue as long as the Council did all its work exclusively from one centre in Belvedere Road.

By Dr. Collins: He put down the profit of contractors in their tenders at about 8 per cent. He had stated to Sir John Lubbock that prior to the establishment of the Works Department, the contractors had carried out work at 6 per cent. below his estimate. That information he had gained from a sheet published some years ago.

The witness was still under examination when the committee adjourned until Wednesday, January 13.

Amongst the documents put in during the sitting was a report by Mr. C. J. Stewart, the clerk of the Council, on the establishment of the Works Department and the work generally of the works committee. In the course of this report Mr. Stewart stated that in 1895 the works committee suggested to the various committees that jobbing works to be carried out a distance of more than three miles from the central works and of an estimated value of less than 3*l*., should not be entrusted to the works committee unless there was a difficulty in getting them executed otherwise. The bridges committee and public control committee stated that they would adopt the suggestion, but increased the value to 5*l*.. The fire brigade committee had on several occasions brought before the Council the question of the cost of jobbing works executed for that committee by the Works Department, and recently the Council, on the recommendation of the fire brigade committee, resolved that the jobbing work required at fire brigade stations should be executed at the option of the fire brigade committee by contractors or by the Works Department. The Works Department did not compete with contractors in tendering. The procedure was for the particular committee which desired the execution of works to lay before the Council the officer's estimate and to recommend the Council in what way the work should be carried out, *i.e.* either by a contractor, by the Works Department, or by labour employed directly by the originating committee. If the recommendation was to the effect that the Works Department should do the work, the recommendation was in the following terms:—"That the work be executed without the intervention of a contractor, and that the plans, specification and estimate be referred to the works committee for that purpose." The works committee then reported on the estimate submitted to the Council by the executive committee, and if the works committee was satisfied as to the sufficiency of the estimate, it proceeded at once with the work. In the event of the committee not deeming the estimate sufficient, it reported to that effect to the Council, and the estimate was referred back by the Council to the originating committee. The practice had then been for tenders to be invited and the works carried out by contract. There had, however, been two cases in which works had been refused by the works committee, and tenders having been invited and found to be in excess of the estimate the works had eventually been referred to the works committee on a revised estimate. The average time

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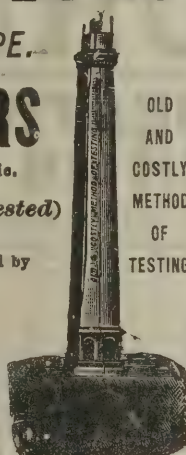
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occupied by the ordinary meetings of the works committee and its sub-committees was six hours a week, and the inspection by the committee of the works in progress, which was held half-quarterly, averaged about six hours. The sub-committees were (1) finance, (2) plant and materials, (3) horse, vehicle and fodder, (4) wages and staff. Directly the manager had authority to commence any work he, in accordance with the instructions of the committee, selected six or more firms from whom he invited tenders for materials, and if the value of the materials required was of sufficient amount, invited tenders by advertisement and submitted the quotations to the sub-committee, which had power to authorise the goods being ordered subject to a report of the steps taken to the committee. The valuation of plant and machinery at the central works and various works in progress was made at March 31 by the engineer and valuer, and the list of stores and materials was checked by the comptroller. Foremen and timekeepers employed at the various works were appointed and dismissed by the manager of the department, and the gangers and workmen were engaged and dismissed by the foreman of each work. The officers at the central works were members of a superannuation fund, and the clerical staff were placed on the fund after being twelve months in the Council's employ. At the conclusion of his report Mr. Stewart submitted a return of works carried out by the Works Department and reported to the Council since its establishment. From this return it appeared that for works supervised and carried out under estimates furnished by the engineer, the original estimate was 156,171*l.*, the final estimate 144,695*l.*, and the actual cost 130,604*l.* In this amount is included work for the main drainage committee, for which the original estimate was 64,987*l.*, the final estimate 58,142*l.*, and the actual cost 44,849*l.* On the other hand, work for the bridges committee, which was finally estimated at 50,174*l.*, actually cost 50,773*l.* Work supervised by the architect for the asylums committee was estimated at 14,369*l.*, and cost 14,774*l.* The work supervised and carried out under estimates furnished by the architect was 224,416*l.*, and the actual cost 232,211*l.* Included in this amount is work done by the housing committee, the estimate for which was 121,801*l.*, and the actual cost 131,781*l.* The summary of all the works executed by the department and reported to the Council shows that the final estimate amounted to 383,538*l.*, the actual cost being 377,643*l.* From March 1895, when the schedule of prices came into operation, the schedule value for jobbing works carried out by the department has been 29,372*l.*, whilst the actual cost has been 27,410*l.*

### A NEW WAY TO STRENGTHEN FOUNDATION PIERS.

IN a recently constructed large office building in New York, says the *Engineering Record*, some of the exterior main columns of the steel-cage framework have isolated foundations which consist of 8 by 8-feet hard red brick piers, which are supported on the natural soil composed of fine sharp sand, dry and compact. In the centre of the capstone is an iron pedestal about 4 feet square which receives the column, carrying a computed maximum load of 420 tons. When the building was approaching completion, after the columns had been enclosed in brickwork, it was observed that in four of the piers cracks had developed that extended through the capstone and into the brickwork, reaching down to the stone binders. These cracks had a maximum opening of about one-quarter inch, and generally extended entirely across the capstone parallel to the sides. Alarm was felt for the safety of the building, and an investigation was conducted by the Department of Buildings to determine whether repairs could be efficiently carried out. The piers were carefully examined by different engineers, architects and inspectors. Various theories were presented to explain the cause of failure and different remedies were suggested, involving the removal or considerable alteration of the piers.

Mr. John F. O'Rourke, C.E., New York, was retained by the contractor for the building, and reported substantially that the trouble was primarily due to the capstone, which had to distribute the heavy column load concentrated upon 18 square feet of its upper surface and transmit it evenly to the whole 64 square feet of upper surface of the brick masonry. The elasticity of the brickwork, he assumed, made the functions of the capstone those of a beam, and he computed that the strains of flexure were high for the material of which it was composed, particularly if any defects existed in the capstone or its bed, though very moderate when straining it by direct compression only. He therefore concluded that if he could take up the tensile strains developed by flexure and properly fill all the openings in the masonry, the piers would be efficient and have ample strength for their loads. To this end he designed a reinforcement that could be easily applied to each pier, and which consisted of two pairs of adjuv able through tie rods in opposite directions at the top of the brickwork, arranged to exert a heavy pressure on its four outside faces in opposition to the assumed tension in the lower part of the capstone, together with a method of grouting under pressure.

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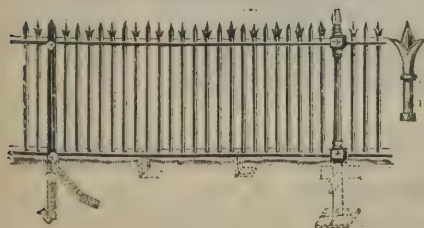
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From the above data and the dimensions Mr. O'Rourke computes that—

Before rupture the maximum strains were developed when the bending moment at either the longitudinal or transverse section through middle of shoe is equal to one-quarter the total weight, multiplied by the difference of the distance from middle of shoe to centre of pressure of half-shoe and of half part of cap considered.

Bending moment in middle section running north and south.

$$M = (24 - 11·75) \times 21,000 = 2,572,500 \text{ in lbs.}$$

$$\text{Moment of inertia of section of cap} = \frac{BD^3}{12}$$

$$I = \frac{96 \times 16 \times 16 \times 16}{12} = 32,768.$$

$$\text{Extreme fibre strain} = \frac{M \times \frac{1}{2}D}{I}$$

$$\frac{2,572,500 \times 8}{32,768} = 630 \text{ lbs. per square inch} =$$

about 500 lbs. per square inch at this time.

The whole tension in caps at the middle in the direction considered is equal to two-thirds of one-half the extreme fibre tension multiplied by one-fourth the depth multiplied by the width =

$$\frac{2 \times S \times D \times B}{3 \times 4} = \frac{630 \times 16 \times 96 \times 2}{4 \times 3} = 163,000 \text{ lbs.}$$

In the middle section of caps running east and west the shoe being placed nearer the south side of cap the bending moment is somewhat less and need not be calculated. The effect of the eccentric loading being to cause a smaller transverse strain in the cap and a greater compression in the brickwork at the side nearer the shoe, the rods proportioned to suit the first case will be ample for the second.

Two-inch rods were used, and their efficiency was determined as follows:—

$$3·14 \text{ square inches} \times 15,000 \text{ lbs.} = 47,100 \text{ lbs.}$$

In order to equalise the strains in the capstones each rod is

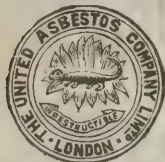
placed half-way between the outside of the piers and the middle of the shoes. With the rods screwed up a tension of 15,000 lbs. per square inch, the strains in each pair would be 94,200 lbs. This force reacts against the capstone and brickwork, reducing the tension in capstone that amount. Two-inch rods are therefore amply strong to supply sufficient tensile strength to the cap to enable it to distribute pressure of base of casting over the whole top of brickwork. The strains in the cast washers were determined in the usual manner, and the dimensions are sufficient for strength in the washer and for distributing the reaction on brickwork and granite, so that 15 tons per square foot pressure is not exceeded. If the capstones had no tensile strength because of cracks or flaws the rods would still supply all the strength necessary to enable the caps to distribute their load uniformly over the whole area of the brickwork without reaching the elastic limit of the steel, which practically would never be reached, as the brickwork would take up much of the tension.

A prospector's ordinary diamond drill driven by a small steam-engine was set up and two 2½-inch holes were drilled through the top of each of the four disabled piers on each side, about ten hours being required to drill each hole. The water, which is abundantly supplied to the bit by its special attached pump, escaped through both holes, and was collected in semi-cylindrical tin vessels on the sides of the pier. Perfect continuous cores were taken out of the holes, and showed solid sound brick well cemented together. No difficulty whatever was observed in operating the drill through the interior brickwork, even where the pressure was estimated to be more than 40,000 lbs. per square foot. After the holes were completed a small electric lamp, operated by a storage battery, was attached to a light wooden rod bearing a 45-degree reflector, and inserted into the whole. The rays of light from the walls of the hole were reflected parallel to its axis by the mirror, so that any given point could be made visible to an observer looking into the hole. This novel method of examining the interior of masonry piers was devised for the occasion by Mr. O'Rourke, assisted by Mr. Charles L. Eidlitz, electrical engineer.

The whole interior surface of each hole was thus carefully explored by Superintendent of Buildings Constable and the other experts, and the masonry was found to be in good and satisfactory condition.

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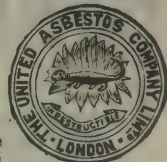
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was then inserted in each hole, four for each pier, and the ends of the hole enlarged just above it at each end to receive a horizontal 2-inch iron pipe, which was carefully caulked in with oakum. A few inches from the face of the pier the pipe was bent 90 deg. and extended vertically upwards about 9 feet and terminated in a galvanised-iron funnel. Portland cement and water were then mixed about 1 to 1, forming a thin grout whose volume was about 80 per cent. of the sum of its constituents. This grout was poured into the funnels and filled the spaces around the bolts and the adjacent interstices of the masonry, penetrating it indeed so thoroughly that it exuded in many places through the face joints of the courses as well as through original cracks. Wherever grout escaped the opening was caulked with oakum, and the pouring was continued until it ceased to subside in the funnels.

After the grout had set sufficiently the pipes were removed, and it was found that the surplus water had been taken up by the bricks, leaving a solid mortar of neat cement forced into the openings in the piers. Heavy cast-iron webbed bearing washers, 5 inches deep and 18 inches square on their bases, were put on the ends of the rods so as to seat on the dressed surfaces that were prepared to receive them both on the brick and the stone faces. Rich cement mortar was plastered on behind these washers, and the nuts on both ends of the rods were simultaneously screwed up on them as tightly as possible by two men on a 6-feet wrench at each end, developing an initial tension in the rod roughly estimated at about 48,000 lbs. The whole time required to make the repairs was about thirty days. It is about one year since the completion of this work, and it is considered to have given entire satisfaction. The piers are reported to appear perfectly sound and firm, and show no evidence of settling or weakness.

#### GRAVEL-DIGGING ON COMMONS.

A DECISION of no little importance to London commons was given, writes a correspondent of the *Times*, in the Queen's Bench Division. During the past summer a controversy, to the importance of which the *Times* drew attention at the time, arose between the District Council of Bromley and the Conservators of Hayes Common, respecting the right to take gravel from the common for the repair of the roads. It is well known that the highway authorities have, speaking generally, the power of resorting to open waste lands for road material,

and very serious is the injury done to many commons by the exercise of this power. Within the last month a noted Druidic monument standing on a Devonshire common was invaded by the highway contractor and suffered irreparable injury at his hands. It may be doubted whether blocks of masonry obviously placed in a position of set purpose and in fact constituting, in a large sense of the word, a building, come under the category of "stones," for which a road authority may "search," but the destruction of soft, springy turf, such as that on the Surrey Downs, in order to extract the underlying flints, is almost certainly lawful and is quite certainly largely practised. In 1876, when the question of preserving and regulating commons was under the consideration of Parliament, the injury which might be inflicted upon a place of recreation by the highway authorities was recognised, and a provision was inserted in the Commons Act for the protection of such places. Wherever a common had been placed under regulation in the interests of the public the highway authority was forbidden by the Act to search for road material, except with the consent of the body managing the common, and where this consent was refused the road authority was empowered to appeal to the justices in petty sessions for an order sanctioning recourse to the common under such conditions as the justices might see fit to impose. This provision has practically put a stop to gravel-digging on London commons, for the London County Council and the other bodies having charge of such commons have naturally refused their consent, and we believe in two cases only has the highway authority challenged their decision. Soon after the passing of the Act the Wandsworth Board of Works appealed to the justices for power to dig on Wimbledon Common, and appealed in vain. And now the District Council of Bromley have applied to the justices in relation to Hayes Common.

But the view which the Bromley justices took of the law raised a more important question than that of the possible disfigurement of the particular common in question. The justices came to the conclusion that they had no discretion to make or refuse an order, but were bound to sanction the taking of gravel from the common, subject only to any conditions they might think fit to impose. The road authority was entitled, they held, to an order as a matter of course; all that the justices could do was to specify the places in which digging might be carried on and the manner of such digging. Happily, two eminent judges of the High Court have held, upon a case stated by the justices for their opinion, that there is no foundation

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whatever for such a view. The Act of 1876, it is now judicially declared, gave the conservators of a common a veto upon gravel-digging, subject to an appeal to justices, who have an absolute discretion—and a discretion which they are bound to use—to confirm or annul such veto, and, in the latter case, to impose suitable conditions upon the exercise of the power which they allow. The application of the Bromley District Council is therefore relegated to the local justices, who will have now to consider the arguments of expediency for and against gravel-digging on Hayes Common.

It would not be seemly that we should say a word upon this question, which will no doubt receive full consideration at the hands of the justices. But the public of London and of the country generally is to be congratulated warmly on the decision of the High Court upon the question of law which was raised. For, had the application to the justices been held to be a mere matter of form, it is to be feared that many commons would have fared badly; indeed, further legislation would have been necessary for their protection. For, practically the power of gravel-digging would have remained absolutely in the hands of the road authority, and it would have been entirely optional with them to regard the wishes of the body managing the common. Wherever any saving to the highway rate could be shown, the district council would probably have felt impelled to exercise a power which they enjoyed subject only to the observance of certain forms. The provision of the Act of 1876 would have been a dead letter, and London commons, which have been free from disfigurement at the hands of the road-contractor for the last twenty years, would again have fallen under his sway. This danger the recent unhesitating declaration of the law by Mr. Justice Wills and Mr. Justice Wright has averted. Commons which have not been placed under regulation, and thus in a manner set apart for recreation, are indeed still at the mercy of the highway authority. But this authority is now or will be shortly everywhere either the county council or district council. Now district councils are endowed by the Local Government Act of 1876 with many powers of protecting commons, which are thus confided to their care by the Legislature. Moreover, they are bodies which have many functions besides the maintenance of roads, and may thus be expected to take a broad and harmonious view of their duties. It is to be hoped, therefore, that they will not in the future leave to their contractor too large a discretion to break up common lands, and will see that he does not, in the simplicity of his soul, destroy Druidic monuments before anyone knows what he is doing.

### PROPOSED NEW SEWERAGE SCHEME FOR ABERDEEN.

THE sewerage committee of the Aberdeen Town Council have had under consideration a report by Mr. Dyack, burgh surveyor, on the best means of preventing flooding in various parts of the city. He stated that the existing main sewers, excellently as they have done their work during the past thirty years, were never designed to carry the volume of sewage and storm water that the rapid growth of the city now sent into them. The population requiring to be provided for at the present time was 136,000, compared with 63,500 in 1866. What was perhaps of greater importance than the increased population was the extended area of the district to be sewered. This was 6,694 acres at the present time, against 1,280 acres in 1866, or more than five times as much. It was necessary, therefore, to adopt some radical method of dealing with the existing state of matters. The Surveyor estimated the total cost of the various proposed new works at 160,000/. He impressed upon the committee the necessity of at once proceeding with works estimated at 75,700/., or the construction of four portions of the scheme at an estimated cost of 34,000/. The special point in the scheme considered by the committee was that providing for the prevention of flooding at Palmerston Road, and it was decided to recommend the Council to proceed with the enlargement of the low-level sewer between the premises in question and the outfall at Victoria Bridge. The expenditure will be about 6,000/.

### THE HACKNEY BATHS.

AT Hackney Town Hall on December 22, Mr. F. H. Tulloch M.I.C.E., on behalf of the Local Government Board, held a public inquiry with reference to an application of the Hackney Vestry to borrow an additional 18,000/. for the completion of the public baths of the parish. Mr. George Grocott, the vestry clerk, explained that it was originally thought that the baths could be completed for less than 50,000/., but when the building was partially completed the contractor failed, and they had to enter into a new contract. They now required 18,000/. more to pay for the work that had been done. The Inspector asked for details of the increased expenditure. Mr. Grocott said that the land cost 7,000/. The estimate for the building was 36,000/.

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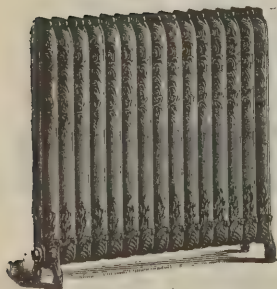
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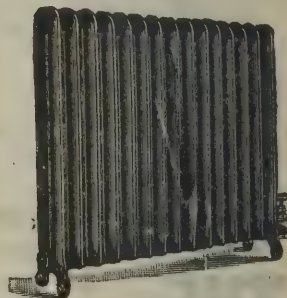
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but through the breaking of the contract it had cost 40,000/. The cost of the machinery had been estimated at 7,000/. but the expenditure had been 10,500/. Besides these additional expenses they had been involved in litigation, which had cost them several thousand pounds. The Inspector asked why the estimate on the building had been so much exceeded. Mr. Grocott replied that among other things the committee had decided to lay glazed tiles at the bottom of the swimming bath—a great and lasting improvement from both a popular and a sanitary point of view. Messrs. Harnor & Pinches, the architects, were both closely questioned as to details. Mr. Mitchell (an ex-vestryman) attended as a ratepayer to protest against the heavy cost the parish was put to in the building of these baths. The general body of the ratepayers were, he said, disgusted at the large amount which had been spent on the buildings, which would cost at least 80,000/. before they could be opened. Mr. Grocott said that the baths would probably be opened within a month, and the cost would in no case exceed 66,000/. At the conclusion of the inquiry the inspector visited the baths and expressed satisfaction with the arrangements.

### THE INSTITUTION OF CIVIL ENGINEERS.

At the ordinary meeting on Tuesday, December 22, Mr. John Wolfe Barry, C.B., F.R.S., the president, in the chair, the paper read was on "Steel Skeleton Construction in Chicago," by Mr. E. C. Shankland, M.Inst.C.E.

The congested area of the main commercial district of Chicago, confined as it was by the lake, river and railways, had brought about the erection of high buildings. The compressible nature of the soil, however, had made it necessary to build thin walls, carried on a steel frame, with isolated footings, spread so as not to exceed the safe pressure on the clay, namely, about 3,500 lbs. per square foot.

After a brief historical account of the earliest high buildings, a description was given of the mode of designing the steel frame, the disposition of the columns and the framing plans of the roof, attic and each floor being respectively dealt with. In a typical case, the Fisher Building, eighteen storeys high, the live load, made up of the weight of the tenants, the furniture and the partitions, which were constantly being changed, was taken at between 60 lbs. and 75 lbs. per square foot for the upper floors and from 75 lbs. to 100 lbs. per square foot for the

first and second floors, which were generally used for shops and banks. The weight of the tenants and furniture of a typical office was found by experiment to be only 6 lbs. or 7 lbs. per square foot. The average weight of the partitions was 25 lbs. per square foot. Having ascertained the live and dead floor-weights, the weights of the outside walls, the lift-loads, the weights of the lifts and house tanks, and of the water-closet floors, window-panes, glass, mullions, &c., a column sheet was drawn up showing the weight supported by each column at each floor. The live load, except that for the partitions, was then deduced, and the remainder was used in designing the foundations. The unit stresses commonly employed were 16,000 lbs. per square inch per fibre strain in steel H-beams, 15,000 lbs. per square inch for plate girders and 15,000 lbs. per square inch for short columns in compression. The roof was made up of beams and girders supporting tee-bars, spaced at 18-inch centres, between which book-tiles were built. Over the book-tile was spread a layer of cement, and on this a six-ply tar and gravel roof was laid, and the beams supporting the tees were fireproofed. The types of columns in general use were mentioned and their relative merits discussed. The steel smoke-stack had supplanted the brick chimney, special arrangements providing for expansion and contraction of the steel where the stack passed through the roof. The author's practice was to construct the frame to withstand a horizontal wind-pressure of 30 lbs. per square foot over the whole side of the building; the resulting stresses were supposed to be taken up by all the columns in each row. If the maximum stress in any column from live, dead and wind stresses exceeded 25,000 lbs. per square inch, the column was enlarged to bring the stress below this limit. The various kinds of wind bracing employed, including rods, portals, knee-braces and plate-girders between outside columns were illustrated, and the effectiveness of each discussed.

Different portions and connections of the steel frame, as well as the cover column connections, spandrel sections, cornice and roof construction, bay windows and balcony construction, &c., were illustrated and described. The most recent floor arches and column fireproofing were also discussed and drawings of different methods given. It had been stated that there was no such thing as fireproof construction if the phrase were taken in a strictly literal sense, no known substance being able to resist a change of state when subjected to intense heat; but the Chicago high buildings were absolutely fireproof in the sense that they would safely resist any fire which could occur.

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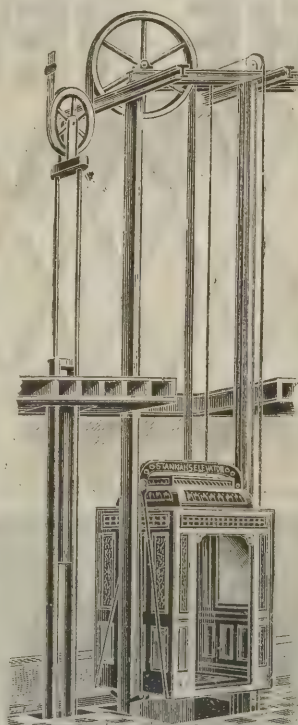
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or around them. This had been shown by severe tests to which certain buildings had been exposed, accounts of which were given.

For preserving the steel frame from rust, the best practice was to thoroughly scrape off the scale and apply a coat of oil at the mill, and a coat of red lead, graphite, or asphaltum after erection. This sufficed for the beams, but all outside columns were filled with Portland cement concrete. The steel beams used in the foundations were always embedded in Portland cement concrete, without being either oiled or painted, as the concrete adhered better to the unpainted metal. In the case of internal columns, when the fireproofing was well fixed and covered on the outside with plaster, the column was surrounded by a nearly air-tight space and the danger from corrosion was small.

Spread footings formed the typical Chicago foundation. Foundations had in some cases been sunk into the hard pan, so as to give greater basement height. Experience had, however, shown that it was safer never to descend below the top of the hard pan. If the borings showed any sand pockets or soft spots, the contractor was required by the specification to excavate them and fill the cavity with concrete. A typical boring was shown, and the results of two tests, to determine the bearing capacity of the clay, were tabulated. The design of a spread footing, on the assumption of a given load per square foot to be used on the clay, was described in detail, and, as an example, a layer of beams in a large footing under the Masonic Temple was computed to show how the number and size of the beams, and their length, were determined. The reason for not using the live load in designing the footings was stated, and a prominent building was mentioned to show the bad effect of using the live load in calculating the foundations. Cantilever construction used in foundation work was described and illustrated. Pile foundations were only used under a few office buildings, and tubes filled with concrete were referred to as unsatisfactory.

The author considered the settlement was caused by the water being squeezed out of the clay, and that it gradually diminished and finally stopped. This was illustrated by an occurrence during the construction of the Masonic Temple, and was further shown by the settlement curves of the same building, extending over a period of four and a half years. The amount of settlement of the high buildings amounted to nearly 1 foot, and the footings were raised when construction was begun in anticipation of it.

The weight of the steel frame in an office building from sixteen to twenty storeys in height was very uniform, ranging between 1½ lbs. and 2 lbs. per cubic foot of the building. The cost was between 4·9 cents. and 6 cents. per cubic foot, being from one-seventh to one-ninth the cost of the building. The length of time required to completely finish a high building was between seven months and one year.

### PATENTS.

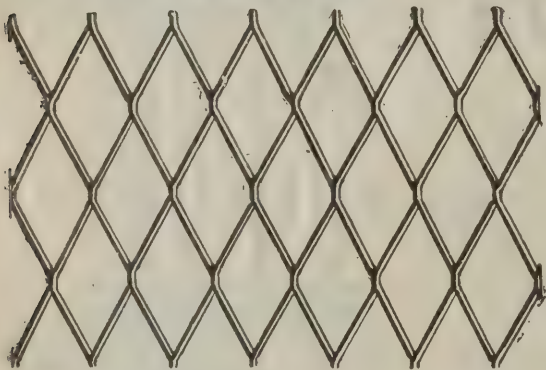
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

- 28582. George Duffield, for "Improvements in or connected with water-closets."
- 28611. Leo Cohn, for "Improved device for indicating the stoppage of water-closets."
- 28615. Henri Schroer, for "Improvements in tiles suitable for roofing."
- 28664. Donald Fletcher, for "Improvements in mechanism for lifting, lowering and locking window-sashes and other articles."
- 28671. Charles Stowe, for "Improvements in traps for waste-pipes and the like."
- 28749. James Minto, for "An improved automatic flushing cistern."
- 28824. Thomas Martlew, for "Improvements in or relating to chimney ventilating and like cowlings."
- 28962. John Dibble and Samuel Henry Dibble, for "Improvements in and relating to combining a water-closet and a sink."

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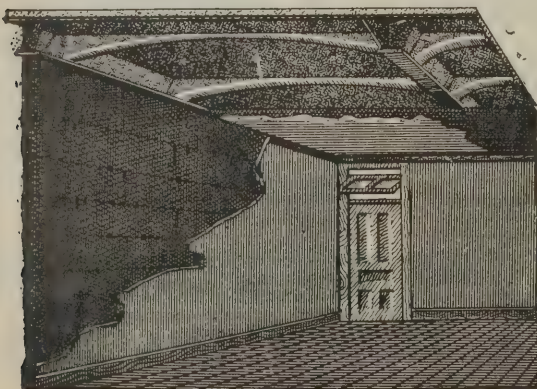
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*.\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xiii.*

## CONTRACTS OPEN.

ALNWICK.—Jan. 16.—For erection of new choir vestry and other works at St. Paul's Church. Messrs. Forster & Paynter, Fenkle Street, Alnwick.

ALNWICK.—Jan. 18.—For erection of four-roomed cottage at Christon Bank. Mr. M. Temple Wilson, architect, 69 Narrowgate, Alnwick.

BIRKENHEAD.—Jan. 18.—For erection of an additional ward pavilion in connection with the infectious diseases hospital at Flaybrick Hill. Mr. Charles Brownridge, borough engineer, Town Hall, Birkenhead.

BOURNEMOUTH.—Jan. 15.—For erection of a house at Canford Cliffs. Messrs. Pinder & Fogerty, architects, 2 St. Peter's Terrace, Bournemouth.

BRADFORD.—Jan. 14.—For erection of stables and coach-house in Morley Street. Messrs. Emsall & Clarkson, architects, 7 Exchange, Bradford.

BRADLEY.—Jan. 13.—For erection of Primitive Methodist chapel and school. Mr. Jas. Hartley, architect, Exchange Buildings, Skipton.

BROADHAMPSTON.—Jan. 16.—For restoration of the roofs, &c., of Broadhampston Church. Mr. Edmund Sedding, architect, 12 Athenæum Street, Plymouth.

BROMLEY.—Jan. 25.—For erection of refuse-destructor buildings and cart-sheds, stores and quay wall. The surveyor, 117 High Street, Poplar.

BURNHAM-ON-CROUCH.—Jan. 18.—For erection of new schools. Mr. Fred Chancellor, architect, Chelmsford.

BURY.—Jan. 11.—For erection, construction and completion of proposed Baptist chapel and school, Manchester Road. Mr. Thos. Nuttall, architect, 26 Market Street, Bury.

CARDIFF.—For rebuilding of Adam Street. Messrs. J. P. Jones, Richards & Budgen, architects, St. Mary Street, Cardiff.

CHRISTCHURCH.—Jan. 14.—For alterations and extensions to the engine and boiler-houses at Knapp Mill and building new filter-beds, building a water-tower at Southbourne, delivery of cast-iron pipes at Christchurch, delivery of valves, &c., at Christchurch. Mr. R. St. Geo. Moore, 17 Victoria Street, S.W.

COCKERMOUTH.—Jan. 13.—For erection of new banking premises and manager's house, for the Carlisle and Cumberland Banking Company, Limited. Mr. Geo. Dale Oliver, architect, Carlisle.

COLCHESTER.—For erection of two houses, Creffield Road, Messrs. Baker & May, architects, Head Street, Colchester.

CORK.—Jan. 9.—For new fixtures for the premises of Messrs. A. Grant & Co., Patrick Street and Grand Parade. Mr. James F. M'Mullen, architect, 30 South Mall, Cork.

CORK.—Jan. 14.—For erection of labourer's cottage. Mr. John Cotter, clerk, Board-room, Workhouse.

CORNWALL.—Jan. 16.—For alterations to "Gonvena," Wadebridge. Major Becher, on the premises.

COSHAM.—Jan. 11.—For enlargement of the girls' classroom at schools. Messrs. Rake & Cogswell, architects, Prudential Buildings, Portsmouth.

CROYDON.—Jan. 11.—For internal repairs, distempering, painting, &c., at infirmary, Mayday Road. Mr. Frederick West, surveyor, 23 Coombe Road, Croydon.

DENGEMARSH.—Jan. 22.—For erection of an officer's house and outbuildings for men at the coastguard station at Dengemars, near Dungeness, Kent. Director of Works Department, Admiralty, 21 Craven Street, Charing Cross, W.C.

DERBY.—Jan. 8.—For rebuilding the branch post office and sorting office at Midland Road, Derby, for the Commissioners of H.M. Works and Public Buildings. Messrs. Welch & Atkinson, 10 Lancaster Place, Strand.

DERBY.—Jan. 11.—For erection of urinal at the corner of Bradshaw Street. Mr. R. J. Harrison, borough engineer, Municipal Offices, Babington Lane, Derby.

EXETER.—Jan. 9.—For rebuilding St. David's Church, including the tower, close to the Great Western and South-Western stations, Exeter. Mr. W. D. Caroe, architect, 8A Whitehall Place, London, S.W.

EXETER.—Jan. 9.—For demolition of the existing structure of St. David's Church, Exeter. Rev. C. J. V. French, vicar.

EXMOUTH.—Jan. 12.—For erection of shop premises, Rolle Street. Mr. W. J. Morley, architect, 269. Swan Arcade, Bradford, Yorks.

GREAT HORTON.—Jan. 13.—For erection of jam works and houses, &c. Messrs. Samuel Jackson & Son, architects, &c., Tanfield Chambers, Bradford.

HALIFAX.—Jan. 8.—For erection of additions to Holy Trinity Boys' School, West Parade. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HAMPSTEAD.—For erection of residential flats. Messrs. Percy Palgrave & Co., architects, 12 Victoria Street, S.W.

HARWICH.—Jan. 19.—For general repairs to the coastguard station. The Director of Works Department, Admiralty, 21 Craven Street, Charing Cross.

HOLBECK.—Jan. 11.—For erection of shed and alteration of closets at workhouse. Mr. Moore, union clerk, Holbeck, Leeds.

IRELAND.—Jan. 13.—For erection of a branch dairy factory at Newpark, Effin. Mr. P. Lynch, Charleville, Cork.

IRELAND.—Jan. 9.—For erection of a creamery, Tarmon, Knock, co. Clare. Mr. W. L. Stokes, Mulgrave Street, Limerick.

KEIGHLEY.—For erection of a Congregational School-Chapel in Oakworth Road. Mr. John Haggas, architect, North Street, Keighley.

KNOCK.—Jan. 9.—For erection of a creamery on the lands of Mr. Ml. Behan, at Tarmon, Knock, co. Clare. Mr. W. L. Stokes, Mulgrave Street, Limerick.

LEEDS.—Jan. 12.—For erection of a detached residence at Roundhay. Mr. W. Carby Hall, architect, Prudential Buildings, Park Row, Leeds.

LEICESTER.—Jan. 11.—For erection of a branch free library on the Belgrave Road Recreation Ground. Mr. Arthur H. Hind, architect, 3 Greyfriars, Leicester.

LEYTONSTONE.—Jan. 13.—For erection of a boiler house on workhouse premises. Mr. Fred. E. Hilleary, clerk, Union Road, Leytonstone, E.

LIGHTCLIFFE.—For erection of a residence and stabling. Mr. Joseph F. Walsh, architect, L. and Y. Bank Chambers, Halifax.

LIVERPOOL.—Jan. 12.—For erection of a warehouse at Liverpool, for the Manchester, Sheffield & Lincolnshire Railway Company. Mr. Oliver S. Holt, secretary, London Road Station, Manchester.

MANNINGHAM.—For conversion of four houses into houses and shops. Mr. Henry Hardaker, architect, Ivegate Chambers, T. New Ivegate, Bradford.

MARYPORT.—Jan. 8.—For erection of two shops and dwelling-house. Mr. C. Eaglesfield, architect, Maryport.

MEXBOROUGH.—Jan. 16.—For levelling and draining two school playgrounds, also for erection of wall and alterations, for the School Board. Mr. H. J. C. Reed, clerk, High Street, Mexborough.

MORLEY.—Jan. 13.—For erection of a house and shop in Queen Street. George B. Clegg, architect, 2 Peel Street, Morley.



NEWARK.—Jan. 8.—For erection of additional buildings to farms situate at North Muskham, erection of fencing on the farms at Muskham and part in Bathley. Mr. Fredk. B. Footitt, clerk and receiver, Newark.

NORTH SHIELDS.—Jan. 22.—For erection of new schools in Coach Lane. Messrs. Marshall & Dick, architects, 4 Northumberland Street, Newcastle-on-Tyne.

NOTTINGHAM.—For erection of two shops, new seating and other alterations and additions at Hockley Chapel. Mr. Henry Harper, 8 Beastmarket Hill, Nottingham.

PAISLEY.—Jan. 16.—For erection of public school at Carbrook Street, for 800 scholars. Mr. Charles Davidson, architect, Terrace Buildings, Paisley.

SHIPLEY.—Jan. 9.—For erection of ten cottages and of eleven cottages, and the forming and sewerage of roads. Messrs. Walker & Collinson, architects, 227 Swan Arcade, Bradford.

SKELMANTHORPE.—Jan. 21.—For erection of an engine-house and weaving-shed. Messrs. John Kirk & Sons, architects, Huddersfield.

SOWERBY.—Jan. 15.—For erection of a Methodist New Connexion chapel and Sunday school at Boulderclough. Messrs. Sutcliffe & Sutcliffe, architects, Todmorden.

STOKESBY-WITH-HERRINGBY.—Jan. 13.—For erection of a classroom and offices at the Board school. Mr. A. S. Hewitt, architect, 10 Regent Street, Yarmouth.

STRATFORD.—Jan. 26.—For erection of a block of school buildings and appurtenances, to be known as the Whalebone Lane schools. Mr. William Jacques, 2 Fen Court, E.C.

SWINDON.—Jan. 18.—For alterations and additions to the laundry buildings at workhouse. Mr. W. H. Read, Corn Exchange, Swindon.

THORNBURY.—Jan. 9.—For erection of a chapel, &c., in the burial ground. Mr. Samuel Fudge, architect, Thornbury, Gloucestershire.

WALES.—Jan. 18.—For erection of an infants' school at Bedlinog. Messrs. James & Morgan, architects, Charles Street Chambers, Cardiff.

WALES.—For erection of four shops and premises at Port Talbot. Messrs. Margrave & Peacock, architects and surveyors, 46 Wind Street, Swansea.

WALSALL.—Jan. 11.—For alterations and additions to houses, 13 and 14 Goodall Street, and workshop in rear. Mr. John R. Cooper, town clerk, Borough Offices, Walsall.

WESTON-SUPER-MARE.—Jan. 12.—For alterations and additions to Albert Memorial Schools. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WIMBLEDON.—Jan. 12.—For alterations and additions to the mortuary at the cemetery, Wimbledon. Mr. W. H. Whitfield, Council Offices, Broadway, Wimbledon.

WIMBLEDON.—Jan. 14.—For erection of five cottages in Hubert Road. Mr. Wm. Cooper, architect, 21 Havelock Road, Hastings.

WINCHESTER.—Jan. 25.—For additions, alterations and repairs at the prebendal house, 4 The Close, and for the conversion of the same into judges' lodgings, for the Very Rev. the Dean and Chapter. Mr. J. B. Colson, architect, 46 Jewry Street, Winchester.

WINCHFIELD.—Jan. 29.—For erection of additional vagrant wards at the union house. Mr. F. S. Chandler, clerk, Oldham.

## TENDERS.

### AXBRIDGE.

For alterations at Weston-super-Mare Casual Wards. Mr. A. POWELL, architect, 3 Unity Street, College Green, Bristol.

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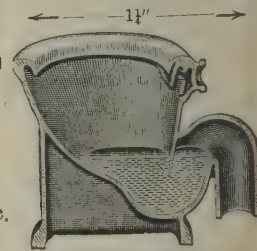
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For erection of Queen's Park Baptist School, Kilburn, W. Mr. GEORGE BAINES, F.R.I.B.A., architect, 5 Clement's Inn, Strand, W.C.

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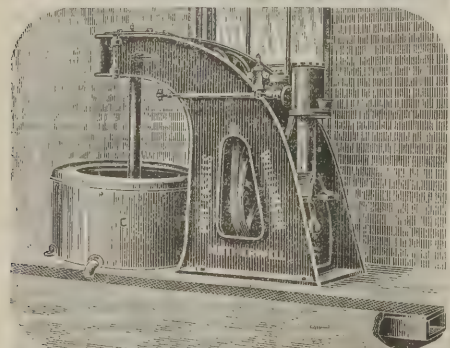
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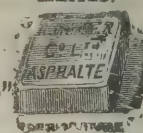
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**MORECAMBE.**

For erection of a mixed school. Messrs. BUTTERWORTH & DUNCAN, architects, 4 South Parade, Rochdale.

*Accepted tenders.*

J. Nichols & Son, Rochdale, mason . . . . .	£1,400	0	0
J. Edmondson, Morecambe, joiner . . . . .	540	15	0
R. B. Abbott, Morecambe, plumber and glazier . . . . .	187	8	6
T. Hadwen, Morecambe, slater and plasterer . . . . .	161	9	10
Heaton, Morecambe, painter . . . . .	19	11	2

**NORWICH.**

For construction of river wall at the site of the new Technical School, St. George's Bridge Street, Norwich.

Monk & Newell, Bootle . . . . .	£1,371	0	0
B. Cooke & Co., Battersea . . . . .	763	0	0
W. North & Son, Norwich . . . . .	762	0	0
W. J. Botterill, Aylsham . . . . .	725	0	0
G. Rackham, Norwich . . . . .	598	0	0
F. H. Blyth, Foulsham* . . . . .	550	0	0

\* Recommended for acceptance.

**PARKHURST.**

For erection of imbecile and receiving wards at workhouse. Mr. JOHN I. BARTON, architect, 1 St. Thomas Street, Ryde.

Quinton . . . . .	£5,891	15	0
J. G. & W. Jolliffe . . . . .	5,450	0	0
Jenkins & Sons . . . . .	5,223	0	0
Barton Bros. . . . .	5,220	2	6
H. E. Day . . . . .	5,173	10	0
J. Barton . . . . .	5,150	0	0
T. Jenkins . . . . .	4,959	0	0
J. Meader . . . . .	4,907	0	0
G. HAYLES, Shanklin (accepted) . . . . .	4,890	0	0

**STAFFORD.**

For alterations to the refuse destructor, for the Town Council. MANLOVE, ALLIOTT & CO., Nottingham (accepted) . . . . .

£320 0 0

**STOKE-UPON-TRENT.**

For construction of a steel tank and three-lift holder, for the gas committee. Mr. WILLIAM PRINCE, engineer.

W. HOLMES & CO., Whitestone Ironworks (accepted).

Thirteen competitors; lowest accepted.

**RETFORD.**

For erection of 120-quarter malting at Retford. Mr. RICHARD HARDY, architect, Bentinck Buildings, Wheeler Gate, Nottingham.

J. Wilson . . . . .	£7,060	0	0
Preston & Hirst . . . . .	6,991	0	0
F. Messom . . . . .	6,678	0	0
C. Jones . . . . .	6,650	0	0
E. Rigby . . . . .	6,630	12	6
C. Baines . . . . .	6,495	0	0
S. Lowe & Son . . . . .	6,400	0	0
H. Vickers . . . . .	6,350	0	0
Mackenzie & Son . . . . .	6,270	0	0
W. Smith . . . . .	6,269	0	0
G. Hurst . . . . .	6,235	15	0
G. Brown & Son . . . . .	6,220	0	0
G. Fenton . . . . .	6,168	0	0
F. Pattinson . . . . .	6,154	12	7
J. H. VICKERS, LIMITED, Nottingham (accepted) . . . . .	5,990	0	0

**STOURBRIDGE.**

For making-up South Avenue, for the Urban District Council. T. VALE (accepted) . . . . .

£185 0 0

**TURNHAM GREEN.**

For erection of a warehouse. Mr. J. DARCH, architect. Quantities by Messrs. JOHN LEANING & SONS.

B. E. NIGHTINGALE (accepted) . . . . .

£8,230 0 0

**WHITCHURCH, TAVISTOCK.**

For building four houses on the Chollacott estate—plumbing, glazing and painting excepted. Mr. B. PRIESTLEY SHIRES, architect, Central Exchange, Plymouth.

W. H. HIGMAN, Tavistock (accepted) . . . . .

£1,450 0 0

THE Liverpool and London and Globe Insurance Company have issued the edition of their "Electrical Installation Rules" for 1897. The rules are an epitome of electrical engineering science in its practical aspects, and acquaintance with them is indispensable for all who have to arrange installations. They are expressed in clear language, and cannot be too widely known.

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## VARIETIES.

THE fine eastern window at Heckington parish church is to be filled with stained glass, at a cost of about 1,400*l*.

A WINDOW to the memory of the late Mr. Alexander Macmillan, the publisher, and to his son, the late Mr. Malcolm Kingsley Macmillan, has been placed in the north aisle of Bramshott Church, in Hampshire, in which parish Mr. Macmillan had a residence. The window is the work of Mr. H. Holiday, of Hampstead.

A NEW hall for the Perth Lodge of Good Templars was opened by Bailie Wright last week. The hall cost 1,200*l*., and is seated for 500.

THE Bournemouth Town Council have again had before them the question of the construction of an undercliff drive at Bournemouth. Since the recent landslip on the east cliff both the tenants and Sir George Meyrick, who have hitherto not seemed favourable to the control of the cliffs being in the hands of the Corporation, have become alarmed at the danger of leaving them any longer unattended to. Sir George has written a letter to the Town Council, by his solicitors, in which he expresses himself in favour of giving the town a lease, or an appropriation, of the cliffs, but he desired first to be informed as to what the Town Council definitely proposed to do in the way of preservation in case he handed the cliffs over to their control. The Town Council have discussed the question in committee, and instructed their surveyor to bring up a scheme for the preservation of the cliffs and an undercliff drive for consideration at the next meeting.

IT has been resolved to convert the Evesham Institute into a free public library.

CLEVELAND HOUSE, St. James's Square, once the town residence of the Dukes of Cleveland, will be offered for sale at Tokenhouse Yard in the course of next month. The Dukes of Cleveland had a long and distinguished ancestry, and were the owners of Battle Abbey, near Hastings, for which town the last duke was member of Parliament before his accession to the peerage. The late Duchess of Cleveland compiled a very interesting work entitled "The Roll of Battle Abbey," dealing with some of the earliest events in the family history of the oldest peerages of England.

LADY HARRIS has commissioned Mr. Joseph Whitehead, of Westminster, to execute a memorial of the late Sir Augustus, to be placed over his tomb in Brompton Cemetery. The

monument will consist of a white marble pillar, surmounted by a life-size bust of the deceased. At one side of the pillar stands a female figure of Fame, crowning the bust with a wreath of laurel. On the other side is a trophy emblematical of music and drama, the whole rising from a beautifully-moulded plinth. The monument will be completed in about six months.

A NEW post office was opened at Harrogate on the 4th inst. The building, which is Perpendicular in style, is built of stone, and has cost 9,000*l*. The architect is Mr. H. Turner, of H.M. Office of Works, Whitehall.

PLANS have been prepared by Mr. E. R. Robson for the erection of a kursaal and baths at the south end of the Winter Garden, Cheltenham, and for the conversion of the existing Winter Garden into Municipal Offices and Winter Garden. The cost is estimated at 50,000*l*. if all the work be done at once, and 53,000*l*. if done in sections.

NEW premises for the Scottish Co-operative Wholesale Society, which have been erected in Morrison Street, Glasgow, at a cost of 90,000*l*., were formally opened on Saturday last.

CONSIDERABLE anxiety being felt as to the safety of the south-west pinnacle of the tower of the old church of Tamworth, the vicar and churchwardens considered it advisable to take the opinion of Mr. Basil Champneys, who has made a careful survey. In a report Mr. Champneys states that in regard to the turret there is a considerable inclination towards the west, commencing above the second crotchet from the top and increasing towards the apex. The mortar has been so generally removed by the action of the weather that the whole upper portion of the spirelet seems to depend for stability on mere weight and balance, which is rendered more precarious by the decay of the stonework at a critical point on either side. He advised that the top of the spirelet be at once taken down to the level of the bed above the second crotchet from the top. Steps are being taken to have the more dangerous portion of the pinnacle at once removed, and when funds are obtained the remainder will be taken down and the whole re-erected in a substantial manner. The three other pinnacles of the tower have all been rebuilt during the present century.

THE next ordinary meeting of the Institution of Civil Engineers will take place on Tuesday next, January 12, at 8 P.M., when a paper will be read, with a view to discussion, on "Superheated-steam Engine Trials," by Professor W. Ripper, M.Inst.C.E. At this meeting the monthly ballot for members will be taken. Students' meeting, Friday, January 15, at 8 P.M.

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Paper to be read, "On 'Monier' Girders and Arches," by Mr. Walter Beer, Stud.Inst.C.E.

MR. WILLIAM GEORGE AYRES, builder, of Epsom, was attacked by four men in Mill Road, Epsom, on Monday night, rendered insensible and robbed of about 40*l*. and his watch. Mr. Ayres, who is in a precarious condition, is able to give only an indistinct description of his assailants.

A NEW monastery, which will be known as St. Phillip's College, founded by the Servite Fathers at Begbroke, near Oxford, was opened on the 5th inst. The building is intended solely for the training and education of novices and students of the Order.

THE slaters in Aberdeen have struck work in consequence of a dispute that has arisen in regard to the bylaws. The workmen desired to have put into operation a series of regulations as to the payment for overtime and country work, &c., that had fallen into disuse, but the masters declined to accept the bylaws or even to discuss them with the men. About 100 slaters are affected by the strike, which is likely to retard building operations if it is not amicably settled.

A STAINED-GLASS window has been placed in the side chapel of Wantage Church as a tribute to the memory of the late Dean of Lincoln, who for many years laboured as vicar of that town. It represents figures of three prelates—namely, St. Birinus, Bishop of Dorchester, who died A.D. 650; St. Wulstan, Bishop of Worcester, 1062; and St. Hugh, Bishop of Lincoln, 1186. These are the three dioceses in which the late Dean worked.

THE new public school at Thornliebank, which takes the place of the one that was burned to the ground two years ago, was formally opened on Tuesday last. The school, which is built in the English Gothic style of architecture, cost about 10,000*l*., and has accommodation for 600 children.

ON Tuesday afternoon the new public schools erected by the Aberlour School Board were opened with some ceremony. The new schools are situated opposite the Fleming Hall, and the principal approach to the new buildings is from the square of the village. Entering by the main door, which is at the west, the lobby, to the right and left of which there are teachers' retiring rooms, is reached, and it leads into the central hall, measuring 40 feet by 27 feet by 24 feet high. It is lined with birdseye maple, is well lighted, and is to be furnished with historical pictures. From the hall the various class-rooms are entered. These are all airy and well lighted. Besides these, there are

cloak and retiring rooms. Outside shelter shades have been provided for boys and girls. The cost of the buildings is about 3,500*l*., and they are built from plans supplied by Mr. Watt, Aberdeen.

THE Leatherhead Water Company are about to construct an additional reservoir, with a capacity of 1,000,000 gallons.

THE president of the Municipal Officers' Association, the Right Hon. the Lord Mayor of London, supported by Sir J. B. Monckton, Mr. C. J. Stewart, clerk of the London County Council, Mr. H. H. Crawford, City solicitor, and others, has kindly consented to preside at the annual dinner to be held in London on Saturday, February 27. This date is arranged to meet the convenience of town clerks attending the Municipal Corporations' Association dinner on the previous evening. The conference of associations and societies promoting the Local Authorities Officers' Superannuation Bill has, through its delegates, arranged to co-operate with the Municipal Officers' Association so that every branch of the municipal service may be represented. Applications for tickets (5*s*. each) should be addressed to the hon. secretary, Mr. C. J. F. Carnell, 33 Paulet Road, Camberwell, S.E.

### TRADE NOTES.

AT the Meltham, Yorks, District Council offices on Christmas Eve a new four-dialled illuminated turret striking clock was set in motion by Mr. Councillor John Mellor, chairman of the District Council, which has been presented by Mr. J. Brooke, J.P., Meltham, the necessary work having been done by Messrs. Wm. Potts & Sons, clock manufacturers, of Leeds and Newcastle, from instructions received from the architect, Mr. Wm. Carter, Meltham, who designed the hands and dials. The company afterwards partook of a knife-and-fork tea, when a vote of thanks was passed to Mr. Brooke for his generous gift.

THE new infirmary for the Sisters of Bethany, Bournemouth, is being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. PECKETT & SONS, Atlas Locomotive Works, Bristol, have sent us one of their abridged illustrated lists of tank engines suitable for ironworks, contractors, &c. The illustrations, which are admirably printed, convey an accurate idea of the various engines supplied by the firm, and each one is accompanied by full particulars as to dimensions of various

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parts, tractive force, and the purposes for which the engine is specially adapted.

THE Enamelled Metal Decoration Company, of Queen Victoria Street, have just supplied their decorative ironwork for the following list of public places:—Trocadero Restaurant; Mecca, Mark Lane; Freemasons' Arms, Long Acre; Commercial Sale Rooms, Mark Lane; Westminster Baths; Southend Public Baths; New River Company's offices, Clerkenwell. They have also been specified for the Poplar Hospital and various other important buildings.

WE understand that Mr. H. C. Eyres, London agent of the Coalbrookdale Company, Limited, has resigned his position there, and assumed the position of manager of the architectural department in London of the Falkirk Iron Company.

### BUILDING AND BUILDERS.

THE erection of new headquarters and drill hall in St. James's Street, Leeds, for the Leeds Volunteer Medical Staff Corps, has just been commenced. The drill hall will be 68 feet in length and will have a width of 35 feet, with a wood block floor resting on a bed of concrete. The roof is to be of wrought iron, with a glass lantern in which adequate provision for ventilation, by means of windows, will be made. The other buildings will comprise quartermaster's office, stores and residence of the staff-sergeant, while outside the main block a lavatory will be fixed and a shed erected for the service waggon. The whole of the work is to be done in accordance with plans prepared by Mr. William Bakewell, of Leeds.

THE United Methodist Free Church has decided to build a permanent church at Ipswich, at a cost of 3,000*l.*, to replace the existing iron structure. The connexional authorities have given permission to build as soon as 1,500*l.* is raised.

THE Free Methodists are building a chapel and school at Frodsham; and at Dunham Hill, in the same circuit, they have secured a site for a chapel, the erection of which is shortly to be commenced.

EUROPE contains 560 miles of electric railway, with 25,000 horse-power, and 1,747 cars. In the United States there are, according to the latest figures, 12,133 miles of road (more than twenty-one times that of Europe), with a total of 34,971 cars.

### THE BELLS OF ST. SAVIOUR'S, SOUTHWARK.

IN the tower of St. Saviour's, Southwark, hang twelve bells, deemed by many experts the finest ringing peal in the world. The tenor exceeds 2½ tons in weight, and, with nine of the sister bells, dates back more than a century and a half to the year 1735, when they were recast from an older peal made in 1424 out of the metal of seven bells of whose remote history nothing remains save that they bore respectively the names "Mary," "Stephen," "Anne," "Lawrence," "Vincent," "Nicholas" and "Augustine."

From 1735 down to the inception of the restoration the peal of twelve were handled alternately by the two great ringing societies of the Metropolis, the "Ancient Society of College Youths" and the "Royal Cumberland Society," who vied with each other in creating an unsurpassed record of marvellous change-ringing performances, many of which are, or were, to be found inscribed on the walls of the belfry.

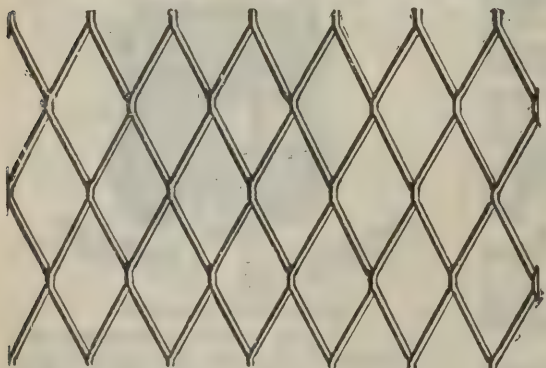
But for long has reigned the silence. When is it to be broken? If, as commonly reported, a dearth of funds is the difficulty, surely during the present year, when there are to be new bells by the hundred, money can be found to put in order this grand and time-honoured peal, the costliest treasure of St. Saviour's Church.

### THE QUEEN'S VISIT TO CIMIEZ.

THE Excelsior Hotel Regina, at Cimiez, where the Queen is to stay during her visit to the Continent early in March, is now rapidly nearing completion. That portion which has been retained for the Queen comprises some 150 rooms, and those which are set apart for Her Majesty's particular use include a grand and spacious reception-room, a commodious dining-room, and a dainty salon. The prevailing colours of the reception-room are gold and white, the style being Empire. The dining-room, in striking contrast, is exceedingly rich in tone. Carried out on Elizabethan lines, the rich red velvet is in pleasing harmony with the warm tints of the decorations. In the case of the Louis Seize salon, one cannot help being struck with the blending of the delicate fawn of the carpet and the blue silk, which has been, it is worth noting, specially designed and woven for this apartment, being the one which the Queen will more generally use.

The Princess's suite of rooms is on the first floor, and corresponds in plan with that of Her Majesty, furniture and decoration being carried out on similar lines.

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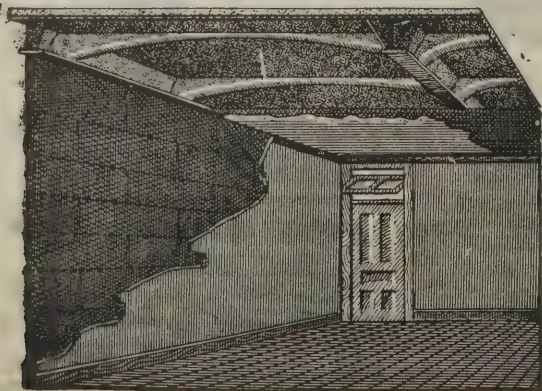
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Altogether, the hotel includes about 500 rooms, and the furniture of this great building has been exclusively entrusted to Messrs. S. J. Waring & Sons, Limited, of Oxford Street, London, who, it will be remembered, had so important a work at the Hotel Cecil.

### THE PENRHYN QUARRY STRIKE.

THE correspondent of the *Times* says that the situation in the Penrhyn Quarry strike has not changed, nor is it likely to change for some little time. Meanwhile, the fact that Lord Penrhyn, through his chief manager Mr. Young, has formally closed the quarries seems to have been taken in many quarters as a proof that he does not intend to quarry slate at Bethesda ever again. It is not necessary to make any inquiry of Lord Penrhyn to be able to say that, as a matter of course, he has no such idea in his mind. For him to close the quarries for ever and to ruin a populous district and a town with some 7,000 inhabitants would be not merely inhuman, but financially suicidal; for apart from the fact that the yearly profits of the quarries are large, the greater part, if not the whole of the district is the property of Lord Penrhyn. Moreover, his action in closing the quarries is precisely analogous to that which has been taken before, and will no doubt be taken again by other employers of labour in like circumstances. The facts, be the merits what they may, are plain enough. Since September of last year practically the whole of the able-bodied men in the quarries have been idle. But the few men who did not strike, being for the most part old men and virtual pensioners, were kept on in employment to the end of the year. There was a certain amount of work to be done in the way of working down to Port Penrhyn slates that were ready for the market, and, no doubt, there was a good deal to be done in the way of clearing away rubbish and bad rock. That, however, has come to an end, and the result is that the old men have been placed on a pension list and the remainder have been discharged with gratuities. But this simply means that, so long as the deadlock between Lord Penrhyn and his quarrymen continues, there is no need for any men in the quarries. The slate rock, which has been in a condition of readiness to be quarried for some thousands of years, may be trusted to remain so ready for an indefinite period without aid

from man. In fact, apart from the question whether an employer ought or ought not to concede certain terms to his workmen, there are but two things which he can do, unless he is inclined towards arbitration, when his men strike. He may either fill their places, as Mr. Livesey filled the places of the men who struck at the South Metropolitan Gasworks, or he may let his works lie idle until, from his point of view, the men regain their senses, or, from the men's point of view, he is compelled to take a reasonable view of the situation.

The difference between the Penrhyn quarries and the mass of other places of employment is, first, that the peculiar skill of the men employed is such that it would be exceedingly difficult to supply their place, and, secondly, that the quarries, unlike collieries and many other enterprises, suffer little or nothing by being left alone. In the first point lies the strength of the men, and they know it. Theirs is an almost hereditary skill, and they have every right to sell it to the best advantage. In the second point lies the strength of the employer, who needs not to fear that, when the strike comes to an end, he will find, as many a Durham coalowner found when the Durham coal strike ended, that the subject-matter of his enterprise has become worthless. These matters are pointed out because they are essential to an understanding of the situation, which is simply that the forces on both sides are strong, and the issues real and not merely nominal. But that the deadlock will end some day is quite certain. Equally certain is it that strikes in the quarries, whether at Penrhyn, or in Mr. Assheton Smith's quarries at Llanberis, or at Festiniog are usually obstinate affairs. What form the solution may take is another matter. It may be that Lord Penrhyn will follow the example of a neighbouring quarry-owner, who, during a similar strike some years ago, adopted a bold policy. For two days in each month employment at the quarries was offered on the owner's terms. Failing acceptance, the men had another month's idleness to look forward to. This went on for some months, and then an agreement was reached. I do not commend this course or disapprove it; I simply state that it was followed. Or, as soon as the excitement arising out of the efforts of the Board of Trade has cooled down, there might easily be a conference of employer and employed, attended by a competent shorthand writer—one of the legal shorthand writers from the Royal Courts, for example, whom no sane man would accuse of partiality. But at present neither side is in the most amiable of moods, and, though the deadlock cannot be permanent, it is likely to last a month or more.

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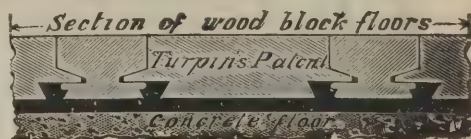
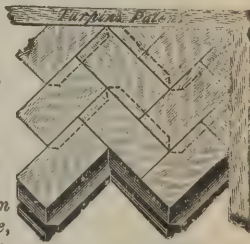
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## TESTS OF CONCRETE.

SOME important tests of concrete were recently made at McGill University, Montreal, by Messrs. Theo. Denis, G. G. Hare and Carl Reinhardt, the results of which will be found below. The experiments are rendered particularly interesting by the fact that the general opinion of the effect of water on cement is somewhat erroneous. Following is the report of the tests as presented at a meeting of the Canadian Society of Civil Engineers:—

Of late, monolithic works of great importance have been carried out, and every day concrete, as building material, is creeping to a foremost place.

Although cement testing proper has been subjected to elaborate scientific and practical investigations, very few researches, and especially normally conducted researches, have been made on the strength and behaviour of concrete and betons. This probably is due to the fact that for such experiments heavy and costly apparatus is needed. Investigations on small specimens would be useless, and conditions approaching as nearly as possible to practice have to be followed.

The following are the results obtained from a series of experiments made by students of McGill University, 1895-96.

The object of this first series of experiments is to determine the effect of different per cents. of water on the strength of the concrete. The limits were 16 and 30 per cent. of water, by weight of cement and sand, which are beyond the extremes of practice on both sides.

*Cement.*

The cement used was, of course, the same brand throughout the series. It was a German Portland of good quality, slow setting, on which separate sand tests were made in connection with this series. The results are tabulated below.

*Sand.*

This was clean, coarse, angular, dry sand of good quality, of slightly higher grade than usual practice.

*Stone.*

This was broken limestone of such size that the pieces would have passed through a ring  $1\frac{1}{4}$  inch diameter. They were unscreened, and just as they came out of the breaker. Consequently a slight amount of dust was mixed with them. They had to be broken a little smaller than in actual practice. The blocks of concrete being only 1 cubic foot, it was thought that more accurate results would be obtained in this way.

*Moulds.*

The moulds were made of  $\frac{3}{4}$ -inch plank, lined with sheet zinc. They were 5 feet long, 1 foot high and 1 foot wide, divided into four compartments, which would mould four cubes at once, of dimensions 1 by 1 by 1 foot, forming specimens large enough to investigate seriously upon. These were removed by unscrewing one side of the box and sliding them out. Care had to be taken to oil the sides of the moulds slightly before ramming the mixture in them, to avoid trouble in getting them out.

*Conditions of Mixture and Proportions.*

The proportions adopted for this series were one of cement, two of sand and four of stones, by weight, the proportion of water being based on the weight of sand and cement.

The cement and the sand were first thoroughly mixed dry, then the water added gradually. The stones were then thrown on this mortar, spread out, and the whole vigorously and very thoroughly mixed. The fresh concrete was then placed into the moulds and rammed in  $1\frac{1}{2}$  to 2-inch layers.

*Ramming.*

The rammer was a block of hard wood 2 feet long by 2 by 2 inches, with a lathe-turned handle. It was not very easy with this to ram uniformly, even throughout one block, and this is one of the main sources of discrepancies in this series of experiments.

It was thought that a reduction of the breaking loads to a standard weight of the blocks would be only fair, and would slightly improve the results.

*Grouping of Tests.*

The tests were made at one week, four weeks and two months, and the results grouped accordingly, that is to say, the one-week tests, with different per cent. of water, compare between themselves, four weeks and two months likewise. Parallels between the results, at different ages, cannot be drawn on

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account of some specimens having been prepared under widely different conditions. For instance, the results at two months are exceedingly low as compared with those obtained at one and four weeks. This is due to the fact that these two months' specimens were the first prepared of all, and this before the cemented trough in which they were to be immersed was completed. Consequently, they were kept eight to ten days longer than the others in the dry air of the laboratory, which seems to have had a disastrous effect on them. But in spite of these slight drawbacks, the annexed table shows that up to 24 per cent. the percentage of water has not a very great effect on the strength. This is an important point, for below 20 per cent. the mortar obtained is rather dry and very difficult to handle.

But beyond this limit of 24 per cent. a greater proportion of water seems to weaken the concrete considerably.

This limit is very sharply defined in the adjoining table, where an additional 2 per cent. of water from 24 to 26 per cent. weakens the concrete by almost one-half for the one-week tests. It is, however, interesting to notice that strength is almost completely recovered with time, the four-weeks test showing the weakening limit to be between 26 and 28 per cent., and the two months between 28 and 30 per cent. So that if immediate strength be not required of the concrete structure, 28 per cent. of water will not affect the ultimate resistance if allowed to stand two months.

In the parallel sand and cement tests the weak line is not so sharply defined, but yet it is sufficiently so to show that the same statement applies. The tests in this case show a marked weakening between 14 and 16 per cent. of water for the one week, which strength is ultimately recovered, as is shown by the four-weeks and two-months test.

The low limit of 14 per cent., as compared with 24 for the concrete is probably due to the fact that the stones of the concrete, on account of their porosity, absorb a part of the water.

The table shows that the great density is obtained with 16 and 18 per cent. The weights of the cubes beyond this decrease up to 24 and 26 per cent., where they are again nearly equal in density to the 16 and 18 per cent. of water. Therefore this 24 and 26 per cent. seems to be the point where the best practical results are obtained, because 16 and 18 per cent. make up too dry a concrete to allow of easy handling.

Another point incidentally comes up. Attention has been drawn to the poor results obtained by the same tests and reason of long exposure to dry air given. This shows up a very

important point, namely, the necessity of covering up carefully all concrete and cement works exposed for any length of time to dry air and sun. The bad effect of these agents is plainly demonstrated, and it is doubtful whether much strength would ultimately have been recovered.

It is also interesting to notice the results obtained by the concretes made of 1 part of cement, 2 of sand and 5 of stones, and 1 cement, 2 sand and 6 of stones. The specimens of these compositions gave results equal to concretes 1, 2, 4, showing that for strength they are as good as the ones containing a less proportion of stones, while being much more economical.

These experiments are as yet very incomplete. But it is hoped that the researches in this subject will be continued and valuable information for the engineer in practice derived from them.

### Concrete Tests—Compression.

Proportions by weight : 1 part cement, 2 sand, 4 stone.

Per Cent. of Water by Weight of Cement and Sand.	Crushing Strength per Square Inch.			Average Weight of Sp. per C.F.
	One Week Comp. Tests.	Four Weeks.	Two Months.	
16	792	677	382	141.5
18	653	679	507	143.0
20	746	626	507	139.5
22	620	615	670	139.5
24	679	542	559	141.5
*26	362	545	500	141.2
28	326	340	823	138.0
30	245	331	361	135.5

Proportion by weight : 1 cement, 2 sand, 5 stone.

20	703
	1 cement, 2 sand, 6 stone.
20	728

### Cement and Sand Tests.

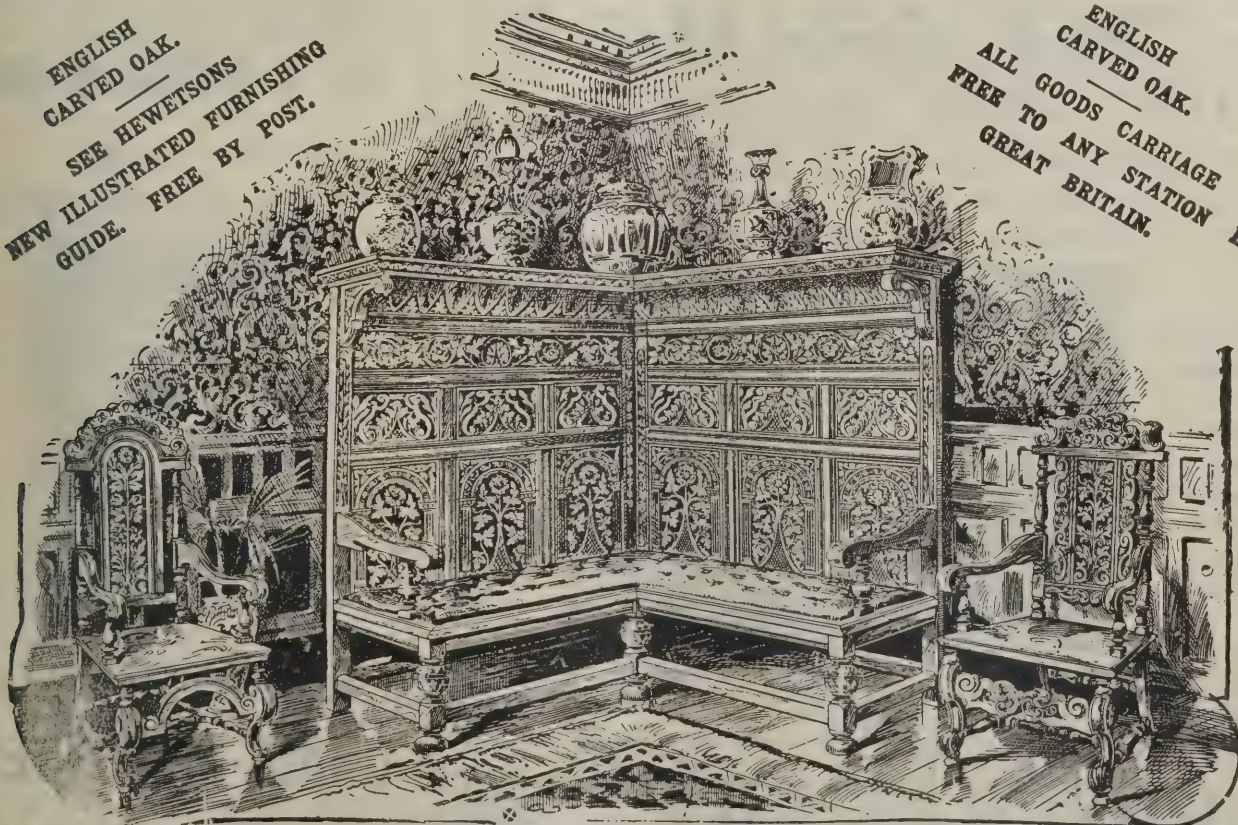
Proportions : 1 cement, 2 sand.

10	825	800	1822
12	800	1311	1666
14	750	1000	1100
*16	475	1389	1777
18	395	1110	1266
20	400	913	1633
22	330	844	1233
24	388		1230
26			1000

\* Line of weakness due to excess of water.

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## WIRED GLASS.

ON November 1, 1893, the committee of science and the arts of the Franklin Institute adopted a report recommending the award to Frank Shuman of the John Scott legacy premium and medal for his machine and process for producing wired glass. This report at some length discusses the varied uses to which wired glass can be put and its superiority in numerous applications over the ordinary glass. The question of the fire-retarding qualities of the wired glass, however, was passed over without special comment.

In December, 1893, Mr. W. S. Lemmon, inspector of the Newark (N. J.) committee of the Underwriters' Association of the Middle Department, requested an owner in that city to place wired glass in two windows of his warehouse to protect it from external exposure. This resulted in a test of the fire-retarding quality of wired glass in Newark, which is described by Mr. Lemmon in a letter as follows:—

"A small brick building, about 6 by 10 feet, was built, in which were placed the following windows, all glazed with wired glass  $\frac{1}{4}$  inch in thickness:—One 20 by 80 inches, one 28 by 80 inches, and one 30 by 80 inches. In the building a fire was made for half an hour, a high degree of heat being developed. When the glass became red-hot, cold water was turned on by the city fire department, under 60 lbs. pressure, through the regular fire hose. In addition to the throwing of water on the glass, the chief of the fire department tried, without success, to throw a half brick through the glass while it was red-hot; this was to show the result of falling walls against the glass when in actual use for exposure purposes."

In this test the frames holding the wired glass in place were constructed of angle iron and of galvanised sheet iron. The intense heat warped and bent the metal work, but the glass did not fall out on account of the warping. Mr. Lemmon further reports that since December 1893 nearly eighty windows in his city had been constructed of wired glass in metal frames to protect buildings against outside exposure, and in a number of cases actual fire tests proved the value of the wired glass for the purpose designated.

In Philadelphia, besides being used in a number of fire doors in stairway and elevator shafts, wired glass partitions have been erected in a number of buildings.

At the request of the Mississippi Glass Company, which controls the manufacture of wired glass, a series of tests of the fire-resisting qualities of wired glass was made, the main test

being described in the following report made to the committee of the Philadelphia Fire Underwriters' Association:—

A brick test-house, about 3 by 4 feet inside measurement and 9 feet high, was constructed in the yard of the Pennsylvania Ironworks, near Fiftieth Street and Merion Avenue. In one side of this structure a wired-glass window was fastened in a wooden frame covered with lock-jointed tin. In another side a Philadelphia standard fire door was hung. The upper part of this door had a pane of wired glass, 18 by 24 inches, set into a wooden metal-covered frame. The entire roof of the test-house was replaced by a skylight, the sash being constructed of wood, metal covered, one side of this skylight being provided with three lights of quarter-inch ordinary rough glass, the other side with three lights of wired glass. The entire structure was constructed by John J. Husband in accordance with specifications furnished by the secretary. The wired glass used was  $\frac{1}{4}$  inch thick, and was manufactured by the Mississippi Glass Company, of St. Louis.

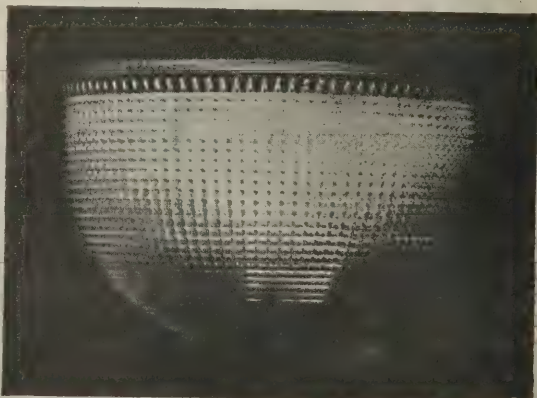
In order to make the fire test as severe as possible, iron grate bars were placed in the bottom of the test-house and openings were left in the wall near the ground for free draught. The test-house was filled for two-thirds of its height with wood, approximately one-half cord being used. After treating the wood with a liberal allowance of coal oil and resin the fire was started. In a few minutes the ordinary rough glass in the skylight cracked, and pieces began to fall into the fire. The wired glass in the fire-door soon became red-hot, so that a piece of paper held against it on the outside was easily ignited. The three plates of wired glass in skylight, subjected to the entire heat of the fire, also became red-hot, but retained their positions throughout the test. At the end of thirty minutes water was thrown on the fire and also on the hot glass. After the fire was extinguished the three plates of glass in the skylight were found to be cracked into countless pieces, but still adhering together, forming one sheet. The window light, which, as the result showed, was not properly secured to the frame, was found to be of the same condition as skylight glass, excepting that a large crack had developed. The plate of glass in the standard fire door was cracked the same as the skylight, but having been well secured into the door frame it did not give way. The action of the fire on the wooden metal-covered skylight and window frame showed conclusively that this class of construction is far superior to iron framing, no warping or giving way of any portion of the frames being noticed. The fire-door in

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direct contact with the fire showed but little buckling on the inner side and no signs of giving way. On removing the tin covering it was found, however, that the inner layer of 1-inch boards was completely charred through, but that the second layer was only slightly damaged.

The conclusions to be drawn from the test appear to be as follows :—

1. Wired glass can safely be used in skylights, and in such situations will withstand a severe fire and will not give way when water is thrown on it. A wooden framing for skylight, covered with tin, all seams lock-jointed and concealed-nailed, is superior in fire-resisting quality to iron framing.

2. Wired glass in wooden sash, covered with tin, all seams lock-jointed and concealed-nailed, can safely be used for windows towards an external exposure.

3. Wired glass can safely be used in fire doors to elevator shafts and stairway towers where it is necessary to light said shafts.

4. In office buildings, hotels, &c., where it is undesirable to have elevator shafts entirely enclosed and dark, wired glass permanently built into a brick or terra-cotta shaft, or arranged in a wood metal-covered frame, can safely be used.

5. Wired-glass plates securely fastened in standard fire shutters can safely be used toward an external exposure. In this case, the fact that a possible fire in a building, all windows of which are protected by fire shutters, can much more readily be detected from the outside through the wired glass, is of importance.

The President of the Boston Manufacturers' Mutual Insurance Company witnessed a test of the fire-retarding quality of wired glass in Boston. A circular issued by him runs as follows :—

There are many places in our risks where it would be very desirable to brick up windows if the light could be spared, but where the requirements for light render it necessary to leave the spaces as they are, often protected with automatic shutters, but sometimes under such conditions that the risk must remain unguarded.

The intervention of wired glass will, in such cases and in many others, suffice to retard the passage of fire in a fully adequate manner. This glass, originally invented for skylights, is now being applied to fire-retardent purposes. It has been introduced in some of the western cities around elevators in place of the ordinary iron cages. It may be used in our risks for similar purposes.

First, it may be remarked that while at the beginning, when used for skylights, some defects were disclosed in the differential strain on the glass and the wire under the heat of the sun, that fault is claimed to have been entirely removed. It would not affect the present purpose.

Second, a test of the fire-resisting properties of this wired glass was witnessed by the undersigned in the vicinity of the Boston Plate Glass Company on A Street, South Boston. What might be called an iron stove was constructed in the form of a fireplace with a wired glass-blower. It was 3 feet high, 1 foot in depth from face to back, 2 feet wide on front. It was set up on bricks, so as to give a draught all around, and was open at the top. The plate of glass which formed the blower was 18 by 34 inches. This fireplace was filled to the top with hard wood and resinous wood upon which kerosene oil had been poured, which was set on fire, resting in front against the glass.

The first effect was to cover the inside of the glass with soot, but after about fifteen minutes the soot was burned off, leaving the glass clear as at the beginning. The stove was recharged, and this intense heat affected the glass for nearly half an hour. A stream of cold water was then thrown on the glass from the outside. Presently the fire was put out with another stream, and the glass was showered from within. The effect was to crack the glass into millions of pieces, but, being held by the wire, none fell out, neither did the glass spring or bend. It held its place even while the iron of the stove was twisted and bent.

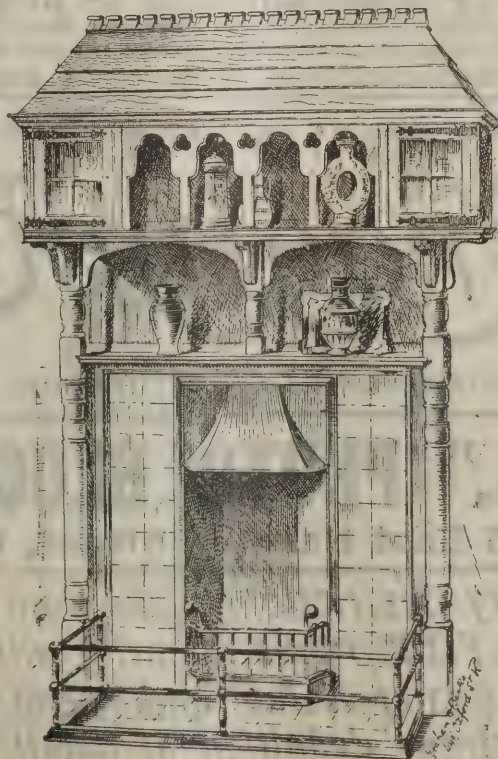
This glass has already been placed at dangerous points in a few of our risks, and may be recommended in all places where the light must be retained, but where it is desirable to put in a fire-retardent material. We have as yet no experience in the test of this kind of window under actual fire.

The glass on which these tests have been made, which is intended for windows or doors, is  $\frac{1}{4}$  inch thick, but it is made up to 1 inch in thickness. The  $\frac{1}{4}$  inch is, of course, too heavy for the ordinary window-frame, nor should any wood be used in the setting of the glass unless absolutely protected. Instructions will be given for placing it in metal frames. This glass is made up to 1 inch in thickness, and that thickness, properly supported beneath, might in many places be suitable to put into floors for the purpose of giving light in dark basements or elsewhere, of course being placed so as not to be subjected to trucks with iron wheels or other danger of chipping.

It is clearly indicated from the above that wired glass can

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safely be used as a fire retardant in numerous ways. Metal-covered wood framing is superior to iron frames for holding the glass in place. The capability of the wired glass to withstand a temperature beyond the melting point of glass appears to be attributable to the fact that the network of wire in the glass acts as a good conductor of heat, and thereby prevents the accumulation of sufficient heat to melt the glass; and although it may thereby be softened and rendered pliable, the network of wire prevents the glass from giving way by reason of its own weight when softened by the heat.

### THE TIMBER TRADE OF 1896.

THE building trade of Bristol has been brisker than for the past five years, and while prices have been higher owing to the advance in the value of material, especially timber, the workmen in all branches have been well employed, and plasterers and painters throughout the summer months were very busy indeed. The increased work has chiefly been in commercial buildings.

The timber trade in the Hartlepoons has been exceptionally brisk. The import is the largest on record, amounting for the eleven months of the year to end of November to 383,591 loads, as against 348,226 loads in the same period of 1895. The consumptive demand has been large, alike for ship and house building woods and mining timbers, and stocks of all classes are small, in spite of the large import. Prices have advanced by about 25 per cent. all round, and contracts for next year have been closed at satisfactory figures.

The year has been a most satisfactory one on the Humber. The total imports at Hull fall not far short of 750,000 loads. This shows an enormous and unprecedented increase, and the same terms accurately describe the advance at Grimsby also. Prices now paid are an advance upon those current a year ago.

Messrs. Allison, Cousland & Co., Glasgow, report that the year just finished has witnessed a remarkable activity in the timber trade. Imports all round were heavy, but there was an excellent demand, and stocks were rapidly worked off. The season opened with freights about last year's figures, and the imports were heavy, but with a sharp advance in September they were gradually curtailed, thereby materially strengthening the position of stocks on hand. Prices showed a steady and continuous rise to the end of the year. Several features of outstanding

interest fall to be noted. The gradual displacement of yellow pine in the log, and the expansion of the trade in deals and boards are very noticeable. The position of teak also calls for remark. It was sold in January at 8*l.* 15*s.*, and the price now is 12*l.* to 12*l.* 5*s.* Quite a feature also was the number of small contracts entered into on account of Canadian shippers, the benefits from which were very questionable. Housebuilding and shipbuilding being our principal wood-consuming industries, the timber trade participated in the activity which characterised these trades throughout the year. The cabinet and box-making trades were also busy.

According to Messrs. Churchill & Sim, London, the figures of the importation of wood into the United Kingdom show very forcibly the remarkable character of the trade during 1896. The total quantities are far the largest of which we have a record in recent years, and the prolific supply, so far from overpowering or deadening the consuming markets, has been coincident with a rise in values which, while beginning quietly and continuing steadily with no element of excitement for the greater part of the year, has attained to something of fever heat in the closing days of December. The causes of this expansion and improvement in the trade, being even now somewhat obscure and prosaic, were not largely foreseen a year ago. The stocks in this and other consuming countries were then small, and there was a definite revival in trade. Buyers, therefore, were prepared to make purchases, and shippers, having a considerable output to deal with, made no effort to lift prices beyond their reach. The result was an immense business in January last, at a very moderate increase on the cost of the 1895 importations. Some signs of exhaustion and nervousness followed, but markets were held firmly throughout this phase, and an under-current of quiet buying, soon resumed, carried the trade through the first half of the year at a gradual improvement of the opening prices. From that point shippers began to understand that they were masters of the position, and buyers were rather unwillingly dragged upwards to their purchases till October. Then, partly startled by a squeeze in freight rates, and wholly satisfied with the retail demand which was carrying off their stocks, they, too, took alarm at the prospects of dearer supplies in the new year, and throughout November and December there was a rush to buy for forward shipment at whatever prices were necessary; a disposition of which foreign shippers have taken full advantage. The trade has shown a steady maintenance of good prices. This was due to moderate and well-regulated supplies, good consumption and the strong

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position adopted by importers in not unduly pressing sales. So far as large, good logs were concerned, prices showed an increasing firmness, and are now rather higher than at the beginning of last year. Small wood relapsed slightly in the autumn, but is now steady. The total quantity landed of the six leading descriptions amounted to 27,247 logs, as against 25,075 logs in the previous year, and as consumption absorbed 31,617 logs, stocks are reduced to 9,506 logs, and have not been so low since 1889. The actual quantity remaining in importers' hands is exceptionally small and consists exclusively of recent arrivals. No heavy shipments are anticipated, and the strength of the market lies in the fact that, owing to the higher prices, yard-keepers, instead of buying freely for stock, only fill immediate wants and are, therefore, always ready to purchase.

According to Messrs. Farnworth & Jardine, of Liverpool, the business of the wood trade in this market during the past season has been of a more satisfactory character than for several preceding years, greatly aided by the extremely low rates of ocean freights. In colonial and Baltic goods the volume of business has increased, and the consumption (especially of some of the leading articles) has shown a marked expansion. The stocks held over are not beyond the requirements of the trade. Values have been well maintained, with generally an upward tendency. The building trade has been very active. In mahogany and other furniture woods the business has also been of a satisfactory nature—an active market and high values.

Messrs. Foy, Morgan & Co., London, say:—The past year has been exceptionally favourable for the timber trade, prices in almost all departments having slowly hardened until the close of the season. All stockholders have consequently realised easier and more liberal profits, while importing firms have, during a period which at one time seemed hazardous owing to the increased cost, unexpectedly reaped a harvest to which there is no parallel later than 1888. The grounds for the satisfactory nature of last year's business and the increased cost of next season's supplies are practically the same, being quite general and not merely local. Among them the most prominent have been, first, the unusually open weather last winter and spring, which permitted building operations to proceed uninterrupted, stimulating consumption and leading to a considerable depletion of customary stocks throughout the country; secondly, the unexpectedly cheap freights ruling in the spring and summer, which allowed the gap in stocks here to be filled at an almost imperceptible increase in cost, whereby affording

the merchants the opportunity, while the demand continued unabated, of an easy turnover at a profit somewhat more liberal than usual, and finally the sharp and totally unforeseen rise in autumn freights, which effectually prevented the impulse to import at a time when such additions to stocks were certain to become dangerous. The month of September proved to be the crucial period, and if freights had not risen the home stocks would undoubtedly have been much larger, and the need of buyers for new goods therefore less intense. As it is, the import during 1896 has expanded to an extent which in ordinary seasons must have led to a general collapse in prices.

### THE ATMOSPHERE OF GLASGOW AND ITS EFFECTS.

SOME years ago an examination was made of the air of different towns, and at that time the condition of matters was stated as:—Manchester, 12' (7124); Newcastle-on-Tyne, 16'7; Glasgow, 18'4 (10589); these figures being the estimated amount of chlorides, while in the brackets are given the amount of acidity (calculated as  $\text{SO}_3$  in grains per gallon of rain). Ammonia salts are a product of the decomposition of animal matter, and their estimation gave, taking Valentia in Ireland as standard purity of 1—Liverpool, 29'89; Manchester, 35'94; Glasgow, 50'55. Albuminoid ammonia, determined by the analysis of the free organic matter in the air, gave—Valentia, 1; Liverpool, 4'67; Manchester, 7'38; Glasgow, 8'82. Nitric and sulphuric acids, the product of the oxidation of organic matter, and the oxidation of a sulphur base, gave respectively:—Nitric acid—Valentia, 1; Liverpool, 1'57; Manchester, 2'79; Glasgow, 6'72. Sulphuric acid—Valentia, 100; Liverpool, 1,450'2; Manchester, 1,641'9; Glasgow, 2,571'; showing, on the whole, that if Glasgow aspires to the rank of the Second City, she may also aspire to the distinction of breathing the most offensive air. We have already mentioned that the air contains many substances, for the most part invisible, divided broadly into gases, dust particles and aqueous vapour, this last varying in quantity with the temperature. One cubic foot of air at 100 deg. Fahr. holds in suspension 20 grains of water, while at the lower temperature of freezing the same capacity of air can sustain only 2 grains. It is well, now, to note the important part that dust plays in this atmospheric economy of nature, a part, in fact, whose importance can hardly be over-estimated.

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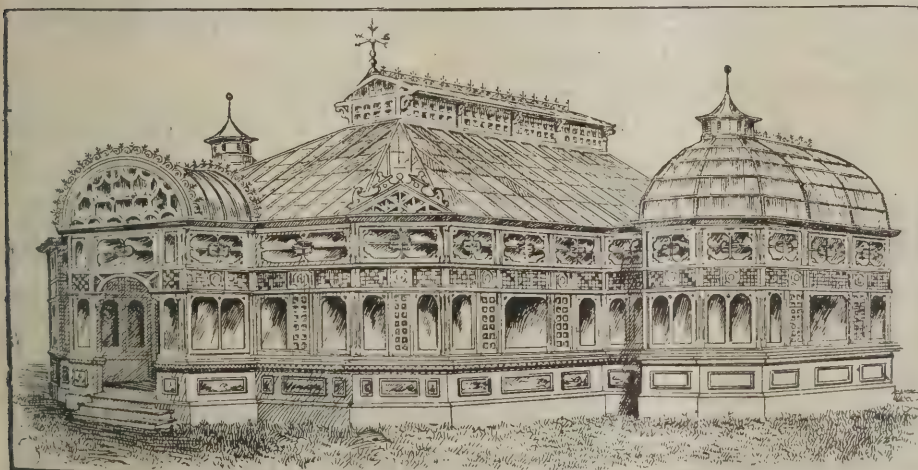
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Mr. Aitken was the first, we believe, to point out that the aqueous vapour in the air requires a free surface on which to condense, and the minute dust particles, which are always more or less present, afford that surface. A course of observation was instituted at the observatory on Ben Nevis with the particular intention of determining so far as possible the amount and relativity of those dust particles. The eighty observations daily were reduced to a mean of ten, and the general deduction appeared, winds are aqueous or aerial—i.e. "wet" or "dusty." Scotch mist contains very little dust, while fog and haze, or any obscuring mist, contain always a large quantity. Our position, then, is, knowing already that the air contains various acids in suspension, and knowing also that the more dust is present the more is there condensation, the acids in the air are converted into corrosive and destructive solutions, and a process of incipient deterioration is inaugurated. Rain is undoubtedly the chief factor in the gradual destruction and defacement of public decorations, and, as by imperfect combustion of coal and mechanical processes, dust is discharged into the atmosphere, and other inorganic substances are given off, the dust particles assist the condensation of these aerial solutions, and the acids are all in turn projected upon the city. Rain is "air washings," and as the atmosphere mechanically acquires the exhalations of the surface beneath, by determining the constituents of the rain we learn what is in the air, and know from them the particular process going on beneath in our midst.

Having gone so far, we may now be permitted to dismiss all further considerations of purely physical interest, and examine the action of this highly offensive air upon the decorations of the city. In the year 1874 the Municipal Chambers in Ingram Street were opened for the conduct of public business. At that time the carvings and other external sculptural decorations were sharp and crisp from the chisel of the mason. This building has thus been exposed to the influence of a period of twenty-one years' corrosion and erosion, the result being that to-day its appearance is in the highest degree disreputable. Its carvings are defaced, the plane surface is denuded and torn up, the general *tout ensemble* being an effect of the most extreme dilapidation. Many of our public buildings show the same progress towards deterioration, though in varying degrees. It is probably not too much to say that the venerable cathedral may have suffered more within the last century than in all the previous period of its existence. However, there is this much to be said—old buildings have a better chance of survival than modern

ones, since stone which has been exposed to a pure atmosphere for a long period invariably protects its surface by a thin patina of silica, which is an effluent of the inner pores of the stones when fresh from the quarry. The carbonic acid of the air assists the formation of this insoluble silica: it follows, that to improve an old building by scrubbing or chiselling off the old surface is but to completely open the way for a new and first inroad of strongly corrosive substances, from which, in point of fact, it was previously protected. Stone is a combination of silicates. In chemical parlance a silicate is, a "salt," and a "salt" is the resultant of the union of an acid with a "base." In stone the base is alumina, potash, soda, lime, &c., varying in quantity and properties with different kinds of stone, while the "acid" is "silicic acid." The *modus operandi* of the destructive process may be put shortly—the sulphuric and other acids act upon the silicated compound, they unite with the "base" and leave the silicic acid free; the rains gradually remove it, but the salts left in its place are soluble and the result is the stone is first dissolved, its form destroyed and a fresh surface left for continued solution. Consequently old buildings, as we have said, whose surface is not a silicate, but a film of pure "silica," which is most insoluble, are comparatively safe, while the unformed modern stone is built but to decay. Much, of course, depends upon the nature of the stone and the method in which it is built. A due regard for its geological axis will assist in its preservation. It is probably not too much to say that any stone almost is liable to deterioration in such an atmosphere. Cleopatra's Needle on the Thames Embankment has part of the inscription obliterated. The side facing Charing Cross station has almost entirely disappeared. The names of Thothmes III. and Rameses II. have almost vanished. This is in London. The atmosphere of Glasgow is quite as corrosive. This condition of the atmosphere undoubtedly calls for very immediate attention. The pollution of the Clyde has attracted much consideration, and various means have been proposed for its purification, but the fact has probably been lost sight of that the air above is a source of danger and nuisance infinitely more formidable than the Clyde. No sculpture is safe in Glasgow. Marble cannot exist in the open air, as, apart from the question of dirt, soot and olefiant smut, the free carbonic acid of the atmosphere would exert too solvent an influence on the calcium carbonate of which it is mainly composed. It is chiefly on modern buildings that the strongest corrosion is apparent. While the tooth of time has gently nibbled the angles of the old houses it has in many



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cases obliterated the ornaments on buildings comparatively modern.

One point of particular interest to visitors in a strange city is undoubtedly its statuary. Apart from the historical interest that more or less attaches to such decorations, there is the idea of locality as a rule invariably associated with it. In the mind of a citizen of Glasgow, for example, the Cross is inseparably coupled with the idea of King William. George Square cannot be thought of without its statues, and it will often be found that the most permanent memory of a town is the nature and location of its monuments. So it must occur to visitors to Glasgow; and while the city is fairly well set forth in this direction of statuary, probably in no other town in the kingdom are the monuments in such a dirty and disreputable condition. In a pure air the one intrinsic quality of bronze is the exquisite patina which develops upon the surface, the colour varying with the component proportions of the metallic alloy. This chromatic quality of founding is an art which the Japanese have carried to a very high degree of excellence. Their Shibuichi, a grey bronze formed of copper and silver, gives an exquisite series of colour tones in yellow grey; the Shakudo, a copper and gold alloy, when treated in certain acid baths, produces a patina ranging from violet to blue-black. Bronzes containing lead, tin, antimony, produce superb qualities of colour, but probably their best quality in metal is obtained from the "red copper," pure copper shining through a thin film of the sub-oxide. This colour can very often be seen (in a slight degree, certainly, but it is visible) on the steam pipes of locomotives which have been several journeys without being polished. The copper under the influence of heat, atmospheric friction and oxidation has taken on the thin sub-oxide film, an excellent ruby colour. The patina on the statuary of Glasgow is a mixture, not of oxides, but a compound of sulphides, soot and dirt. The skin of the metal is degraded, corroded, and to the view highly obnoxious. The rain has rained upon it, and the fowls of the air have perched upon it. The resultant, derived from a combination of free acids—hydric sulphide, soot and guano—is an exhibition lugubrious and despairing, and to the artistic mind certainly discouraging.

While the purification of the air is not within the immediate power of the authorities, there is really nothing to prevent the public statues from being renovated and restored to a condition of almost pristine quality. The process is a matter of comparative ease, very little being necessary but care and periodical attention. We note day by day workmen engaged examining

the electric-light "manholes." A large number of men are continually employed in a laudable manner keeping the streets clean, and it is in the highest degree desirable that a small auxiliary service should be added to the main body for the purpose of giving periodical care and attention to the monuments. Compare the bas-reliefs on the statue of the "Duke" before the Royal Exchange with the duke himself above. The relievo decoration has developed an agreeable quality of colour in parts, the result of oxidation and friction, as the surface is constantly being fingered by juvenile members of the community, who are more or less interested in the artillery depicted there. It may be noted that bronze exposed to the air, and which is lightly rubbed with the hand, invariably acquires a patina. Of course if the metal is polished the patina is destroyed. In Berlin the same general fact attracted the attention of the authorities. The parts of statuary always fingered took on a colour quality; and they hastened to institute experiments extending over a period of several years. Four statues were selected and placed under observation. One was rubbed all over with oil every day, surplus being removed with a soft cloth. The second statue was washed with water daily. The third was also washed similarly, but polished with oil twice a year. The fourth was left *in statu quo*. On the completion of the experiment—extending, as we have said, over a period of years—the position of matters was thus:—Number one had acquired a splendid colour, number two was clean but dead black, the third was passable, and the fourth was a little better than our own, which, of course, is not saying much for it. There is nothing to prevent the bronzes of Glasgow being treated in similar fashion, not experimentally by any means, but as a matter of law. The figures should all be thoroughly cleansed, then coated with a mixture of oleo-palmitic acid, put on very thickly, and allowed to remain for several days. This paste should then be removed by washing off with a mixture of oleic acid and olive oil, and finished with a polish of olive oil. A periodical visit once a week, with a polish of olive oil, would in a very short time bring out all the intrinsic qualities of the bronze. The function of the oil mixture, in the first place, would be the combination with the oxysulphides on the surface, which would be better removed by that method, so far, at least, as regards the ultimate effect, than by mere washing. In a year's time the bronzes would have acquired an increased artistic value—would be works of art, instead of, as they are, monuments of the antagonism between beauty and commercialism, and an example of the destructive and ob-

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noxious nature of the atmosphere of Glasgow. The statue of King William at the Cross would take on an excellent colour; the more so as His Majesty is not in this case even a "copper captain," but is made of humble pewter. There would not be the full deep quality of bronze, but a colour which, though totally different, would still be good. It is matter of regret also that one of Glasgow's treasures, and possibly the least appreciated, should be so far left to itself and forgotten as it is. We refer to the "Tiger" in the "Park," an exquisite work of art, and about the only one in the city not an absolute simulacrum of somebody whom nobody knows and everybody has forgotten. This statue is worthy of particular attention. It is a possession which any community might be proud of, and it betrays an inconsistency almost inconceivable that any municipality who aspire to be known as protectors of the arts should leave this work to corrosion and decay.

Since the air of Glasgow exerts so destructive an influence on stone and bronze, it would be too much to suppose that pictorial art should escape. While undoubtedly all this is good for the "painters" it is very bad for shopkeepers; and the expense entailed on renovating the external decoration of warehouses, signs, &c., is something enormous. White fronts invariably become grey, and cheap gildings tarnish. Of the decorative processes mentioned on a former occasion, mosaic is the only imperishable pigment (with certain exceptions), and resists absolutely all atmospheric deleterious influence. Water glass, encaustic painting and fresco are to an extent obscured by dirt, the free carbon and mechanical impurities of a manufacturing city. Though these to an extent are filtered from the air by suitable means, still it is never with any system entirely free from such impurities. Again, there are the organic molecules which are respired and exhaled from the body, particles which when in excess give that peculiar foetid odour always perceived in over-crowded rooms; all these are ultimately deposited to further decompose. Mosaic also becomes dirty, but it can be cleaned mechanically and readily. This cannot be done with the others, unless with great care, and by experts. When this is the condition of matters in processes that are usually assumed to be imperishable, what can be said for oil painting "that fades with the passing air"? Oil painting depends for its permanency in a manufacturing city to a great extent upon the manner in which it is painted. The incomparable little Van Eyck in the possession of the Corporation retains almost its original purity, while paintings of comparatively recent execution have necessitated restoration and other

improvement. Certain schools, certain palettes bear within themselves the germs of decay, some from the combination of "incompatible" chemical substances, others from the use of fugitive pigments, others from a degraded method of execution, and some from the maladroit use of "medium" and "varnishes." Mr. C. Napier Hemy, in a letter to the secretary of the Society of Arts, 1892, said:—"What artists want is some thing nice to paint with, so one takes Robertson's (pomatum) medium, and his picture goes yellow and dirty, and looks as if it had been buttered; another takes copal varnish, and it cracks; another amber varnish, and the work gets horny or blooms; another turpentine, and it goes dull; and so on." It is hardly possible to treat of the effect of the atmosphere of Glasgow upon pictorial art without at the same time speaking of the method of the artist. When the years have passed and individuality has gone, many modern pictures will be recognised by their stages of decay. The trowel and palette-knife method will have, if unvarnished, the colours degraded, the lead whites blackened into sulphides. Flake whites in combination, whole or part, with orpiment, Indian yellow, gamboge, carmine, orange orpiment, sap green, will lose their verve and become lowered in tone. Pictures thinly painted and lightly varnished in Glasgow air have such whites as cremnitz and flake blackened. Chrome yellow, Naples yellow, emerald green, Prussian blue, Antwerp blue, orange chrome become changed by the action of hydric sulphide and aqueous vapour. The Van Eyck (labelled Van Der Goes, if we mistake not) owes its marvellous condition to the manner in which it was executed. The colours themselves are anything but permanent; the lakes on the banner and dress are fugitive in air, and the picture retains its initial quality only because each molecule of pigment has been surrounded by a suitable medium and is isolated from its neighbours. The medium has also been impervious to atmospheric influence and to light. In ordinary circumstances, then, this picture would have become obliterated long ago if it had not been painted in a suitable manner and with a very special medium. Consequently while with statuary, architecture and the industrial arts the artist is to a great extent in the hands of Providence, as represented by a paternal municipality, the artist in oil paint can by a thorough scientific method render his work very permanent. Pictures, like anything else, are liable to organic decay. They may also suffer from dirt, but organic decay has not overtaken Egyptian paintings executed many thousand years ago, and dirt is removable.

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At this point, however, it may be well to note that in the free air of Glasgow pictures would become unrecognisable in a very few years. Not only would the transparent homogeneity of the varnish be destroyed, but the gradual deposition of soot and other impurities would very soon render destruction complete. Pictures, like anything else, can be preserved if special measures be taken for their protection. Works of art which are efficiently conserved in galleries, public and private, do not come within the scope of the full influence of Glasgow air. On the other hand, oil paintings which are executed as mural decorations are to an extent exposed to certain destructive influences, such as the respiratory products of large companies, changes in temperature and ineffectual actinic exposure varying with their situation, and though the air may be better from the mechanical filtering which it undergoes, as in the Municipal Buildings, still impurities are not entirely absent. The air certainly is cleaner, but it is not much purer. Even the best paintings must inevitably reach a limit of existence. The Vatican is wisely anticipating that evil hour for the value of their property, and such paintings as they possess are being gradually translated into mosaic, which will be absolutely imperishable, and thus the works of such masters as Raphael, Michel Angelo and Da Vinci, works which have more or less become deteriorated, will experience a renaissance and continue the delight and admiration of future *cognoscenti* for innumerable generations to come.

The general conclusion we ultimately arrive at may be briefly stated. Though the atmosphere of Glasgow is highly offensive from a sanitarian point of view, and is, in fact, inimical to the preservation of public buildings, statuary and works of art generally (especially where the use of pure pigment is involved), and is further, apart from the destructive influence of many of the impurities contained in it, a declared enemy to cleanliness in person and dress, there can be no ready means of instituting preventive measures for the removal of this unfortunate condition of matters. In the first place, the only procedure possible for the municipality is to inaugurate a process curative and preventative, as far as possible, applied towards the preservation of public property. This intention can best be met by such treatment so we have already indicated as regards the statuary. As for public buildings, their preservation can only be effected by the adoption of some chemical preventative process, such as the external application of a solution of a double silicate of potash and alumina, or some such means.

## PORTLAND CEMENT INDUSTRY IN BELGIUM.

THE most important centre for the production of Portland cement in Belgium is the calcareous district of Tournai. Some of the quarries in this district date back several centuries, when they were principally worked for building stone and for the manufacture of hydraulic lime. The calcareous stone of these quarries, which, according to the United States consul at Brussels, originated the now extensive and important industry of cement manufacture, extends for many miles in length in apparently inexhaustible quantity. Ordinary lime, best hydraulic lime, slow-setting (Portland) cement and quick-setting (Roman) are especially products of these immense quarries. Consul Roosevelt says that natural Portland cement is obtained from calcareous stone which is carefully analysed and dosed, treated in coke-heated kilns, and after burning finely pulverised. Analyses of the calcareous stone found at Tournai shows the following result:—Silicic acid, 15.75 per cent.; oxide of iron, 1; alumina, 3.95; lime, 43.1; magnesia, .49; sulphuric acid, .5; loss in firing, 35.21 per cent. Before burning the stone presents a fine close grain, and is of a peculiar pasty appearance. Prior to calcination the stone is carefully analysed to ascertain the exact quantity of lime as well as other chemical properties it may contain. The stone loses about one-third of its weight during the process of burning, which also changes it to a brown tinge. When withdrawn from the kiln the cement is placed under sheds to thoroughly cool before being ground. After grinding, and before being packed into barrels, it is put into pits and left undisturbed for two months. Natural Portland cement was first produced in Belgium in 1882, and the establishments now engaged in the enterprise have formed a syndicate under the name of "Mutualité Commerciale des Ciments Belges," with headquarters at Tournai. The company sells about 1,200,000 barrels of cement annually. The syndicate has adopted as a trade mark the figure of a hammer. Any firm, however, of the syndicate having a trade mark is privileged to use it. For instance, those firms having the well-known "rhinoceros," "tröwel," "sword," &c., use them in conjunction with the syndicate trade mark. Independently of the trade marks of the manufacturers, important buyers of the Mutualité who have labels enjoying a certain reputation, are permitted to affix them on the barrels. It is stated that the principal object of this arrangement by the Belgian manufacturers is to warn and protect persons who purchase Roman cement for export

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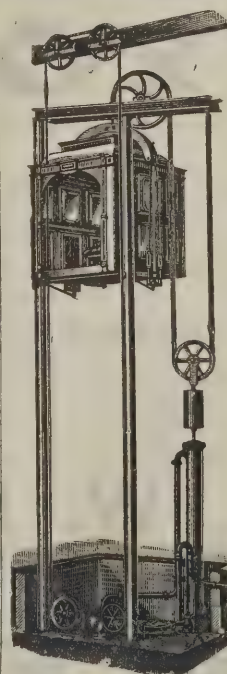
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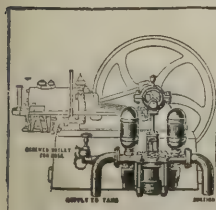
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without mark or label, and unknown and unauthorised by the manufacturers have Portland cement labels affixed to the barrels at the port of shipment. Roman cement is also made in the Tournai district. It is much cheaper than Portland cement, the selling price being about fifty per cent. less than the Portland. It is much employed in Belgium, replacing advantageously a good hydraulic lime. Manufacturers, however, will not guarantee it, as it is made of refuse stone not suitable for the manufacture of Portland cement. It has a natural light yellow colour. Cinders are very often added, changing it to a greyish colour resembling Portland cement, and also including its resistance in a slight degree. This is the product which is purchased by unscrupulous exporters and sold by them marked as Portland cement. This fact is significant, and should attract the attention of builders, to avoid disasters such as the unexpected collapse of buildings where first-class cement has been supposed to have been employed. Artificial Portland cement was first manufactured in 1872 by a Belgian firm—Messrs. Duffossez & Henry. There are now several important works engaged in its manufacture. Artificial Portland cement is the result of burning a thorough admixture of clay and carbonate of lime in constant proportions, and when dry reducing to finest powder. Several cements are manufactured by burning natural argillaceous limestone containing varying proportions of clay and carbonate of lime. Some manufacturers rectify the composition of these cements after burning by adding as required, limestone, slag, &c. Cements are thus produced, resembling in chemical constitution Portland cement, but which do not possess its properties, on account of the constituent elements not having been forced into combination by calcination and semi-fusion of the mass. These cements are sold under the name of artificial Portland cements, though in reality they are mixed cements, composed of limestone or slag, possessing none of the qualities or properties belonging to real Portland cement. Artificial Portland cement having an invariable chemical composition must necessarily present a constant character and behaviour, and the small differences shown by the assays arise generally from more or less perfection in the burning and grinding, but also exhibit radical changes in their physical and chemical constitution on account of the varying proportion of their component parts. Cement may be submitted to a large number of tests for the purpose of ascertaining its qualities. These tests relate to (1) regularity of composition; (2) fineness of grain; (3) gravimetric weight; (4) specific gravity; (5) time of setting;

(6) resistance to tensile, compressive or shearing strains and cohesive strength, either when pure or mixed with sand; (7) uniformity of volume or expansion; (8) resistance to frictional wear; (9) expansion; (10) impermeability, &c. To be considered of good quality the cement must give a satisfactory result to the group of tests to which it is submitted. Thus, if properly proportioned, it should, for a given fineness of grain, have a maximum of weight and specific gravity, fulfil the required conditions of setting, and show the minimum of resistance to strain required within a given time.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

29232. Joseph Thomas Andrews and George Edward Montagnon, for "Improvements in stair treads, landings and coverings of subways, sewer outlets and the like."

29247. William Frederick Crowther, for "Improved cleaning chamber in metal street gully and grate."

29264. Henry James Stewart Cross, for "An improved sink trap."

29347. Frank Gutteridge, for "Improvements in brick-making machines."

29425. John Smith, for "Improved machinery or apparatus for cleaning sewage and other matter off gratings."

29429. Benjamin Joseph Barnard Mills, for "Improvements in brick kilns." (Charles E. Coats and Llewellyn Hancock, United States.)

29563. William John Calloway, for "Improved means for securely holding chimney-pots in position."

29793. Edmund Ashby, Robert Ashby and Samuel Richard Short Batley, for "A new or improved construction of drying floors for bricks and the like goods."

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*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

ABERDEEN.—Jan. 19.—For erection of public school at Chapel of Garioch. Mr. R. G. Wilson, architect, 181A Union Street, Aberdeen.

ABERDEEN.—Jan. 29.—For erection of dwelling-house on the farm of Sunnyside, Drumoak. Messrs. Stronach, advocates, 20 Belmont Street, Aberdeen.

ACCRINGTON.—Jan. 18.—For erection of a house and surgery in Willows Lane. Mr. Henry Ross, architect, 15 Cannon Street, Accrington.

ALNWICK.—Jan. 16.—For erection of new choir vestry and other works at St. Paul's Church. Messrs. Forster & Paynter, Fenkle Street, Alnwick.

ALNWICK.—Jan. 18.—For erection of four-roomed cottage at Christon Bank. Mr. M. Temple Wilson, architect, 69 Narrowgate, Alnwick.

AUDENSHAW.—For extensions to leather-dressing works. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

BATLEY.—Jan. 18.—For rebuilding boundary wall, building new privies, and alterations to property, flagging, &c. Messrs. J. Fearnside & Sons, Commercial Street, Batley.

BELGRADE.—Feb. 20.—For supplying the Belgrade Cattle Market and Bacon-curing Company with the necessary engines, refrigerating machinery and hydraulic elevators. Plans at the Commercial Department, Foreign Office, between the hours of 11 A.M. and 6 P.M.

BETHNAL GREEN.—Jan. 26.—For erection of a block of dwellings for the working classes upon a site on the area known as the Boundary Street area. Apply at the Architect's Department, L.C.C., 17 Pall Mall East, S.W.

BIRKENHEAD.—Jan. 18.—For erection of an additional ward pavilion in connection with the infectious diseases hospital at Flaybrick Hill. Mr. Charles Brownridge, borough engineer, Town Hall, Birkenhead.

BOURNEMOUTH.—Jan. 15.—For erection of a house at Canford Cliffs. Messrs. Pinder & Fogerty, architects, 2 St. Peter's Terrace, Bournemouth.

BRADFORD.—Jan. 21.—For erection of villa, stabling, &c., at Lidget Green. Mr. Robinson, architect, Cheapside, Bradford.

BROADHAMPSTON.—Jan. 16.—For restoration of the roofs, &c., of Broadhampston Church. Mr. Edmund Sedding, architect, 12 Athenæum Street, Plymouth.

BROMLEY.—Jan. 25.—For erection of refuse-destroyer buildings and cart-sheds, stores and quay wall. The surveyor, 117 High Street, Poplar.

BURNHAM-ON-CROUCH.—Jan. 18.—For erection of new schools. Mr. Fred Chancellor, architect, Chelmsford.

CLEATOR MOOR.—Jan. 19.—For erection of a butcher's shop, slaughter-house, &c. General Offices of the Cleator Moor Co-operative Society, Limited.

COLCHESTER.—Jan. 26.—For the enlargement of the sorting office at Colchester post office. Messrs. Lee & Sons, 35 Craven Street, Strand.

CORNWALL.—Jan. 16.—For alterations to "Gonvena," Wadebridge. Major Becher, on the premises.

DARLINGTON.—Jan. 27.—For additions to the North Road locomotive works, for the North-Eastern Railway Company. Mr. William Bell, the Company's architect, York.

DENGEMARSH.—Jan. 22.—For erection of an officer's house and outbuildings for men at the coastguard station at Dengemars, near Dungeness, Kent. Director of Works Department, Admiralty, 21 Craven Street, Charing Cross, W.C.

EDGMOND.—For erection of a mixed school for 160 children at Edmond, near Newport, Salop. Messrs. J. R. Veall & Son, architects, Wolverhampton.

FLECKNEY.—Jan. 18.—For erection of infant-room and offices to the church schools. The Vicarage, Fleckney.

GOOLE.—Jan. 20.—For erection of a house, Boothferry Road. Mr. H. B. Thorp, architect and surveyor, Goole.

GREAT HARWOOD.—Jan. 18.—For erection of manager's cottage at the sewage-disposal works, Martholme. Messrs. Brierley & Holt, engineers, 10 Richmond Terrace, Blackburn.

HARWICH.—Jan. 19.—For general repairs to the coastguard station. The Director of Works Department, Admiralty, 21 Craven Street, Charing Cross.

HEYWOOD.—For rebuilding of the Dressers' Arms. Mr. Charles H. Openshaw, architect and surveyor, Fleet Street, Bury.

KEIGHLEY.—For erection of eleven houses. For particulars apply on the works, Linnet Street, Keighley.

LAITHES.—Jan. 22.—For erection of a pair of workmen's cottages at Laithes, near Penrith. Mr. Geo. Dale Oliver, county architect, Carlisle.

LLANELLY.—Feb. 1.—For alterations and additions to Felinfoel Board school, also for alterations and additions to the higher grade school, and for School Board offices, Llanelly. Mr. J. B. Morgan, architect, Llanelly.

LONG BUCKBY.—Jan. 27.—For excavating for and building a brick gasholder tank. Mr. W. Robinson, gas company secretary, Long Buckby, Rugby.

MARKET RASEN.—For erection of Wesleyan chapel and school at Osgodby. Mr. Fred. W. Dixon, architect, Trevelyan Buildings, Manchester.

MEXBOROUGH.—Jan. 16.—For levelling and draining two school playgrounds, also for erection of wall and alterations, for the School Board. Mr. H. J. C. Reed, clerk, High Street, Mexborough.

MORLEY.—Jan. 19.—For erection of engine and boiler-houses, offices, chimney-stack, &c. Mr. R. Borrough Hopkins, town clerk, Town Hall, Morley.

MORLEY.—Feb. 1.—For erection of new premises for the London and Yorkshire Bank, Limited. Plans, specifications and bills of quantities may be obtained at the offices of Mr. William Bakewell, architect, Leeds.

NEW BROMPTON.—Jan. 25.—For erection of a villa in Balmoral Road. Mr. E. J. Hammond, architect and surveyor, 111 High Street, New Brompton.

NORTH SHIELDS.—Jan. 22.—For erection of new schools in Coach Lane. Messrs. Marshall & Dick, architects, 4 Northumberland Street, Newcastle-on-Tyne.

OBAN.—Feb. 5.—For erection of a residence, Isle of Rum. Messrs. Leeming & Leeming, architects, Victoria House, 117 Victoria Street, Westminster, S.W.

PADIHAM.—For erection of Liberal club. Messrs. Hitchon & Pritchard, architects and surveyors, Manchester Road, Burnley.

PAISLEY.—Jan. 16.—For erection of public school at Carbrook Street, for 800 scholars. Mr. Charles Davidson, architect, Terrace Buildings, Paisley.

PUDSEY.—Jan. 18.—For erection of two shops and dwelling-houses in Somerset Road. Mr. G. D. Goforth, 31 St. Matthias Street, Kirkstall Road, Leeds.

PURLEY.—For erection of new wing at the Warehousemen, Clerks and Drapers' Schools. Mr. J. Kingwell Cole, architect, 17 Hart Street, Bloomsbury, W.C.

RASHCLIFFE.—Jan. 20.—For erection of six dwelling-houses in Victoria Road. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.



RIBCHESTER.—Jan. 23.—For cloakroom, &c., Knowle Green School. Mr. J. A. Seward, 119A Fishergate, Preston.

RUNCORN.—Jan. 27.—For additions and alterations at police station and court house. Mr. H. Beswick, county architect, 17 Newgate Street, Chester.

SKELMANTHORPE.—Jan. 21.—For erection of an engine-house and weaving-shed. Messrs. John Kirk & Sons, architects, Huddersfield.

SOUTH CAVE.—Jan. 21.—For erection of infants' school-room &c. Messrs. Gelder & Kitchen, architects, 76 Lowgate, Hull.

STRATFORD.—Jan. 26.—For erection of a block of school buildings and appurtenances, to be known as the Whalebone Lane schools. Mr. William Jacques, 2 Fen Court, E.C.

SWINDON.—Jan. 18.—For alterations and additions to the laundry buildings at workhouse. Mr. W. H. Read, Corn Exchange, Swindon.

ULVERSTON.—Jan. 20.—For roofing over a portion of the Sun Hotel Yard. Messrs. J. W. Grundy & Son, architects, Brogden Street, Ulverston.

WALES.—Jan. 18.—For erection of an infants' school at Bedlinog. Messrs. James & Morgan, architects, Charles Street Chambers, Cardiff.

WANDSWORTH COMMON.—Jan. 20.—For erection of a greenhouse and potting-shed, &c., at schools, St. James's Road. Mr. Joseph Bond, clerk, Union Offices, Poland Street, Oxford Street.

WILTON.—For alterations and additions to business premises in North Street. Mr. F. Bath, architect, Salisbury.

WINCHESTER.—Jan. 25.—For additions, alterations and repairs at the prebendal house, 4 The Close, and for the conversion of the same into judges' lodgings, for the Very Rev. the Dean and Chapter. Mr. J. B. Colson, architect, 46 Jewry Street, Winchester.

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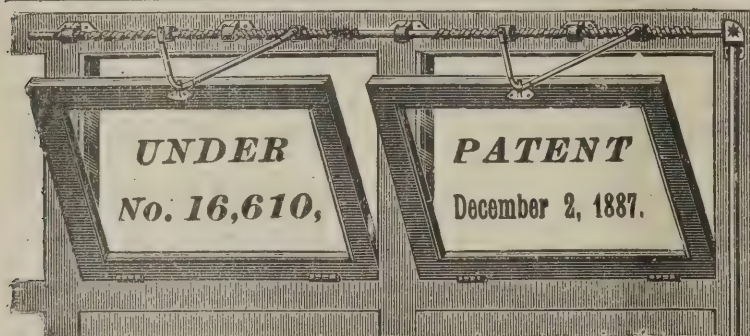
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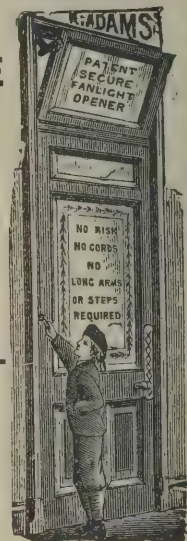
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 G. Law . . . . . 3,850 0 0  
 Currall, Lewis & Martin . . . . . 3,800 7 1  
 R. C. Brebner . . . . . 3,636 0 0  
 Walker & Co. . . . . 3,523 19 0  
 J. Jackson . . . . . 3,196 0 0  
 T. Vale . . . . . 3,123 10 0  
 H. Holloway . . . . . 3,082 10 0  
 J. MACKAY, Hereford (accepted) . . . . . 2,998 11 0  
 Cruwys & Hoborough . . . . . 2,470 9 6

## Hasbury.

Jones & Fitzmaurice . . . . . 4,356 14 6  
 W. Meredith . . . . . 3,343 18 4  
 G. Law . . . . . 3,245 0 0  
 Currall, Lewis & Martin . . . . . 3,119 9 1  
 Walker & Co. . . . . 2,985 15 4  
 H. Holloway . . . . . 2,747 0 0  
 J. Jackson . . . . . 2,613 7 0  
 R. C. Brebner . . . . . 2,570 8 9  
 T. Vale . . . . . 2,515 0 0  
 J. MACKAY (accepted) . . . . . 2,386 1 6  
 Cruwys & Hoborough . . . . . 1,922 6 7

## Hawn.

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 R. C. Brebner . . . . . 1,418 16 4  
 Currall, Lewis & Martin . . . . . 1,242 6 8  
 W. Meredith . . . . . 1,171 2 1  
 G. Law . . . . . 1,159 0 0  
 H. Holloway . . . . . 1,145 0 0  
 Walker & Co. . . . . 1,144 19 2  
 T. Vale . . . . . 1,080 12 6  
 J. Jackson . . . . . 1,022 0 0  
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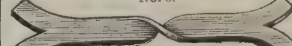
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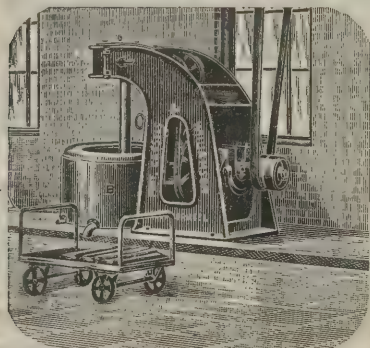
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## TRADE NOTES.

THE Denton Holme Board Schools, Carlisle, are being warmed and ventilated by means of Shorland's patent Manchester stoves, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. C. E. LEOPOLD & Co. have opened their Japanese paperhangings warehouse at 24 Cecil Court, Charing Cross Road, London.

A HANDSOME oak font cover of Perpendicular design was at Christmas time presented to Brampton Abbots Church, near Ross. It is pyramidal in form and octagonal on plan, the lower part being arranged to raise and lower by an ingenious system of pulleys and weights, the upper part being fixed to a bracket springing from an adjacent beam. It bears the following inscription, "To the Glory of God and in memory of George Gilbert Hulme." The work has been executed by Messrs. Jones & Willis, of Birmingham and London.

A GAS explosion has occurred in the Public Buildings at Penzance, and considerable damage done to the north-east corner of the premises. The glass, ceilings, plastered walls and doors of the geological museum, the staircase, ante-rooms and corridors were shattered and broken. Fortunately there was no personal injury.

## VARIETIES.

ANOTHER interesting old mansion, Dunipace House, situated between Denny and Larbert, has succumbed to the devouring element. Dunipace House was a building of three flats, with attics, and containing about thirty-five apartments. The most serious loss in connection with the conflagration is the contents of the museum, the gathering of a lifetime, and which cannot be replaced. The loss is estimated at about 15,000*l.*

WHILE workmen employed in the Central London Railway, at Wood Lane, Shepherd's Bush, were pulling down some houses, one of the walls collapsed, injuring five men.

LADY PENRHYN and Miss Glynne are about to place a window in Hawarden Church, in memory of their sister Nora. It will replace what is known as the old Vine Window.

A TENDER for 19,209*l.* has been accepted for the rebuilding of the Royal Cambridge Music Hall.

ON Saturday morning the greater portion of the Bishop Auckland Post Office was burned down. The damage done is considerable.

A BRASS tablet is to be placed in Bovey Tracey parish church, Devonshire, to the memory of the late Bishop Knight Bruce, who was vicar of the parish.

AN Arts and Crafts Exhibition is to be held at Lancaster in commemoration of the Queen's lengthy reign.

ABOUT four o'clock on Saturday morning last fire was discovered to have broken out in the gallery of the recently redecorated Royal Court Theatre, Liverpool. The flames spread rapidly, and for a time it was feared that the building would be totally destroyed. Fortunately, by the exertions of the fire brigade, the fire was confined to the gallery and the roof, where, however, serious damage has been done. The under portions of the house have also been considerably damaged by water, but owing to the energy and pertinacity of the lessee, Mr. Robt. Arthur, the theatre was ready for reopening last night. A great number of workmen were engaged night and day replacing the roof, and this part of the structure was practically completed on Tuesday, proof against all kinds of weather. The fire, as before mentioned, was confined to the gallery, and the beams supporting the seats and some of the seats themselves were partially burned. These beams remain in position, but alongside are placed new supports of equal strength to the others when they were in their original state, so that the actual

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resistance to pressure is much greater than it was previously. The beautifully painted ceiling has been destroyed, but this has been covered by a strong striped canvas, which serves the purpose splendidly, and does not materially detract from the appearance of the interior. Between twenty and thirty braziers have been continually alight in the theatre to obviate the dampness—in fact, the place is now almost as dry as it was before the fire.

A NEW Congregational school-chapel has been opened in the High Park district, Southport.

A NEW church has been consecrated at Cwnpark, in the parish of Ystradfydwg, Rhondda Fawr Valley. It comprises a chancel, nave, south aisle, porch and massive tower over 60 feet in height, and accommodates about 400 worshippers. It has been erected at the cost of Mrs. Llewellyn, of Baglan Hall.

THE Duke of Norfolk a short time ago generously provided Arundel with a splendid water supply. Negotiations between the duke and the local authorities have now resulted in the formulation of a scheme for extending this supply to Littlehampton.

A SCIENCE and art school is to be erected at Newark in commemoration of the sixtieth year of Her Majesty's reign. The Duke and Duchess of Newcastle have offered to give a piece of land. Mrs. Manners, Mrs. Macrae and Miss Gilstrap, three of the beneficiaries under the will of the late Sir William Gilstrap, have each promised a sum of 500*l.* towards the fabric, and the mayor of Newark (Mr. Alderman Pratt) has promised to contribute a further sum of 250*l.*

A SHORT time ago the fire brigade sub-committee of the Leeds Corporation visited half a dozen factories, with the view of considering what improvements could be carried out so as to prevent loss of life in the event of fire. At a meeting of the committee since held, under the presidency of Mr. Green Hirst, drawings were submitted for suggested alterations in the exits, for staircases, &c., which had been prepared by the city engineer's department, and these were unanimously approved of. The owners of the factories in question will have the drawings laid before them as suggestions from the Corporation, and as the committee do not wish to put the owners to unnecessary expense, they will be prepared to consider suggestions from them before compelling them to carry out the alterations.

As a result of the agitation on the part of the Wolverhampton carpenters and joiners for an increase in the rate of

wages, the masters have offered an advance of a halfpenny per hour, which the workers have accepted.

A SITE has been secured at Nelson, near the South Park, on which the Roman Catholics intend to build a new school, at a cost of 2,000*l.*

ON Wednesday morning the members of the Leigh (Lancs) branch of the United Operative Plumbers' Association came out on strike for an increase in wages of from 8*d.* to 9*d.* per hour, the standard rate in Liverpool, Manchester and other towns. Some firms have consented to the advance, but others decline to recognise the union, and have given no reply to the men's request. The trade is fairly brisk at present.

EARLY on Wednesday morning the shipbuilding yard of Messrs. William Hamilton & Co., Port Glasgow, was partly destroyed by fire. The joiners' shop and sawmill, two buildings about 330 feet long running parallel, were destroyed. The Port Glasgow and Greenock brigades were in attendance, but their efforts were unavailing. The damage is estimated at 30,000*l.*

A SHOCKING accident occurred on Wednesday morning at the Eiffel Tower which is in course of construction at New Brighton, near Liverpool, two men being killed and a third seriously injured. The deceased men were in the employment of Mr. Handyside, of Derby, who is the contractor for the ironwork of the tower. They were working on a scaffold 35 feet from the ground, and were engaged in fixing one of the huge iron girders, when the hook and the crane used for lifting the iron gave way. The ironwork which was swinging from the crane fell, and in its descent it struck the scaffold on which the men were working, entirely demolishing the structure. Two of the men, John Richards and Alexander Stewart, were instantaneously killed, both having sustained shocking injuries from the falling iron, while a third workman, named John Daly, belonging to Hulme, Manchester, was rendered unconscious, and had to be removed to the Seacombe Hospital. The two men killed belonged to Derby.

THE new Selkirk High School, which has been built and is to be maintained by the governors of the Scott and Oliver Trust as a school for higher or secondary education, was formally opened on the 12th inst. The school contains a commodious entrance-hall, three classrooms, and private rooms for the teachers, is provided with all the necessary appurtenances of playsheds, lavatories, &c., and has ample playgrounds around it.

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THE next ordinary meeting of the Institution of Civil Engineers will take place on Tuesday, January 19, at 8 P.M., when the paper on "Superheated-steam Engine Trials," by Professor W. Ripper, M.Inst.C.E., will be further discussed. A students' visit will be made on Thursday, January 21, at 2 P.M., to the engine-works of Messrs. James Simpson & Co.

DURING the recent royal visit to Trentham, the Princess of Wales, accompanied by the Duchess of Sutherland and several members of the house party, drove over to inspect Messrs. Minton Hollins' world renowned potteries. The various processes were shown in operation and carefully explained to the Princess, who manifested the greatest interest and expressed her gratification at what she had witnessed. A beautiful bouquet was presented to H.R.H. by Miss Amy Hollins, granddaughter of one of the principals.

At a meeting of the Loughborough Town Council, held on January 4, a letter was read from Mr. Joseph Griggs, J.P., D.L., offering to erect and present to the town public baths at a cost of 3,000*l.*, to commemorate the completion of the sixty years of Her Majesty's reign, upon a site to be provided by the Corporation. The borough of Loughborough has previously benefited by the generosity of Mr. Griggs, who held the office of Mayor for the first two years after the incorporation, and the office of High Sheriff of the county during 1895. Mr. George H. Barrowcliff, architect, of Loughborough, has been entrusted with the work.

THE Victoria Stone Company have had prepared for their very numerous customers a handsome diary-blotter, which is not only made of excellent paper, but has also novelty. The applications of the materials are so numerous, the Victoria stone may claim to have general utility, and we hope many orders for it will be registered on the memoranda slips.

THE partnership between Mr. S. Walker and Mr. Ernest Rüntz has been dissolved. Mr. Walker has taken his son, Mr. W. S. Walker, into partnership, the firm being henceforth "S. Walker & Son." Mr. Rüntz will confine his attention to architecture.

MR. ALDERMAN RYMER, of Croydon, gave as his reason for opposing the proposed increase of the lamentably inadequate resources of the Fire Brigade by the erection of a new central station and the purchase of six horses, four of which would be available for the purposes of the corporation, on the grounds that he thought that the pouring of water on burning buildings

was a failure, as he believed that before long the science of chemistry would be brought to bear on the subject and that the cumbrous appliances now in use would be done away with.

MESSRS. OLDACRES & CO., electrographers, lithographers and law stationers, have removed to 52 Chancery Lane, Holborn, W.C.

### ELECTRIC NOTES.

THE electric-lighting committee of the Derby Corporation have just issued a report respecting the undertaking. They say that there has been a satisfactory and steady increase in the consumption of electricity, and in order to meet the demand which they anticipate will be made upon their resources during the next three years, they are about to ask the Town Council to grant a further sum of 20,000*l.* for extra plant and machinery.

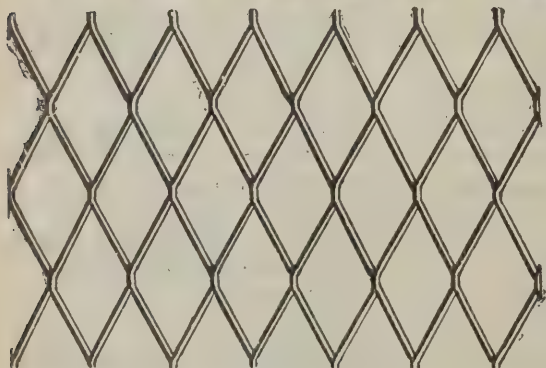
CONSIDERABLE improvements have been carried out during the last twelve months in Clonfert Cathedral, co. Galway, under the supervision of the architect, Mr. J. F. Fuller, F.S.A. The chancel has received special attention. This portion of the building is over a thousand years old. The ancient sacristy, roofed with Danish wattles, has been repaired without altering the archaic character of the structure.

THE Canterbury Town Council have resolved to apply to the Local Government Board for sanction to expend a sum of 23,000*l.* in laying down municipal electrical works in the city.

MR. SYDNEY MORSE and Mr. Alexander Siemens have been elected respectively the chairman and second deputy chairman of the Electrical and Allied Trades Section of the London Chamber of Commerce.

PROFESSOR KENNEDY'S report on the electric lighting of Stirling was submitted to a meeting of the Stirling Police Commissioners on Monday night. It recommended the adoption of the continuous current three-wire system with 200 volt lamps, the estimated cost being 16,000*l.* for the compulsory area and 20,000*l.* for an extended area, including the residential part of the town. The lighting committee recommended the adoption of the report and a remit to the committee to carry out the work to the whole extent therein indicated. Provost Kinross suggested that the matter should be continued for a week for further consideration of the report, and this was agreed to.

# THE NEW EXPANDED METAL



*Meshes from  $\frac{3}{8}$ th in. to 6 in. wide. Strands from 24 B.W.G. to  $\frac{3}{16}$ th in. thickness of steel.*

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**FOR FIREPROOF LATHING**, for attaching to wooden joists and studs; for walls and ceilings, also for suspended ceilings, ornamental mouldings, encasing columns, girders, &c.—no cracking or falling away of plaster to be feared.

**FOR CONCRETE FLOORS WITH EXPANDED METAL**.—The remarkable results and advantages of these will be better understood by perusal of the Report hereinafter referred to.

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**BRASS, ALUMINIUM**, or any other ductile metal can be expanded, and the effect is very pleasing, and here again the absence of joints gives great durability to the metal, and the rapidity of manufacture allows of very low prices.

**CATALOGUES AND PRICE LISTS** can be obtained on application. Also copy of a REPORT by an EMINENT FIRM of ENGINEERS on the use of EXPANDED METAL IN CONCRETE.

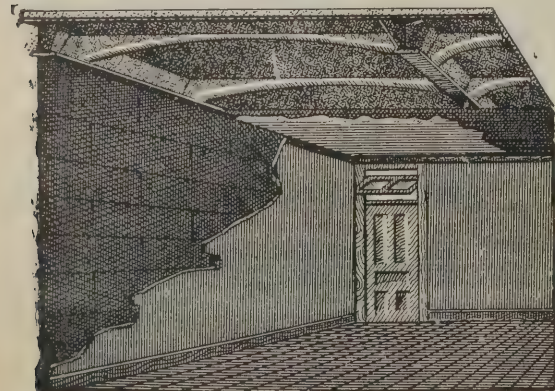
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## DORMER WINDOWS.

ON Tuesday Mr. C. F. Kearley, builder, was summoned before the Lord Mayor, under the London Building Act, 1894, for failing to comply with a notice of irregularity requiring certain omissions to be remedied in the building of premises at No. 60 Cheapside. Mr. Hugh M'Lachlan, the district surveyor, who appeared in support of the complaint, said the builder was willing to do the work required, but the architect and owner declined. The question was whether certain dormer windows on the roof of the premises, which were constructed of wood covered with lead, were combustible within the meaning of the Act, because, if so, the party walls must be made 12 inches higher and wider on each side of them to comply with the Act, and that was what the notice served on the defendant required to be done. Mr. Daldy, solicitor, who appeared for the owner of the premises, contended that the dormers, being covered with lead, were not combustible, although the lead might be melted by fire. There was only a small proportion of wood, and his contention was that lead and glass were not combustible. The chief clerk (Mr. Douglas) said the list of fire-resisting materials enumerated in the Act did not include lead. The Lord Mayor, observing that it was a pity the Act was not more explicit, directed the notice to be complied with within a month, and granted 13s. costs.

## ACETYLENE GAS.\*

At the present time the introduction of acetylene gas, made by acting upon calcic carbide with water, and which is at once the most easily made and the most brilliant of all known gases, promises a complete revolution in domestic lighting where coal-gas is not to be obtained, but much has yet to be done in educating the public as to the proper way in which to use it, as well as in the character of the calcic carbide from which it is produced and in the forms of apparatus employed to generate the gas.

Acetylene, or as it is sometimes scientifically called, ethine, is a gaseous compound of 24 parts by weight of carbon with

\* From the Cantor Lecture by Professor Vivian B. Lewes, published in the *Journal* of the Society of Arts.

2 of hydrogen, and was first discovered and isolated by Edmund Davy in 1836, but it was not until 1859 that Berthelot's investigations gave the scientific world a clear conception of its interesting character and properties. Since that time it has been frequently prepared in small quantities by tedious and costly processes, and it is only within the last few years that a cheap and simple method has been discovered and has brought its use within the range of commercial possibility.

The fact that carbon and lime could be made to directly act upon each to form calcic carbide was discovered independently by Willson in America and in France by M. Moissan, but there exists abundant proof that Willson was making and experimenting with calcic carbide, and had sent specimens of it to various correspondents some time before Moissan had made any announcement of his discovery, and therefore priority undoubtedly rests with the American discoverer.

Calcic carbide is a dark grey substance having a specific gravity of 2.262, and when pure a pound of it will yield, on decomposition, 5.8 cubic feet of acetylene. Unless, however, it is quite fresh, or means have been taken to carefully protect it from air, the outer surface becomes slightly acted upon by atmospheric moisture, so that in practice the yield would not much exceed 5 cubic feet. The density and hardness of the mass, however, protect it to a great extent from atmospheric action, so that in lumps it does not deteriorate as fast as would be expected, but in the powdered condition it is quickly decomposed.

On the addition of water to the calcic carbide a double decomposition takes place, the oxygen of the water combining with the calcium and once again forming lime, whilst the hydrogen unites with the carbon of the carbide to form acetylene.

At the present moment the future of acetylene as an illuminant is largely dependent upon two factors, the commercial production of calcic carbide of a reasonable degree of purity; and secondly, methods for safely making and burning the gas in such a way as to develop its full illuminating power, whilst doing away with the risk of smoking; and as I first drew attention to the production of the carbide, and from it of the acetylene, on a commercial scale in this country, I feel that the results of the past two years' experience will not be without interest.

In spite of extended experience both here and abroad in the manufacture of calcic carbide, the details given as to its cost and the price at which it can be purchased offer the most enter-

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New Depth Gauge for Engineers, 4 inches by 1/2 inch wide, in leather case. The slide and one side marked to read by verniers to 100ths of inches and 1/10th of millimetres. The other side marked for use as a rule, in inches and 64ths and millimetres and halves .. 5s. 6d.

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Surveyors' Chain Scales, containing any two scales or chains and feet each edge, flat section .. 1s. 6d., post free, 1s. 8d.

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No. 2388.—8-inch Oak Case, lined with Silk Velvet, containing the following finest quality Electrum Instruments:—6-inch needle pointed Compass with lengthening bar and ink and pencil points, hair dividers, needle pointed pen and pencil bows, two drawing pens, prickler, knife key, ivory protractor and parallel .. 44 12 6

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IVORY POCKET RULES, ELECTRUM MOUNTED.  
One foot four-fold Pocket Rule .. 5s. 6d.

Two feet, four-fold Pocket Rule .. 18s. 6d. and 21 1s.

Prices of Drawing Instruments are subject to a Discount of Ten per Cent.

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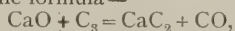


taining reading, as whilst the patentee and would-be seller of acetylene generating plant still talk airily of the cost of the carbide being anything from 30s. to 7l. a ton, the price at which one can purchase carbide more nearly approaches 30l. Indeed, in Paris at the present moment there is considerable difficulty in getting it at 40l. a ton, although we are informed that this is merely due to a temporary carbide famine, and that the new sources of supply will soon reduce the selling price even below 16l. a ton, at which it stood before the late rise in price. Be this as it may, the factor which interests us is the price at which carbide can be obtained in England, and the Acetylene Illuminating Company, who hold the Willson patents for the production of carbide, and also the Cowles electric furnace patents, which I believe enable them to control the manufacture of carbide in this country, have fixed their selling price at 28l. per ton, and although there is no doubt that they will give contracts in considerable quantities at a reduction on this price, yet it is with the factor of the selling price to the public and not with the manufacturing price that we have to deal.

In most cases, the possible prices quoted for calcic carbide by inventors who have been carried away by their wishes rather than by hard facts are simply absurd, and far below the price at which the substance can be produced, and it may be of interest if I give the figures for the electric power necessary, which I myself have obtained in practice in the manufacture of calcic carbide.

Having been kindly granted the use of the electric plant erected for the manufacture of calcic carbide at the experimental works of the Acetylene Illuminating Company, a plant capable of working continuously at from 60 to 70 volts at 1,000 to 1,200 amperes, I made a series of experiments in order to determine the best proportions in which to mix the ingredients from which the carbide is manufactured, and to find out the amount made per electric horse-power.

The production of carbide from lime and carbon under the influence of the heat of the electric furnace appears to take place according to the formula—



and in order to obtain this reaction it would be necessary to use 56.1 per cent. of lime mixed with 43.9 per cent. of carbon. In practice, however, it must be remembered that the carbon used will either be finely-powdered coke or charcoal, neither of which are pure carbon, whilst the lime employed will always vary in purity, such variations having, as I shall presently show, a very important bearing upon the purity of the carbide and

acetylene produced from it. Another practical point also presents itself, and that is that unless the mixture is suitably arranged considerable variations in the amperage and consequent loss of efficiency in the furnace will result.

Using a mixture of 60 per cent. of lime and 40 of carbon, a run lasting  $3\frac{1}{2}$  hours yields about 112 lbs. of fused ingot, and of this 81 per cent. was practically pure carbide, the remainder being a crust of lower value.

The mixed carbides yielded 5 cubic feet of gas per pound, and contained 89.2 per cent. of true carbide; hence the yield may be taken as being 32 lbs. per hour of the commercial carbide.

The current used was 60 volts at 1,000 amperes, or 89 E.H.F., which gives as the make about 0.4 lbs. per E.H.P., per hour, and the result of continued experiments show that 0.3 to 0.4 lbs. per E.H.P. per hour is the average yield.

The cost of the electrical horse-power will, of course, vary with the source from which it is obtained, and the use of steam power for generating the electricity appears too costly to be entertained, unless the present electrical lighting stations could see that it was to their advantage to level up their load by manufacturing the carbide under license when not employed in supplying current directly for illuminating purposes. The Acetylene Company have, however, secured considerable water-power at the Falls of Foyers, and a full installation of carbide plant is at work there, whilst still further water-power has been secured in a convenient position, and additional works will be erected; but it will always be the demand and not the cost of the carbide which will govern the price.

The following yields of acetylene from various samples of commercial carbide that I have analysed give an idea of the variations to be found in the article:—

Swiss carbide per lb.—I. yielded 4.38 cubic feet of acetylene, II. yielded 4.60 feet and III. yielded 4.56 feet.

German carbide per lb.—I. yielded 3.82 cubic feet of acetylene, II. yielded 3.46 feet, III. yielded 3.24 feet, IV. yielded 2.43 feet.

English carbide per lb.—I. yielded 5.24 cubic feet of acetylene, II. yielded 4.84 feet, III. yielded 5.04, IV. yielded 5.52 feet, V. yielded 4.84 feet, VI. yielded 5.32 feet.

It is evident, therefore, that there are wide differences in the commercial article, but with reasonable care in the manufacture the carbide should yield an average of 5 cubic feet of acetylene per pound.

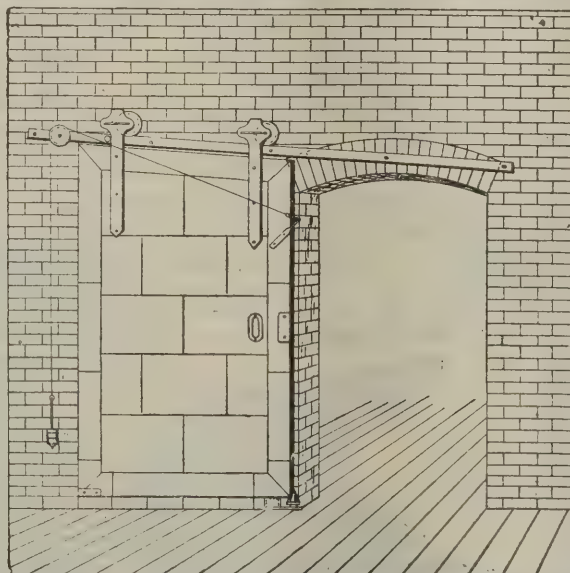
(To be concluded.)

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## ILLUSTRATIONS.

LINCOLN CATHEDRAL.—NORTH AISLE.

LINCOLN CATHEDRAL.—ANGEL CHOIR.

EATON HALL.

BATTERSEA MUNICIPAL BUILDINGS, LAVENDER HILL.

TUDOR CHAMBERS, CORNHILL.

## "EXPANDED METAL" IN FIREPROOF FLOORS.

It was known for some time that the introduction of Golding's expanded metal in concrete, cement or other material not only increased the strength of that material, but also its fire-resisting qualities. Hence partitions, ceilings, floors and walls are improved without any extraordinary outlay. In order to demonstrate again how much endurance is possessed by floors of which the expanded metal forms an element, some remarkable tests were applied in the presence of architects, engineers and other experts, on Monday last, at Mr. Lockwood's yard in Sackville Street, Manchester.

The first exhibit was a continuous flat concrete floor, of an area of 48 square feet, carried upon channel irons (6 inches by 3 inches) and concrete arches arranged 4 feet apart, with a rise of 13 inches, according to the "Golding system." The transverse flooring joists or girders (16 inches by 6 inches) were fixed 12 feet apart from centre to centre. Expanded metal of 3-inch mesh had been embedded in the concrete flooring slab, which had a total thickness of 3 inches throughout. The concrete was composed of one part Portland cement to three parts of granite chippings, sieved to  $\frac{1}{4}$  inch, and the work had been allowed one month in which to thoroughly set or harden. The total average weight of the flooring with its ribs was 35 lbs. per foot super.

The second exhibit comprised an arched concrete floor (on the Monier system) in which expanded metal had been embedded in lieu of Monier rods; it was 3 inches thick at the crown and 4 inches thick at the springing or haunches. In other respects, *i.e.* span, area covered, ingredients of concrete, &c., the structure was similar to No. 1.

The comparative strengths of these two structures were then tested by the application of uniformly distributed loads in the form of lead ingots, weighing 100 lbs. each. The result was

that, while the arched (Monier) floor collapsed under a live load equivalent to 12 cwts. per square foot, the Golding floor (Exhibit 1) was still unbroken at the close of the experiments, that is, under a live load of about 17 cwts. to the square foot.

The experiments were undertaken in connection with the flooring contracts for the New Brighton Tower, which is being erected under the supervision of Sir Benjamin Baker, past president of the Institute of Civil Engineers.

The structures were erected by Mr. Homer Lockwood, of Manchester, the tests being conducted in the presence of a representative of Messrs. Maxwell & Tuke, of the same city, who are the architects of the tower.

The employment of expanded metal in the test exhibits gave every satisfaction, and in the second case, where it had been substituted for Monier rods, the advantage of strength was nearly 10 per cent.

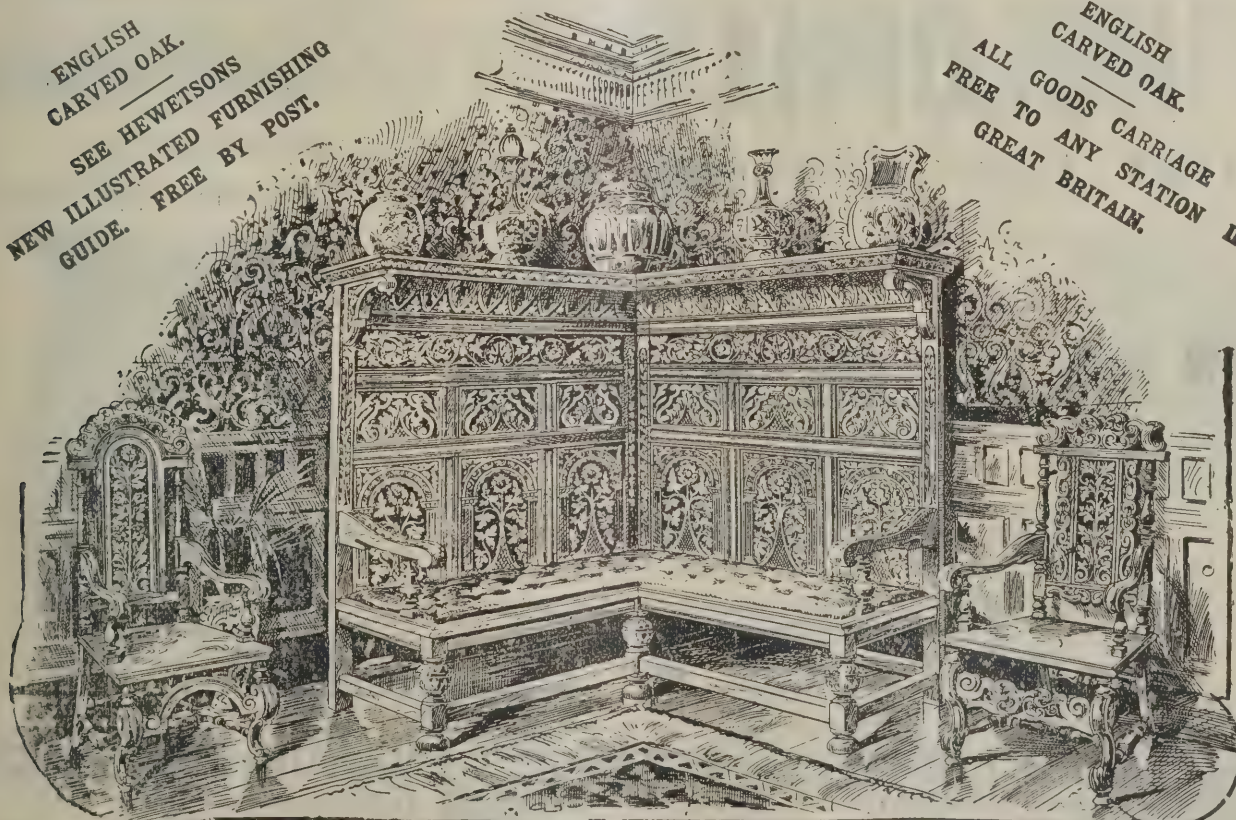
In both instances there was some lateral displacement of the joists through the thrusting actions of the loaded arches, which to some extent impaired the ultimate efficiency of the floors. In the Golding structure the deflection of the floor attained  $4\frac{1}{2}$  inches without rupturing.

## THE SURVEYORS' INSTITUTE.

MR. HOWARD MARTIN read a paper "On the Future Development of the Surveyors' Institute" at the temporary premises of the Institute, Savoy Street, Strand, on Tuesday evening. The chair was taken by the president, Mr. Daniel Watney. Mr. Martin, after referring to the history of the Institute since its formation in 1868, and the progress it had made, said its members were now spread over the whole country. With regard to another institution which he named, he said there was little done for its country members; but as to the country members of the Surveyors' Institute, they were charged somewhat lower fees, and had all the advantages of the Institute in London. While this was so, however, they laboured under a disadvantage in reference to the obtaining of information, their means being limited to their own circle of influence. He proposed, first, that provincial libraries should be established; and secondly, that meetings should be held, taking the provincial centres in rotation. By these means the provincials would be kept posted up, and an increased interest in the Institute promoted. A vote of thanks to the lecturer was proposed and carried, and the discussion was adjourned.

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## PETERBOROUGH CATHEDRAL.

THE following preliminary specification\* has been written at the request of the Society of Antiquaries, in order to explain what it would be generally necessary to undertake in works of repair to secure a part of the fabric of the portico or narthex of Peterborough Cathedral from further dilapidation, and to strengthen and secure it for generations to come in its present authentic condition and appearance, and thus avoid the resulting calamity if the proposal to pull down and rebuild the greater part of the northernmost arch and its spandrels, with the gable over the same, were carried out.

To avoid confusion in the explanation which follows, we shall call those parts of the cathedral which are proposed to be dealt with:—

First, the narthex, which is a triple arched vestibule standing some 16 or 17 feet (inside measurement) in front of the west wall of the church, carried by two triangularly planned piers, and supported by two stair turret wings at the north and south angles.

Secondly, the interposed porch, a construction built in between the two piers, about the end of the fourteenth century, to steady and stiffen these two important supports.

Thirdly, the western wall of the church to which the narthex is attached.

"From the works of sustentation undertaken at various dates there can be no other reasonable conclusion than that the foundation on which the whole building stands is of unequal strength horizontally, for several parts of the church, of greater weight than the narthex, have shown little or no signs of having given way; while the two detached piers, especially the northern one, showed signs of depression early in the history of this thirteenth-century work. Therefore it can but be concluded that the leaning of the piers and disturbance of the superstructure were caused by the weakness of the foundations, though the settlement has been singularly gradual. The external signs of the effects of depression are only what would be expected from a slow movement, otherwise the displacement

of the ornamental facing work would have been more serious than it is.

"The internal parts of the superimposed walling also show the signs resulting from slow settlement, for that part above the springing of the northernmost arch has expanded from east to west as the detached pier under it leaned outwards.

"The foundation of the northern of the two detached piers should first receive particular attention, though the southern pier would also have to be looked to in the same way. With these piers is of course included the strengthening work of the interposed porch.

"The difficulties of strengthening old foundations are necessarily considerable; still, in this particular case they are less so than might have been supposed, for the weight of material balanced on the pier in question is comparatively trifling, and the opportunity afforded by the open character of the situation would allow of ample security being taken to avoid misadventure; but these precautions should be both extensive and particular.

"Before in any way opening or disturbing the ground about the foundation of the northern of the two piers, a carefully designed framework and centering of timber to this pier and its northern arch would have to be set up, which should effectually support and sustain the superimposed weight of the work resting on the capital of this pier and the pier itself. Centerings should also be at once applied to the other two arches for the purpose of steadying them while dealing with the northernmost pier and arch.

"Care must be used in preparing heavy timber sills properly arranged and bedded on the ground level, on which the timbers supporting the cradling and centering are to be erected, bearing in mind that sufficient space be allowed for getting at the foundations of the pier itself and of the porch attached to it.

"The pier in question would then have to be in every fit way supported, secured and protected from injury, as also the pier, archway and window opening of the porch itself.

"Two continuous lines of horizontal timbering would have to be applied extending the whole length of the front on the inside of the narthex; one against the western wall, the other directly against the piers. They should be supported on upright and diagonal beams, probably at the level just under the capitals of the pier shafts. This horizontal beam work inside the narthex should be in right relation to a parallel beam and support work of the same kind on the outside, three longitudinal beams in all. These should be connected by cross and diagonal timbers and

\* Owing to the refusal of the Dean and Chapter to allow any notes or measurements to be taken for this specification, it has not been possible to publish any of the diagrams, which ought properly to have accompanied and explained it. The examination of the building had been made at various times before this prohibition by each of the five architects whose names are attached to it.

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iron tie-rods so as to become one continuous stiffening of the whole front of the building.

"From the timber cills on the ground supporting the upright posts carrying this horizontal framework, the necessary diagonal shores and strutting would have to be fixed, so that the horizontal framework would be stiffened back to the west wall of the church in combination with the special diagonal shoring against the centre of the pier itself. On this framework other horizontal timbers running east and west would be carried out to support the walling and gable above, in connection with other timbers passing through the small windows at the base of the gables.

"The centering of the northern arch should be composed of a series of supports, scribed to the several orders of the arching, according to the various irregular curves of these orders, and their outer edges should be covered with dry hair felt, to avoid injury to the faces of the stonework.

"The centering to the ribs of the vaulting of the narthex would also have to be made in like manner, and, with the centerings of the arch itself, be supported from the horizontal framework described above.

"As we attach great importance to every part of this supporting framework and centering, it would not only have to be carefully designed, but should be adapted to the exact peculiarities and irregularities of the work against which it would be set up.

"This shoring, strutting, cradling and centering should be so effectually contrived that this part of the narthex would be securely sustained from the ground upwards, and in the direction towards the west wall of the church.

"When all possible precautions have been taken to secure the building from movement, as it now stands, the underpinning of the pier in question, with that of the porch in attachment to it, should be undertaken.

"The course of proceeding would be regulated by the state of the foundation, when it is partly or wholly exposed to examination.

"The vital principle of underpinning is that of gradually working under the superstructure by removing the old defective work, and substituting new material on a sound base, piecemeal.

"We believe that simple underpinning from the sound work of the present foundation down to the rock below could be done without serious difficulty if the excavation were properly secured with strutting and planking, patiently and skill-

fully applied. The surrounding earth should be efficiently clay-puddled behind the planking (which would be driven down on to the rock below) so that any necessary pumping should not draw off the water and sand from outside the trenching.

"It might be found necessary or advisable when the foundation of rock is reached to bore into it to ascertain the thickness of the rock itself, and the character of the soil below.

"The underpinning would, of course, be done in detail, bit by bit, in sound hard-burned tough brickwork set in Portland cement and sand mortar, properly wedged and tightly pinned, the mass being attacked from different points of it, one after the other. Hereafter we will discuss the quality of the sand and cement to be used, the making of the mortar and its application.

"It must be clearly understood that the whole of the foundation of this pier and that of the attached porch must be completely underpinned; for if only parts of it were so treated, a very mischievous difference in the support to the work above would occur, and cross strains be set up which would gravely endanger the substance of the main pier itself.

"In the construction of the supporting framework or the underpinning, it might be well to call for the assistance of a skilled civil engineer in conference, whose experience and scientific training would add much to reducing all risks to the least possible amount. The architects, who would have greater experience of the characteristic qualities of ancient walling, as distinguished from modern building, would necessarily retain their general direction of the works, but any difference of opinion between them and the engineer should be settled before any process is proceeded with.

"It should not be forgotten that the timber framed supports, vertical, horizontal and diagonal to the whole of the fabric to be dealt with as above described, would so take off the larger proportion of the superincumbent weight as to make the underpinning a perfectly secure process. At the same time it must be understood that careful and persistent watching of the building when applying the supporting constructions would be very necessary, so that every sign of possible weakness might be met from time to time as the different works were being carried on.

"The underpinning and other underground work of this pier and that of the attached work of the porch having been secured, the attention of the architects would be given to making searching examination of the condition of the foundations of adjacent parts of the fabric, so that any necessary

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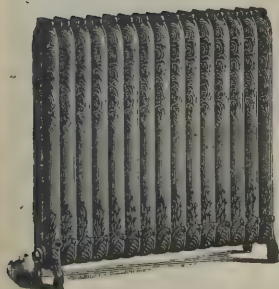
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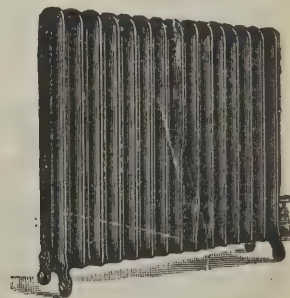
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works to these in connection with the parts, under our particular consideration would be as carefully attended to.

"The next work would be to look to the condition of the pier itself, between its foundations and the springing of the arch and vault; this would not be the least important part, for much would depend on its solidity.

"It is possible that disintegration may not have occurred in its substance to any serious extent, but this would have to be ascertained. The signs of its condition, so far as they can have been observed at present, tend rather to the conclusion that the subsidence and pressure outward from the vertical have been so slow from the time it was built, that the multitude of its parts have yielded, almost elastically, to the change in stability, so as not dangerously to decompose its parts, and the core with its ashlar casing may still be in a state of cohesion.

"However this may be, no pains should be spared in finding out what is its condition; and, after the plumbing, girthing and testing of all its perpendicular lines have been done, the pier should be gently tapped with a wooden mallet on its surfaces, and the sounds at different parts listened to for any indications of hollowness. Should the sounding not be satisfactory, a stone or stones would have to be drawn from the flat surfaces of the pier inside, and the core examined in one place at a time. The triangular form of the pier in plan, and its being some 15 feet wide on its inner side, would allow of the examination being made without risk and of the core being consolidated without serious difficulty in a similar way to that hereafter described in connection with the spandrels of the great arches. Any process of penetrating securely into old walls depends upon the care and ingenuity of the men engaged in the operations and their director, with an avoidance of heavy blows, keeping to one hole at a time, and that of the smallest workable size, a watchful foreman of the works, under the direction of the architects, with a few picked men on whom they could depend, being the most important consideration in such work.

"This pier, on which so much depends, having been secured in the whole of its height, attention would then be given to the springing line of the great arch and the vaulting, for complete consolidation here would be the basis for securing the great arch itself and the spandrels right and left of it.

"Of necessity, a hole or holes would have to be made just above the springing line inside, where the metal tie rods, which would have to be arranged at this level, would come. At present we are of opinion that two tie rods should be used, so

as to lay hold of a larger body of material at both ends than a single rod would allow.

"The particular size and form of the rods would depend much upon the exact calculation of the holding, both on the arch mouldings as they set down on the capital of the pier, and on the least injurious form of anchorage to be found inside the west wall of the nave. At the present time we feel inclined to put a connecting metal plate at the ends of the rods a little behind the quintuple attached shafting, which runs up from the ground to the base of the pinnacle between the spandrels. The form and exact position of this connecting-plate would have to be decided upon as the work proceeds. Two tunnel passages, to be made in the same way as hereafter described, would be the safest and soundest way of working here, and it may be that copper or tough bronze would be used for the rods, &c., or, if not, the most approved kind of iron or steel; in either case their strength would have to be tested before using. The making of one tunnel at a time would allow of taking greater pains with the new consolidating material to meet the strain both above the springing line and below.

"The consolidation of the walling here, in connection with the tie-rods, having been done and allowed to set, the tympanum space at the back of the pier, between the decorative arching and the wall rib of the vaulting at the base of the great pinnacle, would afford easy and secure access to the core of the walling in the centre; and further penetrations would also be made without difficulty or risk from the hollow pockets of the vaulting right and left.

"We now come to the very important point in connection with the present repair of the front, the manner in which the great arches can be safely and securely strengthened without having recourse to rebuilding.

"It has already been noted that the internal parts of the walling of the northernmost arch have expanded from east to west during the slow settlement of the detached pier below, and in a lesser degree this is probably the case in the other arches also. The substance of this walling must, therefore, to a greater or less extent, be in a state of disintegration, and its removal and replacement by sound masonry are essential to the permanent stability of the narthex. The manner in which this may be done without risk or danger either to the building itself or to the men engaged in the work is as follows:—

"In the rubble walling, which has no ashlar facing at the back of the arches, beginning at the lowest point, a hole or tunnel, just wide enough for a man to work in, would be slowly

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driven by short sections at a time. The sides and roof of each section would be made absolutely secure by timber framing before beginning the next one, and the hole would be gradually carried through the wall to the back of the facing stones of the wall itself. The hole would in no case exceed 6 feet in length. Any possible danger from the running of disintegrated material would be met by the prompt application of short lengths of 3-inch planking, thickly coated with wet clay, and held in position by workmen while props with expanding screws are applied to the ends, so as to press each plank well home and keep it in place. Moreover, only one tunnel would be made at a time, and this would be filled and pinned up (with sound material, as hereafter is described) before another one is begun; it would, therefore, bear but a small proportion to the area of the wall bored into. The new filling would thus support the work above it until that in its turn was removed.

Clearly, when doing this underbuilding in the spandrels of the arches, the chief danger in underpinning foundations—namely, the great superincumbent weight—would practically be non-existent, owing to the comparatively slight structure of the gable above. The only danger to be faced, the possibility of the sides or roof of the holes falling in, would be effectually guarded against by the precautions already described.

The process of consolidating the walling of the west front, above the piers and overlying the arches, is simplified by the great thickness of the walling at this part of the work under consideration; and the foregoing indication of a very complete system of timber support to all the weight and thrust of the work above the springing line of the arches shows that any disturbance caused by the execution of the work would be met at all points by the counter support. Extra support in detail would have to be supplied from time to time, so as to make sure that no further dislocation of material would happen, as the supporting framework would be brought into action as soon as the slightest movement took place.

The principle underlying this working by tunnel into the walling from the inside, at the back of the ornamental ashlar stonework on the outside, is that of applying horizontal bands of very hard material at certain distances apart vertically, so as to become, as the work proceeds upwards from the springing line of the arch, something analogous to 'cantilever' construction used in modern iron bridges, that is, a corbelling out right and left from the central axis of the piers below till the bands from opposite sides meet over the centre of the arch between its two piers. The bands of hard horizontal material

thus act as ribs, and the filling-in between them as support to the ribs.

As has been said before, the very thickness of the walling is of assistance to this kind of work, for these bands or ribs, having a great horizontal width, have also considerable power in lateral resistance to bulging.

As this laminated corbelling and its interfilling is passed on to the outer surfaces of the arching, the weight before carried by the arches alone is then shared by the renewed core of the walling. Also, while this process of relief and strengthening is going on, each of the orders of the arch is caught up and securely connected by natural adhesive bonding, or, when needful, by dowels of hard material, and at the same time the spaces between the rings of the arch, which have opened on account of settlement, would be securely filled and incorporated with the work behind.

The horizontal bands or ribs, which were constantly used in the best Roman walling, served more than one office in construction, as they were, so to speak, built in compartments, and the rubble or concrete lying on this laminated bond of two or three joint-broken courses stopped the running down of the water from the new rubble above them to the rubble below, that having already been saturated with grout.

It must also be understood that these laminated bond courses would be of the whole thickness of the wall from the back of the facing stones to the inside face of the wall lining, and on these would be built or put in the rubble or concrete filling. While the work in each tunnel was being done these horizontal bonding courses would be thrust into and under the sides of the walling of the holes beyond the general width of each tunnel; so that after one tunnel was filled up, and a sufficient time was allowed for setting, another parallel tunnel would be made, and these outlying bond courses would be caught up at the base of the fresh hole, and a continuous line of them would run as far as different circumstances would allow.

The kind of materials to be employed in recoring and bonding together old walling is a very necessary condition for insuring permanent success. As is well known, underpinning in the ordinary sense is done at the base of the walls and mostly underground, the materials used being either sound brick or tough stone, with Portland cement and coarse clean sand for the mortar, and thin material, such as tiles or slates, for pinning and wedging.

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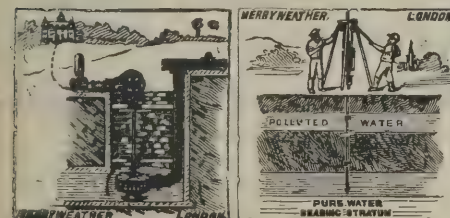


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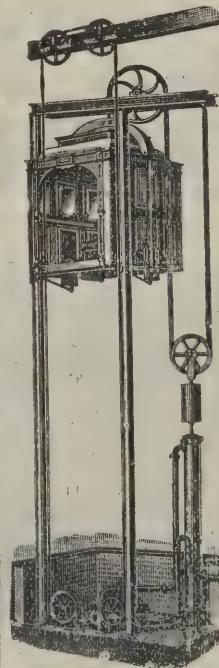


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is generally underground, more license is allowed in proportioning the cement to the sand than would be fitting for work as here described, where the quality of materials and their proportion in use must be strictly attended to. The competition in the manufacture of Portland cement is so keen that large quantities are produced and sold which are wholly untrustworthy; every care must therefore be taken to use only that which will stand the recognised tests of fitness. Its special quality has to be guarded against, for in its use it first expands and then contracts; but this is negated to a considerable extent when it is used underground and is less affected by the atmosphere. If used above ground the proportion of cement to sand must be reduced to a minimum; for though cement mortar is chiefly used for its quick setting, the final consolidation should take considerable time in developing itself.

"In order to make the horizontal courses or ribs as strong as possible, we should mostly use the hard, blue Staffordshire paving-tiles,  $1\frac{1}{2}$  inches or 2 inches thick, of the size 12 inches by 6 inches, with smaller sizes of the same material to avoid cutting. These semi-vitrified tiles have great affinity with Portland cement and are very holding.

"We have specified rubble walling or concrete as the composition of the filling-in between the tile-bands, but this work would be varied by the differences found to exist in the work of the core. Any solid parts of the core which might prove not to have been disintegrated would be well washed and then laid hold of with new thin bonding-stones or flat bricks, so as to range horizontally with any of the work met with on the way, which should not be disturbed; but the particular use of rubble concrete is great, for it can be pressed into the interstices of old walling and lays hold of any connecting bonding from the internal irregular faces of the ashlar or other facing stonework. At different times from the end of each tunnel, parts of the ashlar facing would be exposed to view and all the gaps in it could be securely dealt with; the renewing of the bedding and pointing of the stones (an almost impossible work from the outside only) would be thoroughly secured and attachments incorporated with the new backing.

"It is highly probable that the quintuple shafting, up from the springing of the arches to the underside of the base of the great pinnacle between the roofs, will have been built back with much cube stone, and if this is found so, it will not have to be disturbed (unless in any way dislocated), but carefully embodied in the new filling in and band work of the spandrels.

"So far as can be seen at present, the internal support at the base of these pinnacles is of solid and unfractured work, as is also much of the work of the gable proper, though here fractures or displacement of the stones would have to be dealt with, especially along the range of alternate window opening and niche-work.

"The gable proper, that is the triangular part resting on the continuous dentilled string-course, would present few difficulties in securing it after the strengthening of the foundation on which it stands (*i.e.* the spandrels of the arch below it) had been consolidated. The alternation of windows and niches occurring in thinner walling than that covering the great arch, a far larger part of the work here is done in squared stone, and this would allow of the masonry under the base of the wheel window being made quite sound from the inside, so as to avoid displacing the weather-fretted stones of the bottom part of its circle; the joints of this stonework at this point could be thoroughly washed out from above, run in with new filling, and incorporated with the solidified work below, which would have been done from the inside. Any disturbance of the ornamental stonework on the outside would be most mischievous.

"Doubtless as the work proceeds from time to time at the different parts of the walling, any scheme set down on paper now would have to be modified to suit the peculiarities of the various works as they become disclosed; caution while each part was being dealt with would have to be insisted on, and special contrivances put in practice to suit all situations.

"Though, for the purpose of this specification, the crowning and gable to the northern arch only is supposed to be dealt with, the whole line of work between the stair-turrets would have to be taken into account on one system of horizontal and lateral strengthening.

"We would, for example, here note that the whole of this western front of the building should be considered as necessarily included in the general scheme of repair (though it cannot be dealt with here particularly), and the central porch at the base of the two piers having for so great a length of time been of such vital importance in securing the stability of the building, should have its defects made good and additional strengthening supplied from the base of the new foundation (already noted) to the roof of it, and the condition of its attachment to the two great piers and western wall looked to.

"Again, while the works of support described above were in progress, the old system of timber beam and iron tie work now existing and carried back to the east side of the towers would

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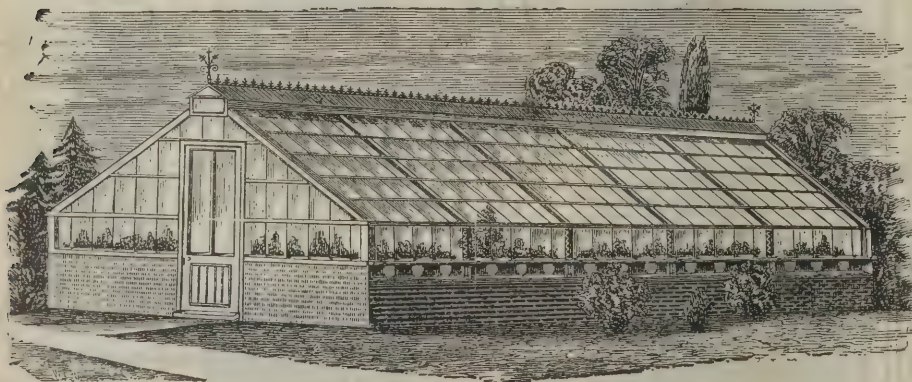
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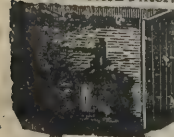
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have to be overhauled, any weakness observed and remedied, and, perhaps, additional support supplied. This would also have to be considered with the possible attachment of further stays and support to the vertical walling of the gable itself from the inside; for, although the internal piers right and left are built out eastward, with a passage through them, and give extra support to the pinnacles, it is not so with the gable. Though this is not in what would be called by builders a bad condition, it would be wise to give it additional support on the inside, which could be very simply done, and the connection of the roof beams with it could be better secured, and made, when properly strengthened, a steadying power to the gable itself.

"We need scarcely here say anything as to the repair and strengthening of the vaulting in connection with the great arch at this part of the front, save that we were much interested in the varied curves of the ribs resulting from the slow strain put upon them by the settlement of the piers; but they present no serious difficulty in the way of strengthening them as they now stand, when once the work on which they rest and abut is made secure.

"In handing to the Society of Antiquaries this necessarily incomplete specification, we would add that, when considering the different points somewhat more in detail, as set down above, and after our examinations of the building from the scaffolding, we were sorry not to have been favoured with further opportunities of taking notes and measurements of the fabric. This would have enabled us to make it as clear to the public as it is to ourselves, that there is no necessity whatever for the taking down and rebuilding of this most remarkable addition to the west front of the cathedral, as proposed by the advisers of the Dean and Chapter of Peterborough. It is in no immediate danger, as was quite evident to us when at last the scaffolding was set up, and the present condition of the building could be scrutinised closely. This study clearly proved to us that it could be both securely and lastingly repaired without detracting from those refined and impressive qualities which go to make a work of such majestic and still uninjured beauty so precious an heirloom to a nation.

"THACKERAY TURNER, W. R. LETHABY, DETMAR BLOW, PHILIP WEBB, J. T. MICKLETHWAITE."

"Having carefully examined from the scaffolding the west front of Peterborough Cathedral, I am of opinion that the work described in the above specification could be safely carried out, and that it would be effective in making the building secure."

"JOHN CARRUTHERS, M.Inst.C.E."

"We, the undersigned architects, have not examined the west front of Peterborough Cathedral from the scaffolding, but we are of opinion that the methods proposed in the above specification are eminently practical, and they are such as we should recommend for repairing work of this nature.

"ROBERT WEIR SCHULTZ, F. W. TROUP, EDWARD S. PRIOR, F. INIGO THOMAS, HALSEY RICARDO, MERVYN MACARTNEY, P. MORLEY HORDER, J. A. COSSINS (Birmingham), H. WILSON, ERNEST NEWTON, E. GUY DAWBER, C. R. ASHBEE, J. J. STEVENSON, F.R.I.B.A."

The following communication has been sent to the Dean of Peterborough:

"We, the undersigned architects and surveyors of Leicester (being the largest town in the diocese), having full confidence in the judgment of your architect, Mr. J. L. Pearson, R.A., and knowing from what he has done in the past that any work he does to the west front of Peterborough Cathedral will be of the most reverent and conservative character, beg to forward a subscription of 71% towards the fund you are raising for the restoration of this unique portion of the cathedral of our diocese.—R. J. Goodacre, J. Goddard, J. B. Everard, S. Harrison, J. Goodacre, C. Baker, S. P. Pick, A. T. Draper, W. E. Keites, W. H. Simpson, F. Seale, H. C. Taylor, A. H. Hind, T. W. Pettifor, E. G. Mawbey, borough surveyor, T. Topott, T. P. Bown, H. A. Roehling, A. S. Gimson, W. A. Catlow, W. M. Cowdell, J. W. Simpson, J. Wigg, A. E. Harvey, J. Lancashire, W. T. Grewcock, F. B. Cooper, A. Herbert, W. E. Moore, H. F. Traylen, R. W. Bedingfield, A. E. Sawday, G. Brown, J. T. Blackwell, W. Keay, C. Ogden, P. C. Mawbey, R. J. Stephens."

A meeting of the cathedral restoration committee was held at Peterborough on the 7th inst. A long discussion took place on the proposals of the Society of Antiquaries with regard to the west front, but the suggestion to refer the matter to arbitration was not entertained. Mr. John Thompson, the mayor of Peterborough, who is the contractor for the work, said he would not risk the lives of his workmen in attempting to carry out the scheme of the Society. Eventually it was proposed by the Marquis of Exeter, seconded by Canon Watson, and carried unanimously, "That this committee, having heard from the Dean and Chapter the report of their proceedings in support

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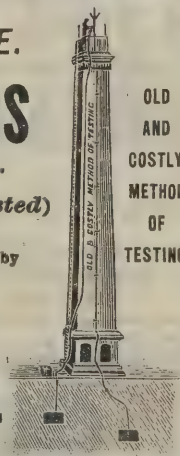
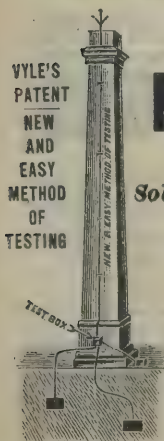
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of the resolutions passed by us on November 25 last with reference to the north-west gable of the west front, assures them of its entire approval of their action and requests that the contractor be directed to proceed at once with the work. The treasurer announced that a little over 300% had been received in subscriptions since the last meeting.

### GLOUCESTERSHIRE ENGINEERING SOCIETY.

A MEETING of this Society was held at the School of Science, Gloucester, on the 5th inst., under the presidency of Mr. Alfred Slater. The President referred to the reading-room and library which the Society had now opened at Arrow House, Southgate Street, and thought that the number of new members just nominated (the largest number that had up to the present been nominated on one evening) showed that the Society had taken a step in the right direction, and he hoped that heads of firms and others interested in the rise of machinery and manufactures would take special interest in the affairs of the Society.

The Librarian reported that the Society now possessed 180 volumes, and he had great pleasure in stating that during the past week about 100 standard books, periodicals and photographs of a technical character had been lent to the Society by gentlemen and firms, to whom he now proposed that the best thanks of the Society be tendered.

Mr. H. W. Kolle, C.E., delivered a lecture upon "Water Tube Boilers," illustrated by a model and by diagrams shown by limelight. He explained the circulation of water in steam boilers and gave a history of water-tube boilers, their construction, erection and operation, and also discoursed upon the theory of steam generating, and dealt fully with the advantage of this type of boiler in its maintenance and evaporative power, with regard to economy and safety, and also detailed the requirements of a perfect boiler.

The President proposed a vote of thanks to the lecturer for his excellent paper, saying that the present shell boiler seemed to be one working against itself, but that the water-tube boiler, in which the circulation was more complete, and by which refuse, sawdust and other waste products and materials could be used for the generating of steam, was tending towards his idea of perfection, and he further described some experiments he had been trying upon the burning of sawdust by means of its explosive qualities.

Mr. Jas. Platt, in seconding a vote of thanks, said that this kind of boiler had had a severe struggle in this country as compared with America and other countries, but that Messrs. Babcock & Wilcox's type still maintained its position, as they were making at present three boilers a day. He added that the Lancashire boiler had been greatly improved, and when properly managed was equal to any other boiler. The water-tube boiler required more close attention than other boilers, but was a splendid one for generating steam; he referred particularly to the water-tube box as an admirable piece of workmanship, and mentioned that his firm were the first makers of the special rivetting machine and plant connected with this boiler.

Mr. Read, the city surveyor, in supporting the motion, expressed his indebtedness to the lecturer for his interesting lecture, and spoke of the suitability of this boiler for the disposal of refuse, and for the generating of steam for electric-light purposes, and made some observations on the expansion of the tubes.

A discussion followed, in which Mr. Walton, Mr. Seekings and other members took part.

Mr. J. W. Howard, the president, announced that the next meeting will be held on February 2.

### THE OFFICES OF THE SEWERS COMMISSION.

THE new offices of the Commission of Sewers, facing Basinghall Street, says the *City Press*, are not in accord with the principal architectural features of that well-known thoroughfare. The reason for this departure is not far to seek, as the Commission, under an injunction, unsuccessfully resisted by that body, has been unable to complete the original plans of the building. The question of ancient lights, which was raised by the opposite tenants, has proved fatal to the intention of the Commission to erect a handsome structure facing the street. The fact that someone has blundered is now only too painfully apparent. How the error occurred is a mystery, for it ought to have been elementary knowledge to those concerned that the question of ancient lights would prove a formidable, if not a fatal, obstacle to the execution of the original plans. For the oversight the Commission has had to pay very dearly by the mutilation of the original scheme. Instead of having a compact structure rising in a line upward from the street, the



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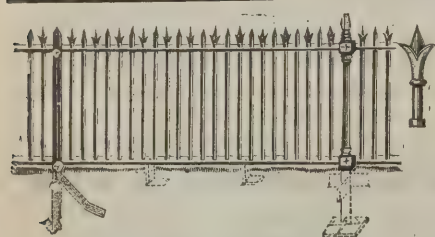
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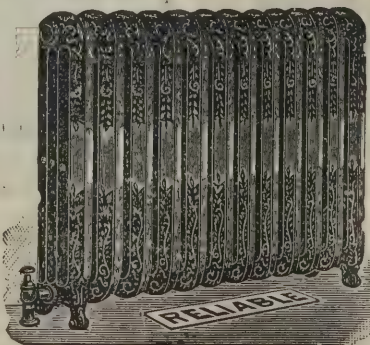
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new building will be erected in terraces, culminating with a steep roof at the rear. It is needless to say that much valuable space has been sacrificed in order to conform to the requirements of the injunction. The half-basement will be devoted to the clerks' strong-room, 34 feet 2 inches by 17 feet; a room for the gas inspector, 15 feet 3 inches by 17 feet; rooms for the sanitary inspectors, 27 feet 6 inches by 19 feet 6 inches, and 19 feet 6 inches by 17 feet 6 inches respectively; an office for the electrical engineer, 12 feet 6 inches by 19 feet, and his testing-room, 17 feet 9 inches by 19 feet. The ground floor will provide accommodation for the clerk, his room being 27 feet 9 inches by 15 feet; the second clerk's room, 13 feet 3 inches by 14 feet; the clerks' general office, 36 feet by 18 feet 6 inches; with waiting-room for the messengers, 15 feet 9 inches by 17 feet 6 inches. There is also a room for the accountant, containing an area of 220 feet superficial; with lavatory and w.c. accommodation for the staff. The office for the medical officer will also be on this floor, its dimensions being 20 feet by 15 feet, and that for the sanitary clerk is 15 feet by 11 feet. The first floor will accommodate the rate collectors' office, 16 feet by 18 feet 6 inches, and a private room, 15 feet 9 inches by 17 feet 6 inches, for the copying and general clerk in connection with the clerk's department. The principal entrance to the building will be from Basinghall Street, at the southern end, with staircase and a lift for passengers, giving access to each of the floors. A separate lift for books will also be provided. The offices now occupied by the engineer and his staff will be retained in their present position, and access will be given to them by a staircase and corridor leading from the new building.

### MANCHESTER ASSOCIATION OF ENGINEERS.

AT a meeting of the Manchester Association of Engineers at the Grand Hotel, the president, Mr. Joseph Nasmyth, said in his inaugural address that the past year had been noticeable in particular in that it had probably seen the high-water mark of panic which occasionally seized the public mind with regard to our industrial prospects. There was convincing evidence that we had no cause for serious alarm, although there was plenty of room for increased vigilance. Among the factors which affected the problem there were three which had supreme influence—the economic effect of improved appliances, the adoption of the best commercial methods, and the fullest

development of the skill of all those engaged in an industry, and especially of the leaders. In all engineering industries, and more especially in those in which machines of one class containing a number of similar parts were made in large quantities, the most complete system of employing special appliances was found. But it was equally true that in other industries, apparently much more simple in their nature, such as, for instance, the manufacture of iron and steel, the same process had been going on. Thus in the production of steel rails this generation had seen an enormous advance. One of the direct consequences of the adoption of the newer methods and appliances had been such a subdivision of some operations as to involve a fresh organisation of labour. In this way there had been silently worked a revolution which was not always fully appreciated even yet, and which had had no less an effect than the elevation of the machine-tender from a subordinate to an important position in the economy of a workshop. It was in consequence of the facility of subdivision which the ingenuity displayed in the production of special appliances had brought about that in all organised industries the labour cost of an article continually tended to decrease. It was obvious, however, that any such method could not produce handicraftsmen, nor, on the other hand, did it call for them. The unfortunate part of the matter was that the system tended to lower the general standard of skill, and thus, unless some other means were found, gradually caused a deterioration in the men available when the occasion called for them.

### ST. PANCRAS, SEFTON PARK.

THIS new mission church, which was opened this week, has been erected on a piece of land measuring 2,500 yards at the corner of Lidderdale Road, near the junction of Smithdown Road and Ullet Road, and is at the furthest corner of the parish of St. Agnes's Church, and will subsequently be used as a parish room and Sunday school, &c. Adjoining this is the choir vestry, and between the latter and Lidderdale Road will ultimately be built a permanent church capable of accommodating 800 people. Pending the erection of the sacred edifice the services will be conducted in the mission church. It is a substantial room of 60 feet by 30 feet. The ceiling has a height of 29 feet. The roof is of the tie-beam form in pitch pine boarded at the back of the rafters, and the floor is of pitch pine blocks laid upon concrete. At the west end there is a gallery,

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one-half of which will accommodate between forty and fifty persons, while the other half contains the organ. The building is of grey brick with red brick quoins and Rainhill sandstone dressings to the doors and windows. It is lighted with clerestory windows from one end to the other, and at the east end is a fine window of ecclesiastical design, all the windows being glazed in tinted lead lights. The choir vestry measures 23 feet by 16 feet, and the roof is panelled in pitch pine, while there is a dado 5 feet high of the same wood. The lead glazing has been executed from the architects' designs by Messrs. Williams & Watson, and the zinc roofing by Braby & Co., both being Liverpool firms. The architects are Messrs. H. & A. P. Fry, Liverpool, and Messrs. Morrison & Sons, Wavertree, have been the general contractors. The cost of present building and fitting-up is about 3,200*l*.

### NEW CHURCH AT ALSAGER.

THE recently erected church of St. Mary Magdalene was dedicated on the 8th inst. The building is a handsome one of Alton stone, and has been erected by Mr. John Fielding, of Alton, Messrs. Austin & Paley, of Lancaster, being the architects. The tower and spire are left to be provided by later effort, and will add considerably to the present stateliness of the structure. The church is in the Decorated style of architecture, and consists of a nave and chancel 26 feet wide, north and south aisles opening into nave by arcades of five bays each, and organ chamber on the north side of the chancel, with spacious choir and clergy vestries opening out of the same. The church will be entered at the west end by north and south porches, both of which open into the tower, which is 16 feet square and forms the baptistery. The tower will be surmounted by a spire. The total length of the church is 124 feet, and the width across the nave and aisles 56 feet. The portion now carried out consists of the chancel, organ chamber and vestries, the nave, with the south aisle and a portion of the north aisle, the south porch and the lower portion of the tower to the level of the roof of the nave. The church is seated at present for 450, but will eventually accommodate 700 people. The cost of the present portion will exceed 8,000*l*., an additional sum of 1,500*l*. being required to complete the tower and spire. The roofs, seats and dados are of pitch-pine, and the chancel seats, altar rail and altar table of wainscot oak. The roofs of the nave and chancel are covered with red Staffordshire tiles and

of the aisles and porches with lead, the ceilings throughout being boarded. The heating is effected by hot-water pipes on the low-pressure system, carried along the main passages in channels below the floor, with coils of pipes in the window recesses, &c.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

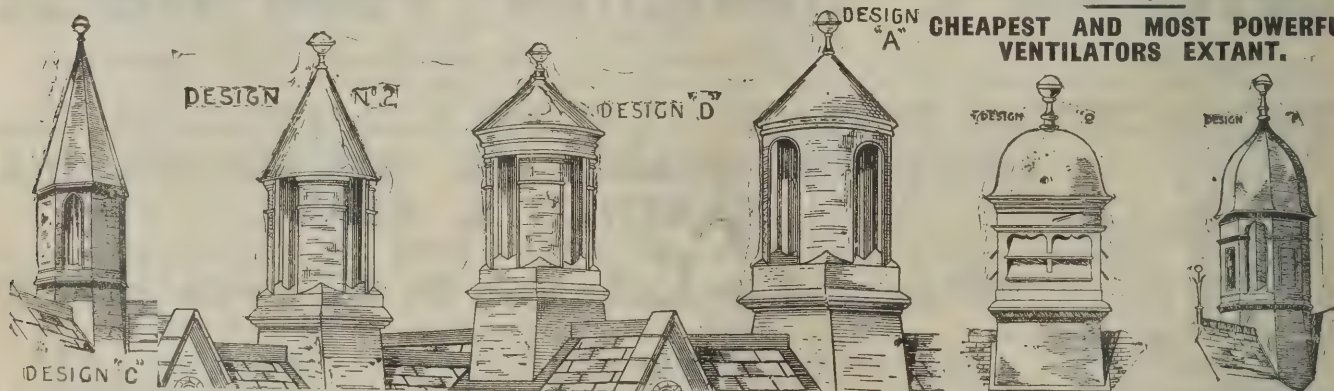
22. Robert Ambrose Wood and Samuel Richards, for "Draught and dust excluder, as applied to doors, windows and window-frames and casings and the like."
50. David Waddell Buchan, for "Improvements in drain-traps."
56. Daniel Pilling and James Greig, for "Improvements in and appertaining to the doors of ashpits and frames thereof."
58. Thomas William Henry Partridge and Edward James Abbott, for "An improved device for drain-wells leading to sewers and the like, and for disinfecting the same."
60. John Law Kirkbride, for "An improved sash-fastener."
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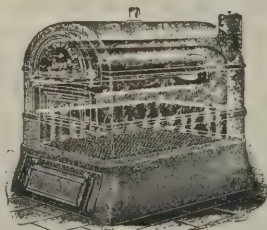
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## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## CONTRACTS OPEN.

ABERDEEN.—Jan. 29.—For erection of dwelling-house on the farm of Sunnyside, Drumoak. Messrs. Stronach, advocates, 20 Belmont Street, Aberdeen.

ALFRETON.—Jan. 23.—For construction of public urinals. Mr. E. Houfton, Council Offices, Alfreton.

ASHTON-UNDER-LYNE.—For erection of an hotel in the Market Place. Messrs. John Eaton, Sons & Cantrell, architects, Ashton-under-Lyne.

BACUP.—Jan. 30.—For erection of a caretaker's residence at the Maden Recreation Grounds. Messrs. Smith & Cross, architects, Bacup and Rochdale.

BATLEY.—Jan. 26.—For erection of boundary walls at Smithies Moor Lane. Mr. Jos. Hanson Craik, town clerk.

BETHNAL GREEN.—Jan. 26.—For erection of a block of dwellings for the working classes upon a site on the area known as the Boundary Street area. Apply at the Architect's Department, L.C.C., 17 Pall Mall East, S.W.

BRADFORD.—For erection of a weaving-shed and warehouse in Bowling. Mr. Fred. Holland, architect, 358 Wakefield Road, Bradford.

BROMLEY.—Jan. 25.—For erection of refuse-destroyer buildings and cart-sheds, stores and quay wall. The surveyor, 117 High Street, Poplar.

BURNLEY.—Jan. 26.—For reconstruction of Massey Street footbridge. Borough Surveyor, Town Hall.

CAMBRIDGE.—Feb. 3.—For erection of dwelling-house, boundary walls, office, &c. Mr. John T. Wood, 3 Cook Street, Liverpool.

COLCHESTER.—Jan. 26.—For the enlargement of the sorting office at Colchester post office. Messrs. Lee & Sons, 35 Craven Street, Strand.

CORNWALL.—Feb. 1.—For erection of four private dwelling-houses at Lostwithiel. Mr. A. S. Liddicoat, Lostwithiel.

CROYDON.—Feb. 9.—For erection of an isolation hospital at Beddington Corner, in the parish of Carshalton. Messrs. R. M. Chart & Son, architects, Union Bank Chambers, Croydon.

CHRISTCHURCH.—Jan. 30.—For adapting the school buildings at the workhouse into an infirmary. Mr. E. H. Burton, The Workhouse.

CUPAR-FIFE.—Jan. 25.—For erection of a villa at West End. Mr. David Storrar, architect, Cupar-Fife.

DARLINGTON.—Jan. 27.—For additions to the North Road locomotive works, for the North-Eastern Railway Company. Mr. William Bell, the Company's architect, York.

DONCASTER.—Feb. 2.—For erection of two additional stands on the race common. Borough steward's office, Mansion House.

ESSEX.—Jan. 30.—For additions to house at Heybridge, near Maldon. Mr. P. M. Beaumont, architect, Maldon.

GRANTHAM.—For erection of brick chimney, 130 feet high and 50 inches wide inside at the top, octagon or round, at Spittlegate Ironworks. Messrs. R. Hornsby & Sons, Limited, Grantham.

GREAT YARMOUTH.—For additions to the Queen's Hotel. Mr. Arthur J. Lacey, architect, 6 Upper King Street, Norwich.

GUILDFORD.—Jan. 23.—For erection of church, Charlotteville. Mr. William G. Lower, architect, 12A High Street, Guildford.

HALIFAX.—Feb. 8.—For erection of Ovenden Ward Constitutional Club. Mr. Joseph F. Walsh, architect, L. & Y. Bank Chambers, Halifax.

HALIFAX.—Jan. 27.—For taking down and rebuilding retaining wall in Huddersfield Road. Mr. Edward R. S. Escott, borough engineer, Town Hall, Halifax.

HALIFAX.—Jan. 29.—For erection of two pairs of semi-detached houses at Lightcliffe. Mr. Joseph F. Walsh, architect and surveyor, L. and Y. Bank Chambers, Halifax.

HASTINGS.—Feb. 3.—For alterations and additions to engine and boiler house in Waterworks Road. Mr. Philip H. Palmer, borough engineer, Town Hall, Hastings.

HASTINGS.—Feb. 1.—For additions to the public convenience, White Rock. Mr. Philip H. Palmer, borough engineer, Town Hall, Hastings.

HAWES.—Feb. 1.—For erection of stabling, boundary walling, &c. Mr. J. P. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

HUDDERSFIELD.—Jan. 30.—For erection of two dwelling-houses, Victoria Road, Lockwood. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

ILKLEY.—For erection of a billiard-room, stabling, &c. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

IRELAND.—Feb. 27.—For renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

IRELAND.—Jan. 25.—For erection of twenty-nine dwelling-houses at Lurgan. Mr. Henry Hobart, architect, Dromore, co. Down.

IRELAND.—Jan. 30.—For erection of five dwelling-houses in Moville. Mr. Foster Nolan, architect, Greencastle, co. Donegal.

KING'S LYNN.—Feb. 1.—For erection of an additional wing to the infectious diseases hospital at Horsley's Chase. Mr. E. J. Silcock, borough surveyor, King's Lynn.

LANARK.—For erection of two blocks of attendants' cottages, &c., for Hartwood Asylum. Mr. John Lamb Murray, Heavy-side, Biggar.

LEEDS.—Jan. 27.—For erection of eleven houses in Rose Terrace, Horsforth. Mr. J. P. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

LEEDS.—Jan. 27.—For erection of eight terrace houses in New Laithes Road, Newlay. Mr. J. P. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

LEEDS.—Jan. 23.—For erection of nine houses and house and shop, Woodhouse Hill. Messrs. Swale & Mitchell, architects and surveyors, 98 Albion Street, Leeds.

LEEDS.—Jan. 26.—For repairs to the various schools for ensuing year, for the Leeds School Board. Mr. W. Packer, clerk, School Board Offices, Leeds.

LEEDS.—Jan. 25.—For erection of economiser-house and alterations at Headingley pumping station. Mr. Thos. Hewson, city engineer, Leeds.

LEICESTER.—For erection of Primitive Methodist Sunday schools, Syston. Mr. Henry Harper, architect, Market Place, Nottingham.

LIVERPOOL.—Jan. 25.—For construction of a tank-house at Bevington Hill. Mr. W. R. Court, 15 Great George Square.

LLANELLY.—Feb. 1.—For alterations and additions to Felinfoel Board school, also for alterations and additions to the higher grade school, and for School Board offices, Llanelly. Mr. J. B. Morgán, architect, Llanelly.

LONG BUCKBY.—Jan. 27.—For excavating for and building a brick gasholder tank. Mr. W. Robinson, gas company secretary, Long Buckby, Rugby.

LUTON.—For fencing new football ground and erection of stand, dressing-rooms, &c. Messrs. J. R. Brown & Son, architects and surveyors, Luton.



MORLEY.—Feb. 1.—For erection of new premises for the London and Yorkshire Bank, Limited. Plans, specifications and bills of quantities may be obtained at the offices of Mr. William Bakewell, architect, Leeds.

NEW BROMPTON.—Jan. 25.—For erection of a villa in Balmoral Road. Mr. E. J. Hammond, architect and surveyor, 311 High Street, New Brompton.

NEWHAVEN.—Feb. 2.—For erection of tramp wards, porter's lodge, board-room, &c. Messrs. Clayton & Black, architects, 152 North Street, Brighton.

NEWPORT.—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

NORTHUMBERLAND.—Jan. 26.—For erection of a house and shop. Mr. Cuthbertson, Bamburgh Castle Inn, Sea Houses, Chathill.

OBAN.—Feb. 5.—For erection of a residence, Isle of Rum. Messrs. Leeming & Leeming, architects, Victoria House, 117 Victoria Street, Westminster, S.W.

OSWESTRY.—For erection of an hotel at Glyn Ceiriog. Mr. E. Bremner Smith, architect, Oswestry.

PENZANCE.—Jan. 27.—For erection of Wesleyan chapel at Teamoor. Rev. J. W. Genge, 13 Regent Terrace, Penzance.

PETERBOROUGH.—For erection of a steam laundry. Mr. J. G. Stallebrass, architect and surveyor, North Street, Peterborough.

PONTYPRIDD.—Jan. 29.—For erection of a shop and dwelling-house. Mr. Thomas Rowland, architect, Market Buildings, Pontypridd.

RAINHILL.—Feb. 19.—For additions and alterations to wards 10 and 11, main building, county asylum. Mr. Jas. Cornall, acting clerk, Rainhill.

RIBCHESTER.—Jan. 23.—For cloakroom, &c., Knowle Green School. Mr. J. A. Seward, 119A Fishergate, Preston.

RUNCORN.—Jan. 27.—For additions and alterations at police station and court house. Mr. H. Beswick, county architect, 17 Newgate Street, Chester.

STOCKPORT.—Jan. 26.—For building boundary wall on the east side of the castle yard. Mr. John Atkinson, borough surveyor, St. Petersgate, Stockport.

STRATFORD.—Jan. 26.—For erection of a block of school buildings and appurtenances, to be known as the Whalebone Lane schools. Mr. William Jacques, 2 Fen Court, E.C.

SWANSEA.—Jan. 26.—For erection of new technical buildings. Mr. L. Collwyn Lewis, Swansea Intermediate and Technical Education Grammar School.

SWINDON.—Feb. 1.—For erection of small-pox hospital and caretaker's house at Gorse Hill. Mr. William Drew, architect, 22 Victoria Street, Swindon.

TAVISTOCK.—Jan. 23.—For erection of a pair of semi-detached villas. Mr. William Squire, architect, Tavistock.

TRURO.—Jan. 27.—For renovation and repairs at St. John's Schools. Mr. Wm. Swift, architect, 23 Lemon Street, Truro.

UXBRIDGE.—Jan. 25.—For vaulting over cellars in Lawn Road. Mr. W. L. Eves, 54 High Street, Uxbridge.

WALES.—Feb. 17.—For enlargement of Congregational chapel, Aberayron. Rev. T. Gwilym Evans, pastor.

WATERFOOT.—Jan. 25.—For extension to scutching and cotton room. Mr. S. T. Williams, St. James's Chambers, Waterfoot.

WINCHESTER.—Jan. 25.—For additions, alterations and repairs at the prebendal house, 4 The Close, and for the conversion of the same into judges' lodgings, for the Very Rev. the Dean and Chapter. Mr. J. B. Colson, architect, 46 Jewry Street, Winchester.

WINCHFIELD.—Jan. 29.—For erection of additional vagrant wards at the union house. Mr. F. S. Chandler, clerk, Oldham.

WOOLWICH.—Jan. 26.—For erection of a fire station at North Woolwich. The Architect's Department, L.C.C., 21 Whitehall Place, S.W.

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## TENDERS.

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For laying granite causeway at Rosemount Viaduct. Mr.  
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P. TAWSE, Birchfield, Kemnay (*accepted*). .£1,106 11 4

## BAILDON.

For erection of two semi-detached houses in Trench Wood,  
Baildon. Mr. CHARLES E. MARSDEN, architect, 3 John  
Street, Bradford.

## Accepted tenders.

J. Deacon, mason	£335	0	0
J. Deacon, joiner	125	10	0
J. Smithies, slater	46	15	0
Wilks & Sons, plasterer	26	0	0
R. D. Taylor, plumber	19	0	0
H. Haley, painter	8	10	0

## BARRY DOCK.

For making new roads. Messrs. A. TREVOR ROBERTS HILL &  
Co., Surveyors, Barry Dock.

R. J. Matthias	£1,988	11	4
T. W. Davies	1,800	0	0
T. Rees	1,792	0	0
Brebner	1,762	5	2
Lathey & Co.	1,675	0	0
G. Rutter	1,588	15	4
Barnes, Chaplin & Co.	1,486	0	0
J. Sydenham	1,463	4	8
C. H. HIRST, Barry Dock ( <i>accepted</i> )	1,450	0	0
W. Froom	1,423	1	2
D. Love	1,391	3	1

## BRADLEY.

For erection of Primitive Methodist chapel and school. Mr.  
JAS. HARTLEY, architect, Exchange Buildings, Skipton.

## Accepted Tenders.

T. Atkinson, slater	£695	0	0
T. Green, joiner	348	0	0
T. Throup, slater	75	4	0
I. Wilson, plumber	71	10	0
J. Greenwood, plasterer	56	19	6
R. Petty, painter	17	15	1

## BROADHEMPSTON.

For the restoration of the roofs of church. Mr. EDMUND  
SEDDING, architect, 12 Athenæum Street, Plymouth.

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P. Blowey	720	0	0
J. P. Berry	679	0	0
R. Veale & Son	615	0	0
W. Atwell	597	0	0
K. F. YEO, Rock Road, Torquay ( <i>accepted</i> )	590	0	0
Farr Bros.	585	0	0

## BURY.

For erection of Baptist chapel and school, Manchester Road.  
Mr. T. NUTTALL, architect, 20 Market Street, Bury.

C. BRIERLEY, Fishpool, Bury (*accepted*).

## CAMBERWELL.

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## DUNDEE.

For roofing over part of cattle market. Mr. WM. MACKISON,  
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## Accepted Tenders

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W. Philip, smith and ironfounder	735	0	0
A. Buttar, slater	562	11	9
J. Bruce, mason	529	14	0
D. Brown, plumber	425	0	0
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Wimpey & Co.	412 0 0
Nowell & Robson	406 0 0

Imperial.

Imperial Stone Co.	399 0 0
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Victoria.

Nowell & Robson	49 0 0
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## HALIFAX.

For erection of a Liberal club at Claremont. Mr. JOSEPH WALSH, architect, L. and Y. Bank Chambers, Halifax.

Accepted Tenders.

E. Balmforth, mason.

W. Ratcliffe &amp; Sons, joiner.

G. Greenwood &amp; Son, concreter.

J. Bancroft &amp; Son, slater and plasterer.

J. Naylor &amp; Son, heating and plumbing.

Hinchcliffe &amp; Hainsworth, painter.

J. Mackrell, ironfounder.

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Higginbottom & Mattock	173 0 0
Tangye	170 0 0
T. Smith	155 0 0

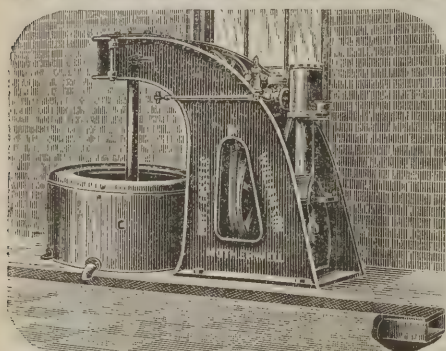
Exciter.

Antill	625 0 0
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Steam alternator.

Siemens	3,300 0 0
Ferranti	3,130 0 0

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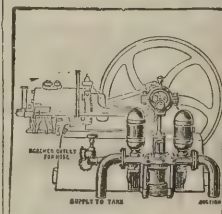
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Paterson & Cooper, market hall	148	7	0
C. O. Dawson, Harrogate, free library	64	17	6

**HENSHAW.**

For erection of Wesleyan chapel.

*Accepted Tenders.*

T. Nixon, mason and bricklayer.	
Johnson & Forster, joiner and carpenter.	
W. Norman, plasterer.	
T. Ellis, painter.	
Reed, Millican & Co., glazier.	
Clark & Kitchin, plumber, founder and smith.	
De Ridder, heating apparatus.	
Total, £477 13s. 6d.	

**HOVE.**

For Roadmaking, &amp;c., in Rochester Gardens. Mr. H. H. SCOTT, surveyor.

PARSONS & SONS (accepted)	£148	0	0
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**INVERNESS-SHIRE.**

For erection of new shooting lodge at Corrou, for Sir John Stirling-Maxwell, Bart., M.P. Messrs. WHARRIE, COLLEDGE &amp; BRAND, architects, Glasgow.

D. &amp; J. MACDOUGALL, Oban, joiner-work (accepted).

WM. WILSON, Rannoch, mason-work (accepted).

Total cost, about £23,000.

**ISLE OF WIGHT.**

For erecting a Foresters' Hall, Ryde. Mr. JOHN I. BARTON, architect, surveyor, &amp;c., Ryde.

Whitewood	£2,200	0	0
Jenkins	1,843	10	0
James	1,805	0	0
BARTON (accepted)	1,749	0	0
Holland	1,635	0	0
Hayden	1,549	6	2
Wheeler	1,534	0	0

**LEEDS.**

For alteration of the Markland Arms, and repairs to adjoining cottage. Messrs. SWALE &amp; MITCHELL, architects, 98 Albion Street, Leeds.

*Accepted Tenders.*

R. Buttery, brickwork.
J. W. Germain, joiner.
W. Allen, plumber.
T. Moore, plasterer.
A. Bateman, painter.

For erection of two houses in New Leeds. Messrs. SWALE &amp; MITCHELL, architects, 98 Albion Street, Leeds.

*Accepted Tenders.*

J. Pickard, bricklayer.
Todd Bros., joiner.
J. Stead, plumber.
J. Season, slater.
J. D. Dakin, plasterer.
Dearden Bros., painter.

For erection of shed and alteration of closets at the Holbeck Workhouse.

E. & A. CHADWICK, Hunslet (accepted)	£167	0	0
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**OBAN.**

For additions and alterations in Caledonian Hotel, Oban. Mr. ALEX. SHAIRP, architect.

D. & J. MACDOUGALL, Oban (accepted)	£4,000	0	0
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**RAMSBOTTOM.**

For excavating, forming, paving, kerbing and flagging Hope Street, Winifred Street, Edgar Street, Spencer Street and Pilkington Street. Mr. JAMES HALLIWELL, surveyor.

T. Rowland (including materials)	£1,509	6	1
R. H. Castle	506	17	0
T. & J. Foster	384	11	7
J. BURNHAM, Manchester (accepted)	359	0	4

**RUSHDEN.**

For erection of an additional classroom and cloakroom extension at Newton Road Schools, and for the erection of a wood and iron cloakroom, North Street School. Messrs. SHARMAN &amp; ARCHER, architects, Rushden and Wellingborough.

T. Swindall	£460	7	0
T. Wilmott, jun.	450	0	0
C. E. Bayes	446	0	0
R. Marriott	436	10	0
F. Henson	410	0	0

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## WAKEFIELD.

For extension of shed, Alverthorpe. Messrs. C. S. NELSON & R. W. SAVAGE, architects, Sun Buildings, 15 Park Row, Leeds.

## Accepted Tenders.

W. Kitson & Son, mason.  
E. & W. H. Haley, ironwork.  
J. W. Nettleton, joiner.  
A. Higginbotham, plumber.  
Pickle Bros., slater.  
Total, £919 7s. 4d.

## TRADE NOTES.

MESSRS. GEORGE PRICE, Limited, bankers' engineers, Cleveland Street, Wolverhampton, are to be congratulated upon securing probably the largest order for safes ever placed with a local firm, viz., 400 cash safes for the Admiralty. They are also engaged upon some massive strong-room doors for the new Humber factory at Coventry, and have supplied them with all their "bent-steel" book and cash safes. A "bent-steel" safe is also in course of construction for his Grace the Duke of Portland. From the foregoing it would appear that Wolverhampton manufactures are still keeping well to the front.

DARLEY ABBEY CHURCH, near Derby, has just been presented with a handsome brass eagle lectern by a member of the congregation. It was manufactured by the well-known firm of Messrs. Jones & Willis, of Birmingham and London.

IN the erection of the Non-Infectious Hospital, Rothesay (Mr. J. Russell Thomson, Rothesay, architect), the ventilation has been carried out by means of Messrs. Cousland & Mackay's patent direct-acting turret ventilators and improved air inlet brackets, which have been supplied from their works at Glasgow.

THE new free library, Harrogate, is being warmed and ventilated by means of Shorland's patent Manchester stoves and patent exhaust roof ventilators, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. WRIGHT & SUTCLIFFE, Globe Sanitary Works, Halifax, have recently brought out an improved combination kitchen and scullery sink, which they fitly describe as a novel departure. The drainer is not made of the same material as

the other parts, as heretofore, but consists of a strong corrugated piece of indiarubber, specially moulded for this purpose, firmly attached to the sink. By this arrangement, owing to the non-slipping and pliable properties of the drainer, a great saving in the breakage of and damage to crockery, glass, &c., is effected, an advantage which will be appreciated by heads of families, hotel proprietors and restaurateurs.

THE Thames Bank Iron Company, Upper Ground Street, S.E., have sent in a price list of their new radiators for hot water or steam. These radiators possess a large proportionate heating power as compared with some others in the market, having in fact an efficiency equal to from 18 feet to 102 feet of 4-inch pipe, and the prices vary from 17. 16s. to 127. 15s.

## BUILDING AND BUILDERS.

A COMMITTEE, consisting of the Mayor of Newport and other gentlemen, are on the look-out for a site on the Corporation Road on which to build a new church.

A NEW United Methodist Free Church is about to be erected in Loughton, Pudsey, for which the contracts, amounting to nearly 7,000l., have been signed. The new building is to occupy the same site as the present chapel.

SOME scaffolding in Sauchiehall Lane, Glasgow, fell on Monday, and four labourers—John Macinulty, John Docherty, Alexander Macdonald and Thomas Fitts—were seriously hurt. The injuries consisted of broken limbs and fractured skulls, and all four men had to be removed to the infirmary.

THE building of a new Catholic church at Eccles will be begun in the spring. The new church, which will be in the thirteenth-century Gothic or Early English style, will cost 6,000l., exclusive of the tower, and will seat about 650 persons. The church and presbytery will adjoin the present mission schools in Liverpool Road.

THE work of constructing a large reservoir and other waterworks at Springsmire, Dudley, for the South Staffordshire Waterworks Company, has been commenced, the estimated cost of which is stated to be nearly 14,000l. The dimensions of the reservoir will be 200 feet by 150 feet, with a depth of 17 feet, the capacity being 3,250,000 gallons. It is being constructed for the purpose of dealing with the water supplied from the company's pumping station at Kingswinford, and for dis-

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tributing it to Cradley Heath, Quarry Bank, Pensnett, Kingswinford, Brierley Hill, Hart's Hill and Round Oak. The contract has been given to Mr. H. Lovatt, of Wolverhampton.

### ELECTRIC NOTES.

MESSRS. EASTON, ANDERSON & GOOLDEN, Limited, of Erith, are now erecting a lift, to carry fifteen passengers, at the Kelvin Bridge Station of the Glasgow new district subway. It will be worked by electricity with continuous current and will be fitted with improved safety-gear, automatic stops and other accessories of the makers' latest designs.

OWING to the breakage of the circuit wire, six of the electrically controlled time dials placed at Glasgow street corners stopped on Wednesday in last week. The wire was promptly repaired, but it was impossible to set the dials right, as the Municipal Buildings, where the switchboard is erected, were then closed. Throughout the night the dials indicated two hours behind time.

THE premises of the Crystal Palace District Electric Supply Company (Limited), in Beardell Street, Norwood, have been severely damaged by fire. The insulation of the wires in the engine-room running to the armature had become ignited, and the whole of the motor transformer was involved. The fire was rapidly overcome, but much damage was caused in the engine-room.

### VARIETIES.

MR. H. C. EYRES, whose resignation of the management of the Coalbrookdale Company's London business, and appointment to that of the architectural department of the Falkirk Iron Co., we recently noted, was on Saturday last entertained by the Coalbrookdale London staff, and presented with an illuminated address, together with a handsome piece of plate.

THE N.A.A. Students' Sketching Club seventh annual social gathering will take place in the Grand Assembly Rooms, Barras Bridge, Newcastle-on-Tyne, on Tuesday evening next.

AT Widnes a chimney has fallen on the roof of a large shed belonging to the United Alkali Company and demolished it. A labourer, named Edward Kinsella, was killed, and three other workmen, named Windows, J. Sherwood and Taylor, were injured, Taylor seriously.

A MEETING of the Architectural Association was held on Monday last, when Mr. E. Prioleau Warren read a paper on "Plastering." The report will be published next week.

A NEW post office was opened at Fort William on the 15th inst. The new building, which is large and commodious, is situated in High Street, near the middle of the town, and its construction was rendered necessary on account of the large increase of postal work in that part of the West Highlands.

THE proposed expenditure of Ayr Town Council for 1897 embraces 10,000*l.* on sewerage, 6,000*l.* on iron bridge near station, 8,000*l.* on extension of the waterworks, 1,000*l.* on underground conveniences and 10,000*l.* on extension of electric-lighting plant.

BY the law coming into force in Sweden this year a dwelling-house must not have more than five storeys. An attic containing a stove is reckoned a storey. The height of the buildings must not exceed the width of the street by more than 5 feet. The height of a building will be measured from the street to the cornice of the roof.

A LOCAL GOVERNMENT BOARD inquiry was held at Wigan regarding the application of the Corporation for a provisional order to enable them to obtain a supply of 200,000 gallons of water daily in perpetuity from the Manchester Corporation's supply at Lake Thirlmere. It was proposed to construct a line of pipes from the service reservoir at Wigan Lane to the aqueduct leading from Thirlmere to Manchester. The cost of the proposed work was estimated at about 12,000*l.*

THE premises of Mr. H. Bassant, parquet-flooring manufacturer, 87 Charlotte Street, W., were on Saturday last the scene of a fierce conflagration. The flames burnt very strongly until late at night, and the firemen, working in the height of the snowstorm, presented a remarkable spectacle. Eventually the surrounding premises, though they suffered from heat, smoke and water, escaped serious damage from fire, but Mr. Bassant's premises suffered severely from fire, heat, smoke and water.

MR. HENRY SLATER made an offer to the Gordon Hotels Company, on behalf of a syndicate, to purchase the Metropole Hotel, Brighton, with all the furniture, fittings, fixtures, as it now stands, for the purpose of converting the same into flats. Mr. Coxon, the company's secretary, however, has written stating that his directors have no intention of disposing of the property. An idea seems to prevail in some quarters that flats will shortly supersede hotels and boarding houses at the queen of seaside watering places.

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IN connection with the Morecombe improvements all the landowners, with two exceptions, on either side of Heysham Road from the Battery Inn to Cross Cop, have offered the land free of charge for the purpose of widening the road in question and constructing causeways. The work was expected to be completed during the spring. It is naturally anticipated that Heysham will rapidly develop as soon as the harbour and new station for the Midland Railway Company are completed there. The contractors are pushing on the work in the erection of the Winter Gardens, which it is hoped will be in readiness by Whitsuntide.

THE new Court House, Sheffield, was opened last week by the Mayor, the Duke of Norfolk, in the presence of a distinguished assemblage of local notables. Some time ago the Corporation leased from the Town Trustees 670 yards of land at the rear of the old Town Hall, for 470 years, at a ground rent of 240*l.* per annum. Upon that site has been erected an additional court, solicitors', waiting and other rooms, additional offices have been provided, and twenty-two extra cells for prisoners. There is easy communication between the old and the new courts, and the entire block is convenient and comprehensive. The estimated cost of the additions is about 18,000*l.*

A NOTABLE addition to the architectural features of Reading has just been erected in Friar Street, from the designs of Messrs. Chas. Smith & Son, of that street. It is a range of shops built for Messrs. Fuller & Sons, and arranged for wholesale and retail business, with a suite of offices and clerks' rooms in the rear. Further to the south and east are four storeys of stores approached from a covered yard, entered by the archway which forms a central feature. At the southern extremity are the stables, stores, &c. The lower part of the façade towards Friar Street is built in polished granite, the upper storeys being in local red brick with Bath stone dressings. The buildings are warmed throughout with hot water, and lighted by electricity.

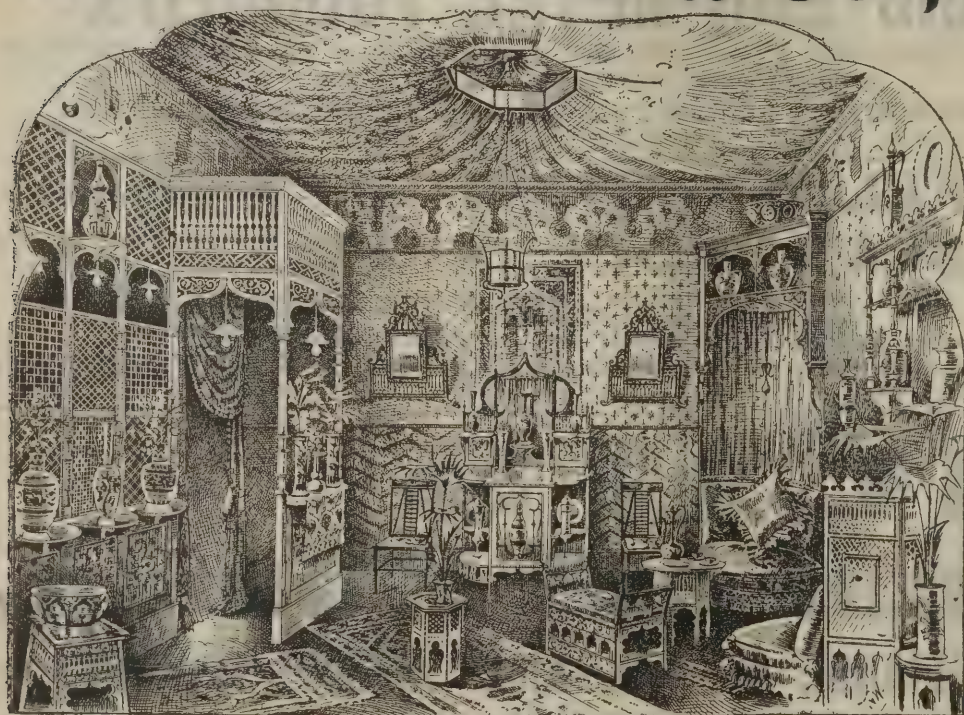
A VERY pleasant and successful gathering took place last week at the Hotel Cecil, when Messrs. S. J. Waring & Sons, Ltd., of Oxford Street, held their first house dinner. Appropriately enough, the gathering took place in the handsomely decorated great hall of the hotel, and it was natural that some of the speakers should make a point of alluding to this admirable example of the firm's artistic work. The chair was taken by Mr. S. J. Waring, jun. (managing director), and he was sup-

ported by Mr. John Waring (Liverpool) and Mr. Giles Ponter (Manchester), directors, and by about 250 members of the London staff and friends. The toast of "The Firm" was very cordially pledged, and the Chairman in his reply affirmed the conviction that the success of the firm was largely due to the devotion and self-sacrifice of its staff. After dinner a musical entertainment brought an enjoyable evening to a close.

THE new Sunday school just erected by the congregation of Zion Baptist Chapel, Bramley, was opened on the 16th inst. The building, which has been designed by Mr. W. A. Hobson, architect, of Leeds, and which is an ornament to the village, stands back from the main road on ground adjacent to that occupied by the chapel. It is a two-storeyed building, faced with stone, and is of a pleasing architectural style. Both the upper and lower storey can be entered from either end of the building. On the ground floor is a meeting-room, with accommodation for 300 people, with eight class-rooms communicating. Spacious staircases give access to the upper floor, which contains a large assembly hall, with seating accommodation for 500 people, two class-rooms and retiring-rooms, and over these, again, there are two more class-rooms. The principal contractors were Mr. W. W. Haley and Messrs. J. Trickett & Sons, and the clerk of works Mr. E. Webster Tate. The building, which is conveniently arranged and well lighted, has cost about 2,500*l.*

THE parish church of Irthlington was opened on Friday last, after having been restored from plans by Mr. T. Taylor Scott, F.R.I.B.A., of Carlisle. This church contains some good examples of thirteenth-century Norman work, noticeably the chancel arch, which is a striking feature of the interior, and is regarded as one of the finest of the kind to be found in any ecclesiastical structure in England. In the work of restoration it is a relief to find that no characteristic of the old Norman work has been interfered with, care having been taken to avoid even cutting the walls for purposes of bond. Where the new vestry walls, for example, abut upon the old chancel, the connection has been made by means of wrought-iron ties. The new vestry is on the south side of the chancel and encloses a Norman doorway, and is designed to harmonise with the adjacent work. A heating chamber is constructed below it, whence the church is heated by the low-pressure hot-water system. The whole of the seating is new and of Dantzic oak. Another considerable improvement is the spacious vestibule constructed of Dantzic oak at the main

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entrance. The organ has been renovated by Mr. A. Barton, Silloth. Numerous other works have been carried out, the whole of the contracts having been executed with thoroughness. The cost has been about 800*l*.

### ABUSES OF PUBLIC ADVERTISING.

A CONFERENCE was held in the hall of the Society of Arts, Adelphi, on the 14th inst., for the purpose of promoting the objects of the National Society for Checking the Abuses of Public Advertising. Sir Lepel Griffin, at the request of Mr. Alfred Waterhouse, R.A., president of the Society, who was present, but had been indisposed, took the chair.

Mr. Bryce, M.P., writing to the hon. secretary as to the meeting, said:—"You are certainly right to try and keep the flame alight in this way. After a time the public ear is reached and opinion affected. I am sure also that you are right in thinking that an appeal ought to be made to local opinion and local efforts. I would ballot for Mr. Boulnois's Bill were I not pledged to ballot for another."

Sir Edward Poynter, writing to the honorary secretary, said:—"I send you a few lines in great haste, in answer to your letter received this morning, to say that I am fully in sympathy with the objects of your Society, especially in your efforts to check the needless disfigurement of natural scenery by the conspicuous advertisements which are only too common. Even if the objectionable placards which assert themselves so offensively along some of our principal railways served any public purpose whatever, there would be no excuse for obtruding them just where they can spoil the one pleasure which may be derived from railway travelling—that of enjoying such views of peaceful or romantic rural scenery as are obtainable from the passing train. But it is notoriously the contrary; the advertisements are only in the interests of the advertising firms, and no one can pretend that the public would lose in any way by their suppression. The only argument on the side of the advertiser that I have seen possessing a pretence of plausibility is the appeal *ad misericordiam* which was made on behalf of the impoverished farmer who gains a small annual sum by letting his field for advertising purposes; but no one, I suppose, will contend that the benefit to the farmer enters into the intentions of the advertisers. The argument is a pure after-thought, and only dragged in because there is no other available.

I think you do rightly in not attempting general legislative repression. A world entirely free from advertisements is a dream too enchanting to be realised, and to draw a line by law between what would appear to be legitimate or illegitimate in advertisement would be an impossible task. Local control, with power to deal with the most annoying cases, seems the best method of applying the requisite check, and I should be glad if it were found possible to move the Legislature to this effect. Once such powers were obtained people's natural sense of what is fit and appropriate would lead them to revolt very generally against the irritating and useless disfigurement of the charms of natural scenery which all are capable of enjoying."

Mr. John Richmond, who had taken an active part in the movement, wrote:—"It is, as you say, most urgent that all members of the Advertisement Regulation Society should use individual effort to further the cause both by enlisting new members, by drawing attention to abuses of advertising wherever they occur, and chiefly by bringing pressure to bear on the members of Parliament representing districts in which they are interested, to induce them to ballot for our Rural Advertisements Bill. When once powers of control have been placed in the hands of local authorities, a real beginning will have been made to check effectually what is, I fear, still a growing evil. Much has been done in some districts, notably in the Lake country, by individual protest, and I am told that the boards, which were becoming a hideous eyesore around Windermere, have been literally burnt and purged away." Mr. Richmond added that he was now drawing attention in the local press to some advertising abuses on the sea-front at Hastings, which seriously injured the view of the Old Town, admittedly, he said, one of the loveliest places on the South Coast.

Mr. Lecky, M.P., in his communication, urged in the most emphatic manner the necessity for such legislation as the Society was desirous of promoting.

Mr. Evans, the honorary secretary said that, even if Parliamentary action should at first fail, the Society could reckon on the support of a large amount of social influence and individual effort in promoting the cause at heart. No formal resolutions would be moved, but it was desired to take the sense of the meeting regarding the following steps:—(1) A memorial or deputation to the First Lord of the Treasury or the Home Secretary, to draw attention to the grave harm done by advertising disfigurement, and the certainty that the practice must spread indefinitely unless subjected to reasonable

# THE BATH STONE FIRMS. LTD.

TELEGRAMS,  
"OOLITE, LONDON."  
"OOLITE, BATH."

Head Offices: **BATH.**

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G.W.R. WESTBOURNE PARK, W.  
L. & S.W.R. NINE ELMS, S.W.

INCORPORATING PIOTOR & SONS, RANDALL, SAUNDERS & CO. LTD., I. SUMSION, CORSHAM BATH STONE CO., LTD.  
R. J. MAREH & CO. LTD., S. R. NOBLE, STONE BROS., LTD.



QUARRIES.  
MONK'S PARK.  
CORSHAM DOWN.  
CORNGRIT.  
FARLEIGH DOWN.

*Fluate,*  
FOR HARDENING,  
WATERPROOFING & PRESERVING  
BUILDING MATERIALS.  
To be  
obtained only of  
The Bath Stone Firms, Ltd.

QUARRIES.  
BOX GROUND.  
COMBE DOWN.  
STOKE GROUND.  
WESTWOOD GROUND.



Summer Dried Seasoned Stone for Winter Use.

## PARQUET FLOORINGS

One inch and  $\frac{1}{2}$ -inch thick.  
Immense Stock always ready for Laying.



Turpin's Patent 5-16 inch thick. |  
Laid in Patent Composition on Concrete,  
Stone, and Deal Floors. (See section.)

## ARTISTIC



## MARBLE MOSAIC PAVEMENTS

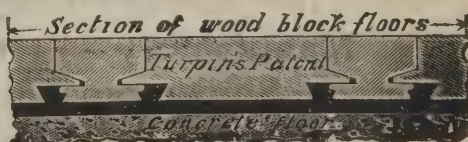
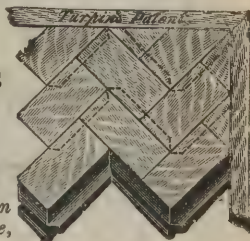
Executed in all  
Styles.

## OAK BLOCK FLOORINGS

One inch thick, from 4/10 $\frac{1}{2}$  per yard super.  
Also in Pitch Pine, Teak, Deal, &c.

## JOINERY.

TURPIN'S  
PATENT  
INTER-  
LOCKING  
SYSTEM  
for Laying  
Block Floors on  
Concrete, Stone,  
and Deal Floors



ESTABLISHED 28 YEARS.

22 QUEEN'S RD.,  
Bayswater,  
London.  
**TURPIN'S**  
Parquet Floor,  
Joinery and  
Wood Carving  
Co., Ltd.



control; to urge the Government (a) to grant facilities for Mr. Boulnois's Bill, or (b) to introduce a measure of their own, or (c) to grant a Parliamentary committee or a commission to inquire into the subject as one of national importance. (2) A memorial or deputation to the Chancellor of the Exchequer, to ask him to consider the propriety of imposing a duty on exposed advertisements. (3) The establishment of some concert between members of Parliament who are favourable to our cause, for the purpose of introducing (by way of amendments or instructions) provisions in restraint of advertising disfigurement into Railway Bills and similar measures.

The three propositions were put to the meeting, with the result that the first and third were agreed to, whilst the second was negatived.

### THE FUTURE OF CHELTENHAM.

THERE is no doubt, says the *Birmingham Post*, that a crisis has arisen in the history of Cheltenham, and that the town's position among the leading inland watering-places of the country will depend in no small degree on the decision at which the Town Council will arrive in regard to the improvement committee's scheme for spending 45,000*l.* on municipal buildings and a kursaal. The scheme, which first saw the light at the Council's meeting early in the month, has since then been explained to as many of the inhabitants as have chosen to avail themselves of the twice daily lectures which Dr. Ward-Humphreys (the chairman of the committee) has been giving in the room at present doing duty as a council chamber. As was perhaps inevitable, opinions differ as to the merits of the scheme—some raising objections on one score and others on another. There is, however, a general consensus of opinion favourable to something being done in the direction proposed; and, in default of a better plan, there is reason to believe the Council will adopt that which comes before it with the strong recommendation of the committee. If it does, a striking addition will in a short space of time be added to the attractions of "the garden town of England." The proposal is, briefly, to convert the present Winter Garden—which the town recently acquired for 13,000*l.*, but which cost 20,000*l.* in its construction—into municipal offices and a palmery, and to erect at the north end of the garden a kursaal, replete with all the accommodation for drinking the mineral waters, bathing, entertainment, &c.,

associated with such institutions as continental spas. The municipal offices would occupy the whole of the ground space of the present glasshouse, and in the respect that all the departments of the governing body would be housed on one floor, probably these offices would have no parallel in the country. The council chamber, also on the same level, would be located immediately underneath the dome; it would be an octagonal room amply large for the purpose. The ceiling of the offices and council chamber would form the floor of the palmery, and would mark the commencement of the glass superstructure, which rises higher even than the lofty rooms beneath. To bear this new floor the walls of the Winter Garden will have to be strengthened, and it is intended to case them with Ruabon brick, relieved by terra-cotta mouldings. Other architectural improvements will be effected to render the building of a more attractive appearance than at present. The kursaal will also be of red brick, and its principal entrance will be facing the promenade and close to the Queen's Hotel. The lounges, reading-rooms, &c., will be separated from the baths by a circular-shaped room capable of holding 500 persons, and which will be used for concerts, &c., and while there will be no communication between the kursaal and the municipal offices, visitors to the former will be able by an easy gradient to ascend into the palmery. The chief rooms of the kursaal will also overlook the grounds of the Winter Garden, which it is proposed to lay out in ornamental style. The scheme has certainly much to commend it, and for what it will do the estimated outlay is reasonable. The chief objection seems to be to the location of the municipal offices in the promenade; but as a matter of fact, although the building faces that thoroughfare, there will be no entrance from the promenade to the offices. There are of course those who object to the expenditure of so large a sum as 45,000*l.* on a scheme of this character, but the obvious answer is that, so far as the one part of the scheme is concerned, suitable municipal buildings (which are absolutely necessary) could not be erected elsewhere at anything approaching the sum now proposed to be devoted to that purpose, and that, as regards the other part of the scheme, if the Spa is to be revived at all, it is worth doing the thing well while the Council are about it. The Prince of Wales is expected to visit Cheltenham in May in connection with the annual review of the Gloucestershire Yeomanry, and it is hoped His Royal Highness may be induced to take part in the inauguration of this scheme, which is fraught with much promise for the future of the town.

### THE

# NEW PATENT SUNBURNER

Patented in Great Britain and all Chief Foreign Countries.

SOLE MANUFACTURERS:—

## STRODE & CO.

Lighting, Heating, and Ventilating Engineers.

**MAXIMUM ILLUMINATING POWER**

WITH

**MINIMUM CONSUMPTION OF GAS.**

**BRILLIANT AND STEADY LIGHT AND PERFECT VENTILATION.**

**UNSURPASSED FOR DURABILITY.**

**ADAPTED FOR ANY STYLE OF ARCHITECTURE.**

**DOWN DRAUGHT IMPOSSIBLE.**

Manufactory, 48 OSNABURGH STREET, LONDON, N.W.

Showrooms, 67 ST. PAUL'S CHURCHYARD, E.C.

Showroom for Electric Light Fittings, 188 PICCADILLY, W.



## ILLUSTRATIONS.

LINCOLN CATHEDRAL.—CHOIR AND NAVE, LOOKING WEST.

LINCOLN CATHEDRAL.—GENERAL VIEW.

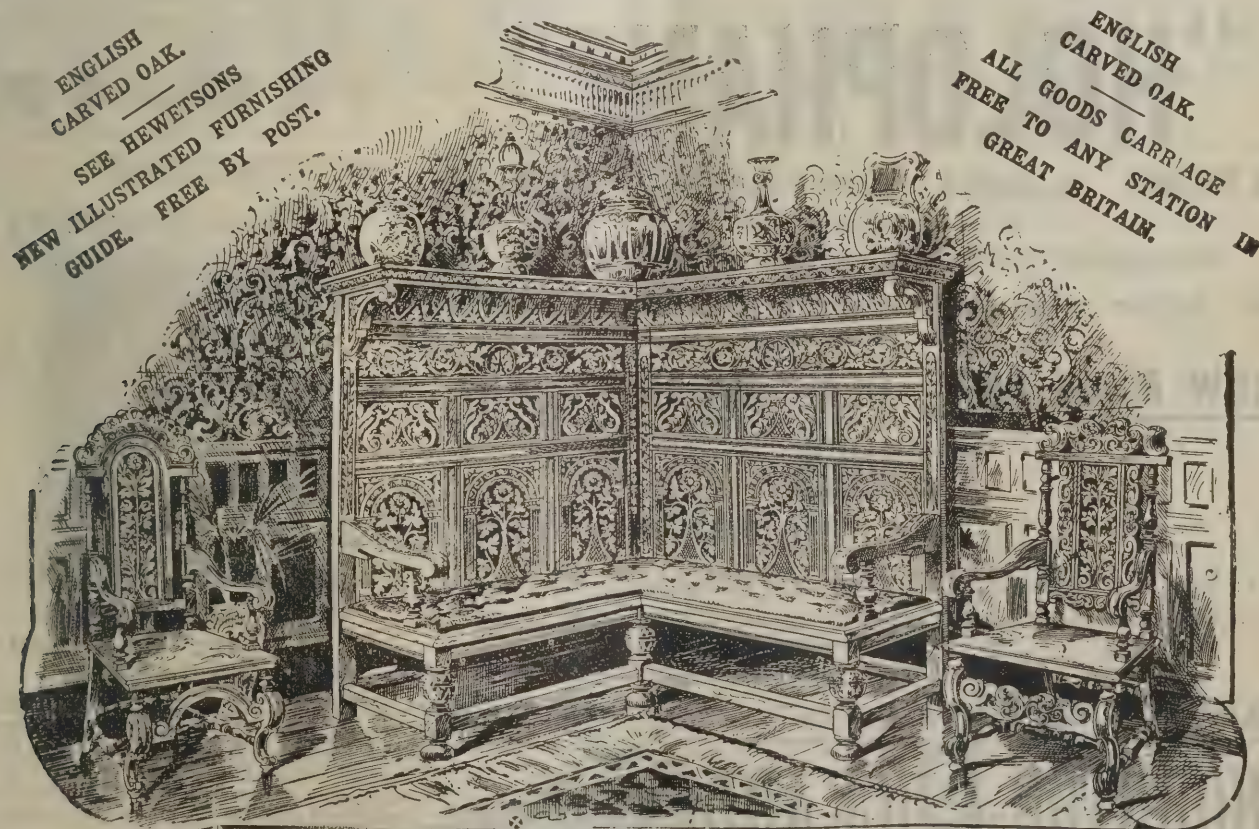
"THE LEICESTER," LEICESTER SQUARE, W.C.

"THE LEICESTER" SALOON, LEICESTER SQUARE, W.C.

## PROPOSED BUILDING TRADE EXCHANGE IN EDINBURGH.

As a strong desire has been said to exist among parties connected with the building trades throughout Edinburgh and district that an exchange should be instituted on somewhat similar lines to the Glasgow one, a meeting of all parties interested was held on the 13th inst. in Dowell's Rooms, George Street, Edinburgh. Councillor Hunter occupied the chair and about 200 gentlemen were present, the gathering being of a most representative character. After some preliminary remarks from the Chairman, Colonel Bennett, Glasgow, who was largely instrumental in inaugurating the exchange there, gave his experiences of that institution and also of those in America which he had visited. He said they in Glasgow had found it advisable to take a lesson from their brethren in America. What they had done in Glasgow had proved the probability of the existence of these exchanges in this country. The general principle was a simple one. The builders believed that a more intimate social relation and acquaintance with each other would tend to check the bitterness of rivalry and keep the eagerness of competition within reasonable limits. Further, it was believed that the skill and knowledge of each member would be secured by all and their usefulness to the community increased. Such exchanges had been instituted in nearly every one of the larger cities of the United States and their utility demonstrated. In America the builders were nearly fifty years in advance of those in Britain. The principles of the exchange were adhered to in the offices of the leading architects and surveyors. An exchange based upon proper lines, and which was strong and associated for the common

good of all, would mean that the competent men would come to the front and the laggard would go to the wall. The exchange would also mean the putting an end to shoddy work and shoddy prices. In Glasgow during the last two years they had formed themselves into a limited liability company and they were perfectly solvent. They had found favour with many of the architects and surveyors. In fact, they found benefits daily. In Glasgow they had pointed out the fallacies of the new City Improvement Bill. Further, as business men they objected to the grocer, baker and candlestick-maker, who were their city rulers, tackling business which they knew nothing about. They objected to faddists. Mr. Cook, secretary of the Glasgow Building Trades Exchange, also addressed the meeting, explaining the inner working of his institution. Their membership in Glasgow was about 300. They had found a firm footing, and were now in a really prosperous condition. In reply to a question, he stated that at the close of the first year the Glasgow Exchange had a surplus of 50*l.*, and at the close of the second year 200*l.* Councillor Yooll, Leith, moved the Building Exchange be formed for Edinburgh and Leith. Mr. Peter White, in seconding the motion, said the members of the building trade desired to protect themselves in a proper business fashion. They did not want the Town Council or any other body to teach them. In Edinburgh the builders were just cutting each others' throats, whereas in Glasgow they had succeeded in abolishing a great deal of unnecessary competition. The motion was unanimously adopted. The chairman, in referring to the memorandum and articles of the proposed limited liability company, stated that between 700 and 800 shares had already been applied for. Mr. John Laird, valuator, Glasgow, stated that in Glasgow recently a set of schedules went out from the Glasgow Corporation which were found to be not in conformity with what the building Exchange considered to be a proper form of contract. It was ascertained to whom schedules had been sent. A notice was sent to these gentlemen, who happened to be members of the exchange, to return their schedules to the secretary. The schedules were all returned, and were put into a large envelope and sent back to the wealthy Corporation, with instructions that no one would offer unless the contract was altered. The result was that the contract was altered and put into a form which was just to the contractor and to the builder. A committee was afterwards appointed to forward the formation of the exchange, and a cordial vote of thanks was awarded to the delegates from Glasgow.



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE

No. 319.—The "WORTLEY" CARVED OAK ARM-CHAIR, £4 15*s.*No. 320.—CARVED OAK HALL COSY CORNER, 6 ft. 6 in. high, £24 10*s.*No. 321.—The "KNIGHT" CARVED OAK ARM-CHAIR, £4 5*s.*

**HEWETSONS,** ARTISTIC FURNISHERS AND HIGH-CLASS DECORATORS, **TOTTENHAM COURT ROAD, LONDON.**



### PROPOSED EMBANKMENT AT ASSUAN.

At a meeting of the Victoria Institute on Monday, Professor E. Hull, F.R.S., described the last proposed and most generally approved scheme for embanking the waters of the Nile at Assuan, in Upper Egypt. After referring to the long lapse of time during which the cultivation of the ground in Egypt had been carried on by irrigation, and having described the origin of the rise and fall of the Nile and the source of the fertilising sediment, the author proceeded to deal with the question of the proposed embankment of the Nile waters at the first cataract, by which, during the period of Low Nile, the waters would accumulate to the extent of allowing a second flood by means of distributing canals carried down the valley on each side of the river. He also gave an historical sketch of the various projects proposed by Linant de Bellefonds, Count de la Motte and Mr. Prompt, and the final adoption of the Assuan site on the report of Mr. W. Willcocks, director-general of reservoirs, together with the arrangement by which the Island of Philæ with its monuments would be preserved from injury

bridge was 77 feet in length. The new bridge, 84 feet 9 inches in length, had been erected beside the old one, complete even to the rails and its final coat of paint. This had already been provided with temporary wheels in the same way. The preliminary part of the work—the raising of the old bridge and placing it on wheels—was the most arduous part of the task, and occupied the men incessantly until a quarter to seven. Then, by means of powerful crabs and winches attached to the new bridge, this was slowly pulled into the place of the old, the latter being at the same time pushed out of the way. It was a dead weight to move of 250 tons, but it was accomplished in an hour. At a quarter to eight the new bridge was in its place, and the old bridge was by its side. The next thing to be done was to remove the trolleys or wheeled carriages from under the new bridge and lower it into its final position flush with the permanent way. The completing of this occupied the remainder of the morning, and then the levelling-up and adjustment was gone on with; but at 2.20 the engineer's train was able to cross the new bridge, and the work was practically completed.

### AN ENGINEERING FEAT.

THE Great Eastern Railway Company, which has been doing some great feats of late in replacing some of their bridges which span rivers in a single night, beat its own record on the night of the 16th inst., when, in spite of a severe snowstorm, the bridge over the River Lea, to the south of Tottenham Station, on the main line, was replaced by a new bridge, the old one being removed and the new one placed *in situ* in nine hours. The old bridge was removed and the new one put in its place by the same process and at the same time. Mr. Wilson, the chief engineer, with a large body of officials, and gangs of men to the number of seventy, were on the bridge soon after twelve o'clock with a huge crane, several land crabs, a couple of 100-ton jacks and several 50-ton jacks in reserve. At 12.35 A.M. operations were commenced. The first thing to do was to strip the rails from the old bridge, taking up the plank-ing as well as the permanent way in order that the lifting apparatus could be attached to the girders to raise the whole bridge bodily to the extent of 18 inches. This was to allow of movable trolleys or carriages to be placed underneath resting on transverse girders, which had been erected so that the bridge, being elevated on wheels, could be drawn away. The old

### A PRACTICAL TEST IN COURT.

AN action was tried before Deputy Judge Sills and a jury, at Southwark County Court, on the 19th inst., in which George William Stock, a bricklayer, sought to recover 100% under the Employers' Liability Act from Messrs. Edwards & Medway, builders, Kennington Cross, as compensation for personal injuries. Mr. Kemp was counsel for the plaintiff, and Mr. David for the defendants. On July 13 the plaintiff was at work at the Red Cross Tavern, Paternoster Square, the ground floor of which was not boarded. A plank was laid across the joists for the use of the workmen, but when the plaintiff was walking upon the plank it broke and he fell into the cellar. It was said that the board was weak and rotten. The plaintiff was cut and bruised, his ankles were sprained, his right elbow dislocated and he was still incapable of doing work. The defence was that the board was quite suitable for the work, and that the plaintiff must have jumped heavily upon it. In order to show the condition of the board, counsel for the defendants invited the foreman, a fairly heavy man, to jump upon the half produced in court. This the man did, and to the astonishment of many in court the board snapped in two. The result was received with cheering. The jury found a verdict for the plaintiff, damages 60%, and judgment was given accordingly.

# "HOLOPHANE"

## PATENT LIGHT DIFFUSING GLOBE.

GUARANTEED TO GIVE MORE LIGHT  
With better diffusion than any Globe in existence.

## NOW MADE FOR "GEM" INCANDESCENT BURNER.

These "Gem" Holophanes are made in two patterns, No. 28 (similar to No. 10), and 28/28 (similar to No. 10/10).

Prices: IN CLEAR CRYSTAL, 2/4 each. IN NEW PATENT ROSE TINT, 3/6 each.  
ILLUSTRATED CATALOGUES FREE.

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THE  
**THORNTON-PICKARD**  
CAMERAS.

Complete "Amber" outfit from 25 18/6.

"AMBER"  
and "RUBY."  
Illustrated Catalogue free.



The Thornton-Pickard Manufacturing Company, Altrincham, near Manchester.

HIGHEST AWARDS: Exhibitions, 1891-93-94-95-96.  
Awarded the Royal Photographic Society's Medal for  
Architectural Photography.

**S. B. BOLAS & CO.,**  
Medallists, Royal Photographic Society,  
Architectural  
Photographers,



11 LUDGATE HILL AND  
3 CREED LANE, E.C.

Price List and Estimates on Application.

MEMORIALS.—Stained Glass Windows, Brasses, Church Furniture, Church Plate, Pulpits, Fonts, Altar Cloths, &c. Catalogues and designs on application. Old Military Flags netted and arranged for preservation; those of the 24th Regiment now on view.

**THOMAS PRATT & SONS,**  
MEMORIAL ARTISTS.

24 Tavistock St., Covent Garden, London, W.C.

READING CASES FOR THE ARCHITECT.  
Price Two Shillings.

OFFICE: 175 STRAND, LONDON, W.C.



**CABINET-MAKING IN IRELAND.**

A LECTURE was delivered on the 12th inst. by Lord Mayo on "Cabinet-Making in Ireland," at the Mansion House, Dublin, under the auspices of the Irish Industrial League.

His Lordship said the cabinet-making trade of Ireland, he regretted to say, had declined. It had been declining for the last fifty years or more. In seeking the causes that had brought about the collapse of what had once been an important industry in Ireland, they would find first of all that it was cheap transit and free trade. This had the effect of causing inferior goods to be run into Ireland from countries where labour was cheaper. In the second place, machinery was bringing about the enormous developments that had taken place in the making of mouldings, &c., by steam power. A third cause was the loss of income the gentry had to endure, that was to say, the land-owning class, and which was not confined to Ireland only. This class used to buy fine pieces of furniture; they could not do so any longer. He was not going to descant upon the woes and wrongs of the cabinet-making trade of Ireland, but to look boldly at the present state of affairs, and seek a means of combating the circumstances that militated against this trade. Competition in all trades was immense, and this trade had felt it keenly—perhaps more keenly than others. Fifty years ago furniture was of the heaviest description. This stuff was now cut up to make old Chippendale furniture, for the mahogany was well seasoned and the colour darkened by age. On reference to "Thom's Directory" he found there were at the present time in Dublin fifteen cabinet-making firms, and the number of workmen employed was about 160. Fifty years ago 1,000 to 1,400 workmen were employed. It was lately stated to a deputation to the Board of Works that the cabinet-making trade consisted now of joinery, workshop and office fittings, and the restoration of antique furniture—that is to say, the furniture of the last century. The present public taste ran in that direction; no doubt to some extent that statement was true, and considering the depression in trade that began in the eighties, and from which they were only just now recovering, it was wonderful that a trade like cabinet-making had survived in Dublin and in Ireland. They found, however, that the cabinet-work was done in Dublin, and that carpenter's furniture was made in Ireland, and that fittings for ships' cabins were carried out on a large scale. The schools of carving in Ireland did sound work. With reference to the decline in the cabinet-making trade in Ireland, he said in the other countries systems

of technical education were in existence. They in Ireland were attempting to compete with countries where the workman and the employer were taught at a cheap rate the trade from youth upwards. Drawing with a pencil was absolutely necessary to every modern workman. He had to say with regret that the rising generation in Ireland were, as a rule, going in for professional education to fit them for clerkships in Government offices, railway companies, breweries, distilleries, &c., and that to work with the hands was considered neither dignified nor becoming. To those who were workers in the room, he said whatever they took in hand they should do it well. If they scamped their work it must be found out in the long run, and they would never rise in their profession, and the dignity of labour would never be known to them. Good steady men of every trade commanded good and certain wages; the unstable and idle went to the wall. There was a revival of trade in Ireland, and he begged of them to try and work more and dwell less on wrongs, imaginary or otherwise, and remember that if they wanted help in the way of designs and working drawings, they would be furnished to them. If what he said to-night may be remembered even until to-morrow evening he should have done something to encourage the cabinet-makers and the cabinet-making trade of Ireland.

**NEW THEATRE FOR LEEDS.**

A NEW theatre is to be erected on the south side of the river, on a site containing 1,520 square yards, at the junction of Jack Lane and Meadow Road. The new theatre, which is to be called the "Victoria," has been designed by Mr. William Smelt, architect, Newcastle, assisted by Mr. F. W. Rhodes, architect, Upper Wortley. The design is Classic, and it is proposed that the front of the building should be of red Ruabon bricks, relieved by stone and terra-cotta dressings. The front is on a curve, which is broken up into sections by pilasters with ornamental bases and caps. There will be four shops each 14 feet 6 inches in height. Seating accommodation will be provided for upwards of 3,200 persons. The pit, which will be 60 feet by 76 feet, will seat 1,300, and in the stalls there will be accommodation for 130. In the circle there will be seats for 480, and the gallery will seat the same number of persons as the pit. There will also be six stage boxes. From

**GRAHAM & BANKS.**

**LARGE STOCKS  
OF  
DECORATIONS,  
FURNITURE,  
UPHOLSTERY,  
WOOD MANTELS,  
CARPETS,  
CURTAINS.**



**CATALOGUE POST FREE.**

**A LARGE VARIETY  
OF  
MANTELS, GRATES,  
TILES, &c.,  
ALL FIXED UP,  
SHOWING VARIOUS STYLES  
OF ARRANGING  
FIRE OPENINGS.**

**Wood Mantel and Overmantel, £8.  
Black and Copper Grate and Enamelled Tiles, £6 5s.**

**445 OXFORD STREET, LONDON, W.**



the pit three exits will be constructed, on a level with and leading directly into the street. The gallery will have two exits. The circle will be approached by a marble staircase, at the top of which there will be a large crush-room. Behind the circle a refreshment saloon will be found, 28 feet by 18 feet and 15 feet in height. Ladies and gentlemen's cloak-rooms will also be provided. In connection with the pit there will be another refreshment saloon, 28 feet by 19 feet and 15 feet in height. The stage portion of the building will be 62 feet by 36 feet and 48 feet to the grid. The proscenium front will be 32 feet wide and 31 feet high. The stage will be separated from the auditorium by a fireproof curtain, and it is intended that the building should be thoroughly fireproof. The estimated cost is about 15,000/.

### INSTITUTION OF ELECTRICAL ENGINEERS.

A GENERAL meeting of the Institution of Electrical Engineers was held on the 14th inst., when Dr. Hopkinson, the retiring president, vacated the chair in favour of Sir Henry Mance, C.I.E., the new president.

Sir Henry Mance delivered the inaugural address. He said that the volumes of the proceedings of the Institution formed a record of twenty-five years of useful work. During that period the nominal roll of the Society had increased from 100 to nearly 3,000. Founded originally by electricians and telegraph men, it had adapted itself to modern requirements and was now the oldest and largest institution of electrical engineers in the world. It represented all branches of the profession, and would, he trusted, in the future as in the past, aim at including in its ranks the names of all who were interested in and devoted to the development of electrical science. He felt that the only claim he had to the position he now occupied was the fact that for the best part of his life he had been actively connected with submarine telegraphy. Before dealing with submarine telegraphy, however, he wished to refer to certain facts and figures in connection with electric lighting and traction. In the matter of traction we had been outstripped by our transatlantic friends, but there was abundant evidence that this had not been caused by want of knowledge or skill on the part of our engineers or manufacturers; it was, he thought, an acknowledged fact that in excellence of design and workmanship our manufacturers could not be beaten. Our electric-light stations were unsurpassed in the excellence and efficiency

of their plant, electrical and mechanical, and unequalled in their suitability to the end in view. The best features of the methods preferred by us were all of home growth, and if we had to borrow from American practice in connection with the electric traction movement, we should at least be able to point to our tunnel railways as unique, and to the Liverpool overhead railway as the first elevated electric railway in the world. We were now beginning to reap the benefits of the Electric Lighting Act of 1888, both in the number of towns seeking powers for electric lighting and also in the extensions required for those already in existence, the magnitude of these latter promising to exceed that of the original scheme. It was satisfactory to note that manufacturers were turning their attention to the development of cells especially suitable for traction purposes; the advantages already claimed were that for any fixed output the rate was reduced in the ratio of 28 to 15, and the space occupied reduced from 19 to 10. Should these expectations be fulfilled there was every reason to anticipate an extensive use of storage batteries. Dealing with the subject of submarine telegraphy, he said that the earliest record of a subaqueous line was that of the experiment made by Baron Schilling, who, in 1812, exploded mines across the river Neva, using wire insulated with india-rubber. The earliest record at Somerset House of any submarine telegraph company was dated June 16, 1846, when Jacob Brett and Alexander Prince obtained a renewal of their provisional certificate of registration for the General Submarine and Oceanic Telegraph Company. The first concession connected with international submarine telegraphy was also granted to Jacob Brett in 1847, so that this year we might fairly be said to be celebrating the jubilee of the inception of international telegraphy. He had come to the conclusion that to no one individual could fairly be granted the credit of the inception and development of the submarine cable; the work had been the work of many. The earlier history of submarine telegraphy was marked by frequent failures; 20,000 miles of cable were laid during the first sixteen years, but over 9,000 knots of that quantity had been abandoned before 1865. The costly experience thus purchased was derived from the failures of a series of weak and light cables, in many of which the insulation was probably defective or insufficient from the first. Although a commercial failure, the first Atlantic cable was a great engineering success, and during its brief existence gave a practical and striking illustration of its value. The president next alluded to the failure of the Red Sea line, contrasting it with the Malta-Tripoli-Benghazi-Alexandria cable laid in 1861, and



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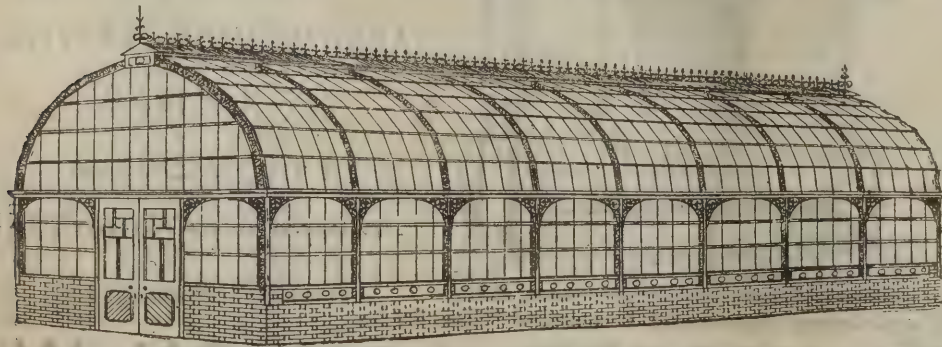
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mentioned that it was in connection with the construction of a land line through Mesopotamia, and the carrying-out of the cable portion of the line *via* the Persian Gulf, that his associations with submarine telegraphy commenced. Five sailing vessels were employed to convey the cable to the Persian Gulf, and as many as twelve vessels assisted during the work, which would now be easily and rapidly executed by one well-equipped telegraph steamer. Having alluded to the Bohemian character of the life of a submarine telegraph engineer, and to the isolation and uninteresting character of most of the localities chosen for cable stations, the president said that there were to-day more than 1,300 submarine cables in existence, the aggregate length of which could not be less than 162,000 nautical miles. They varied in length from a quarter of a mile to about 2,600 miles. Of these cables about 18,000 knots belonged to the various Governments, while the balance of 144,000 knots, mostly composed of long sections, had been laid by private companies. They represented a total expenditure of about 40 millions sterling, of which probably 75 per cent. had been contributed by English capital. Up to quite recently nearly every telegraph cable of importance had been manufactured in this country, but England could no longer boast of a monopoly in this business. There were now established well-equipped cable works at Calais and a smaller establishment at St. Tropez, on the shores of the Mediterranean. In addition to these there were the Government works at La Seyne, near Toulon. The Italians had cable works at Spezzia; Germany had recently subsidised a direct cable from Emden to Vigo. Our telegraph supremacy might be considered by some as ranking next in importance to the supremacy of our Navy. The sounding apparatus of Lord Kelvin had added immensely to the possibilities of ocean telegraphy; a knowledge of the contour and nature of the bottom of the ocean was of the utmost value to the cable engineer. Some of the faults that occurred in submarine cables were of the most extraordinary character. Lightning, earthquakes, landslips, submarine volcanoes had all to be reckoned with, and the leviathan of the deep had more than once been responsible for an interruption. In order to effect the repairs which were necessary, a fleet of forty-one telegraph ships was maintained, the gross tonnage of the telegraph marine being nearly 60,000. The type of cable now generally adopted for deep water was a great improvement on that used in the earlier deep-sea cables. The cost of repairs was a most serious item in the accounts of a telegraph company, and the repairing of one of the Anglo-American cables was said to have cost on one occasion

95,000*l*. This was probably the most expensive repair on record. Thirty words per minute was a high speed for a writer, and no average signaller could maintain a greater speed with the mirror key for any length of time. The work of the telegraph engineer was in one respect incomplete; it still remained for him to establish a girdle round the earth. When our network of telegraphs was complete, there ought to be little risk of Great Britain being completely isolated from her colonies in time of war. The president next dealt with telephone and fast-speed cables, and reminded the students, in conclusion, of their duty to the institution, and congratulated the junior members upon their choice of a profession, which was not only growing and progressive, but full of interest.

### THE COUNTY COUNCIL WORKS DEPARTMENT.

ON the 13<sup>th</sup> inst. the sittings were resumed of the special committee appointed to inquire into the management and financial position of the Works Department of the London County Council.

The Chairman said it seemed to him of importance that the report of the committee should be considered by the Council before March 31 next, the end of the financial year. It would therefore be necessary for the evidence to be concluded within a month.

Mr. T. Blashill was further examined. He said that with reference to suggestions for the future, everything depended upon the immediate supervision of the men. The authority for dealing with the men should be thoroughly in the hands of the persons in immediate supervision of them, viz. the foremen engaged on the job. He meant that the manager should not hamper the foremen. Those conditions being conceded, he saw no reason why the workmen should not work as well for a corporation as for an individual. He took a more hopeful view in that matter than some did. He had said he considered that the Council would attract the best workmen to its service. The experiment had been tried, but its success was not yet proved. Certainly the circumstances had not been very favourable. He thought the system of direct employment adopted by the Admiralty a reasonable one. The power of the employer to do the work himself was a valuable one. It was a check to the builder, who might otherwise think he had the custom altogether in his hands. The difficulties met with at the inception of the Works Department arose from starting so many things at once



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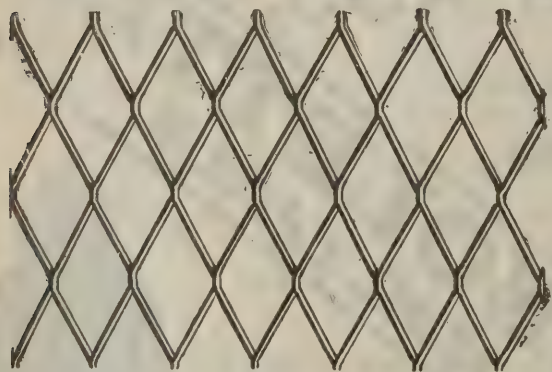
without proper plant or premises, but the great difficulty arose from not getting the amount of work out of the men. That was not an inherent difficulty. Things had been better since then. There had, however, in the past been great waste of time on these jobbing works. That arose from the Council's workmen, so far as he could gather, having a somewhat bigoted adherence to what he might call trade rules. It had been the rule that one workman must take another to a job. He said nothing against that, but when it came to the case of the mere tightening of a joint, and the plumber examined it and then sent for the fitter to carry out the work, the cost was out of all proportion to the work done. No contractor's man who wanted to make a profit for his master would think of doing that. He by no means contemplated the abolition of the Works Department. Under certain conditions which he had stated, he thought it better that there should be such a separate department.

By Mr. Gruning: If work were put out to tender he preferred that there should be a selected list of tenderers.

Mr. H. E. Haward, comptroller to the Council, handed in a statement covering the whole history of the discovery of irregularities in the book-keeping of the Works Department. It stated that the earliest irregular entries which had been traced were apparently made in the books in July 1895. They consisted of two small transfer items of 10*l.* 1*s.* 8*d.* and 18*l.* 12*s.* 5*d.* A few entries were traced in August and several in September. All these would not in the ordinary course have come under audit until about the beginning of October 1895. His suspicions were first aroused as to fictitious entries in June 1896. The total amount of the irregular entries in the accounts of 1895-96 and 1896-97 was 7,229*l.* 11*s.* 10*d.* Of that sum about one-half, comprising items amounting to 3,334*l.* 3*s.* 9*d.* (or, adding general charges, 3,509*l.* 19*s.* 5*d.*), related to the Colney Hatch temporary buildings account. The particular entries that first aroused suspicion were dated March 28 and 31, 1896, but they were not actually inserted in the books until towards the end of May last. They were challenged by him in June. With what he might call the ordinary check of an accountant and without going behind original documents, it would have been difficult, if not impossible, to discover these irregularities. With reference to the fictitious transfers, amounting to 1,892*l.*, it was to be observed that not only were documents fabricated, but that after he had challenged them every effort was made by officials of the Works Department to induce him to pass the entries,

and to prevent further investigation. It would be seen that Horwood's (the travelling time inspector) signature was obtained by Mr. Dyson for the receipt of the materials, and, doubtless with a view to suggest the genuineness of the transaction, Horwood made certain alterations of the figures. As to the high prices at which this transfer was credited, Mr. Dyson explained that the prices were those charged for stock issues, although similar materials had been charged to Colney Hatch at lower prices. After his attention had been drawn to this, he persisted in defending the transfer entries. Moreover, it was only after a prolonged investigation that the manager admitted to him that "an error had been made," and he then gave him an explanation of the "error," which, if his suspicions had not been aroused, might have seemed plausible. With regard to the earlier transfers between certain jobs which were not discovered in the audit, they were for the most part small in amount, and not likely to attract special attention. The most important of them were vouched by the signatures of the manager's chief assistants, and one of them (a transfer for items amounting to 89*l.* 3*s.* 5½*d.*, from Woolwich ferry workshops to Woolwich ferry southern approach, two adjoining jobs, the same foreman being employed on both jobs) was so vouched by the manager himself. The other items, mostly small amounts, were supported by the signatures of foremen, some of which were not genuine. In more than one case he found that the materials were entered in the "Daily Accounts of Materials" as having been received on the job to which the materials purported to have been transferred, although in fact they were not so transferred. The timber credits overpriced, 370*l.* 12*s.* 1*d.*, related to a number of entries spread over the months of April, May and June, 1896. He could express no opinion as to the value of the goods. That rested with the manager. The credits were, as a matter of fact, priced at about the prices ruling for timber issues from the wharf. The new form of transfer-note provided that the cost price of the material should be shown as well as the value on transfer, so that it would be possible, in future, to see that the value of the goods on transfer was not more than the cost price. Even on the cost price questions arose, because it included, as a rule, additions to the original invoice price for cartage, handling, &c. As to timber twice credited in error, 151*l.* 19*s.* 10*d.*, that was altogether an exceptional item and might have been due to an oversight. It represented some timber lying stacked at Colney Hatch, which was taken by the stocktakers as plant in their valuation of March 31. It had been charged to the job as timber, and therefore it was right to

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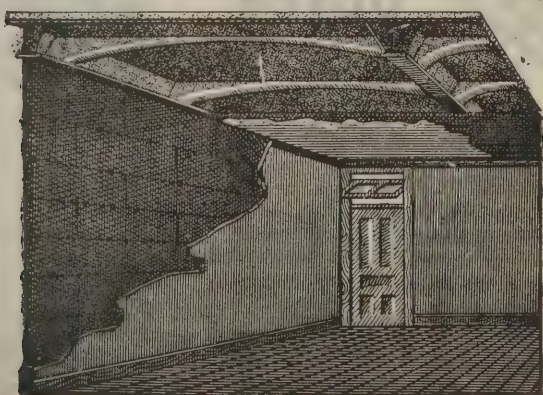
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credit the job and debit plant account when the parcel was taken into the valuation. Some weeks after, when the timber was actually sent away from Colney Hatch to Bexley, it was entered upon transfer tickets in the usual way, and credits were again passed into the books and thus credited to Colney Hatch a second time. With reference to timber drawn from the docks and not charged, 418*l.* 2*s.* 5*d.*, that represented a series of transactions in the months of March, April and May. On abstracting from the timber stock-book all the timber drawn from the docks for Colney Hatch, he discovered that thirty-nine dock delivery notes, from which entries should have been made in the timber journal, were missing. Upon their production being demanded it was stated that they could not be found. They were subsequently handed to him, having been, he was informed, locked up in an official's desk, and wilfully suppressed. It was then found that they had not been entered in the timber journal, and consequently timber account had not been credited and Colney Hatch had not been debited. As to invoices wrongly appropriated to other jobs, 443*l.* 7*s.* 9*d.*, that irregularity had been practised in the case of one or two jobs besides that of Colney Hatch. All invoices before being passed for payment were appropriated by the Works Department either to some job or stock account, and this appropriation was indicated by means of a rubber stamp, there being a separate stamp for each job. These appropriations were examined by him, and if there was nothing on the face of the documents which raised any question, they were accepted. On many invoices merchants did not state where the goods were actually delivered, and this was the case as regards the invoices which were wrongly appropriated, so that it was not possible from the merchant's entries on the documents to check the rubber stamp appropriations indicating the accounts to which they should be appropriated and charged. In some cases be found that the lower part of the invoices, where the merchant had probably stated the place of delivery, was neatly torn off, so that this means of checking the appropriation was lost. In consequence of the irregularities discovered he was continuing to check the appropriation of the invoices by a system which, in the ordinary course, he would not have felt called upon to adopt. From these facts the committee would see that documents were in some cases fabricated and in others tampered with, that there was collusion between various officials of the Works Department, and that it was only by questioning and testing original vouched documents that the improper entries were discovered. Speaking generally with reference to

the accounts of the Works Department and the way in which they had been kept, he stated that the whole subject had been one of great difficulty. Builders' cost accounts necessarily involved questions of a highly technical and intricate character. The difficulties inherent in any such system of accounts were much increased during the first two years of the existence of the Works Department owing to inadequate staff, want of organisation and the condition of the premises at Belvedere Road.

In reply to the Chairman, Mr. Haward said the malpractices that led to this inquiry involved no pecuniary loss whatever to the Council. If there had been pecuniary fraud on the part of those officers who had been dismissed from the service of the Council it would have perhaps been easier for him to detect the malpractices. The regulations were now being revised under the works committee, and it has been found possible to strengthen them in several respects. He did not think it possible for the whole of the bookkeeping of the Department to be placed under independent supervision.

In answer to Mr. Gruning, Mr. Haward said that owing to the existence of the Works Department a larger amount of account-keeping had, of course, become necessary. The cost of the bookkeeping was, however, part of the expenditure of the works committee, and as such was accounted for in the cost of their works. The capital charged to the department was 175,000*l.*, and the turnover for the year was practically 240,000*l.* He could not express an opinion as to whether that was an excessive amount of capital to employ with the turnover of 240,000*l.* Very little money actually passed through the hands of officials in the Works Department. The only money in bulk was for wages, and every single pay clerk was guaranteed for a larger amount than the amount of his weekly cheque for wages. There was small chance of any loss to the ratepayers by fraud in the Works Department.

Mr. Dickinson: The system we have adopted after a good deal of consideration has been that all cash transactions are conducted by the Comptroller's Department, and not by the Works Department?—That is so; only for the purpose of paying the wages we are obliged to call upon the manager's clerical assistants and pay clerks.

With regard to these malpractices, one of the instances you mentioned was the case of something at the Woolwich Ferry. That was the transfer of certain material from one job to another—a bogus transfer?—It was a composite transfer made up of wages and materials which had been charged in the first

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instance to a small job at Woolwich Ferry, and which were subsequently charged to an adjoining job, the two jobs being under the same foreman.

How did you find that out?—I should never have found it out had it not been for this special inquiry.

You suggest that the better system would be one under which the accounts of the Works Department should be independent of the manager; you do not suggest that they should be in the hands of the Comptroller's Department?—Not necessarily. I think the man at the head should have a knowledge of accounts, and should be more of a builder's accountant.

Your reason for that opinion is the disclosure of these malpractices?—Certainly, because it has been shown that the manager has been able to instruct the bookkeeper to make these improper entries.

By Dr. Collins: His summary of work done by the Works Department showed that the final estimate of the works had been 383,538*l.*, and the actual cost 377,643*l.* The result of the rectification of the figures after the discovery of the malpractices had been that a greater profit had been shown up to March 31, 1896; but in the whole period there could be no difference, because what had been taken from one job was simply charged to another. There could be no difference in the ultimate result. The irregularities or malpractices did not amount to pecuniary frauds. There had been no loss to the Council in consequence of them, and therefore no personal gain to any of the individuals concerned. The motive which prompted the irregularities seemed to be to make all the jobs come out at a moderate profit, rather than that some should show a profit and others a loss. His suspicion was first aroused as to some irregularity, not from any information he had received from outside, but merely from an examination of the particular entries as they appeared in the books in the normal course of carrying out the regulations. He himself had had a great deal to do with the framing of those regulations. He had visited Liverpool, where there was a very good system of accounts in operation, but he had found that that system could not be employed in anything like its entirety to the accounts of the London County Council Works Department, because the operations of the Department were altogether different from those at Liverpool. The regulations for the account-keeping in the London County Council Works Department placed the Department more in the position of a contractor than was the case at Liverpool.

By Mr. Beachcroft: The Works Department was almost unique in its constitution. His personal relations with the late manager had always been of a friendly character. The business of the department increased very rapidly. He could conceive the work getting so large that it might become necessary to have a separate audit department. No system of check audit in this huge business could prevent malpractices. He had to rely to a large extent on returns made by foremen. He could not go behind those returns. He had every reason to think that they had now reached the bottom of these malpractices. They went very carefully through the accounts in various ways in order to detect anything further, and he had no reason to think that there were any further entries of the kind in question. He thought there were several works now in progress which would come out at a loss. From fifteen to twenty works had been completed, but not yet reported to the Council. He did not know from personal knowledge that the value of the works now in progress and those completed and not reported was 519,000*l.* In providing the central works at Belvedere Road the works committee naturally expected that they would receive a large amount of work from the Council. If, as the result of the present inquiry, the Council decided to limit the operations of the works committee to engineering works, there would be the risk of a loss to the ratepayers from over-provision of workshops and the like at Belvedere Road.

By Dr. Longstaff: With reference to the detection of the irregular proceedings, it had occurred to him in looking at the matter that yellow deal flooring would hardly be used for foundations or as a material for sewers. That had struck him as a very wild transfer of material. There was a greater cost of supervision in the case of work done by a public body than in the case of that done by contractors.

#### THE NEW COUNTY HALL FOR LONDON.

AMONG the several measures which the London County Council intend to bring before Parliament in the coming session, says the *Standard*, is one bearing the title of the London County Buildings Bill, by which the Council are to be empowered to purchase and take certain lands "for the purpose of erecting thereon," in place of the premises now occupied by them, "larger and properly designed buildings and offices." The preamble of the Bill sets forth that the Council

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have no central office or premises adequate for the conduct of their administrative business, and no sufficient accommodation for their officers and staff. It is declared to be impossible to provide at the present premises and in the adjoining buildings the accommodation which is required, and in consequence the business of important departments has to be conducted in such scattered houses as can be procured in different streets. Under such conditions, the administrative work of London is described as being carried on at great inconvenience and cost, and it is pronounced expedient that the Council should be invested with the powers proposed by the Bill. An auxiliary project enters into the preamble, consisting of the opening up of the Mall, so as to make a continuous thoroughfare from St. James's Park to Charing Cross. This undertaking is mentioned as in contemplation by the Commissioners of Works, and certain provisions with respect to it are included among the clauses of the Bill. Estimates have been prepared by the Council as to the amount which they will require for the purposes of the Act which they are now seeking, the sum named being 851,000*l.*

With respect to this statement of the case it is to be observed that the premises occupied by the Council at Spring Gardens consist, in the first place, of the original building erected about the year 1859 by the late Metropolitan Board of Works, and three adjoining houses subsequently leased by the Board. The Council have added several other houses in Spring Gardens, and have extended their occupation to buildings in Cranbourne Street, Craven Street, Whitehall Place and Pall Mall East. Six departments are thus located entirely away from the main structure, as are also some branches of the departments appertaining to the engineer and the architect. Taking into account the estimated rent of the freehold and long leasehold premises in their occupation, the Council calculate that the actual rent at which they stand amounts to 8,845*l.* per annum. It is complained that the present arrangements are both costly and inconvenient, operating to the detriment of the public service. That the official staff are put into very close quarters at Spring Gardens will be apparent to every one who visits the offices, and it can readily be credited that business must be hindered and a considerable amount of time lost when communication has to be maintained between points as much in one case as half a mile from the central station, while in another instance the intervening space is a quarter of a mile. Be the distance more or less, a system composed of detached offices is a bad one, wasteful of time and strength, and also of money. Still there remains a question as to the proper remedy.

Without disputing any of the statements made as to the unsatisfactory nature of existing arrangements, it is necessary to consider whether the plan connected with the County Buildings Bill is of a reasonable and economical character. To get the land involves the displacement of many old-established and valuable businesses, and it will be seen that, while the Bill provides for an outlay of 851,000*l.*, this is exclusive of the building which the Council contemplate erecting, for which the estimate of the architect is 500,000*l.* The cost of acquiring the site was originally estimated at 813,000*l.*, and we may presume that the larger amount named in the Bill is designed to provide a safe margin, though, unfortunately, in such cases the margin of safety is hard to determine.

For the spot which the Council have chosen whereon to build there is much to be said, if we leave out of view its costliness. It is an admirable situation, contiguous to "the finest site in Europe," and for that reason requires the erection of a building which must be costly in its style if it is to be worthy of the place it will occupy. The area of ground, including that whereon the present County Hall stands, will be nearly two acres. Triangular in form, it has an extensive front towards Cockspur Street and Trafalgar Square; while along the south or south-eastern side will run the continuation of the Mall, opening out immediately to the north of Drummond's Bank. Westward, the Cockspur Street frontage of the triangular space extends to Warwick Street, the length being about 500 feet. The line by the side of the new thoroughfare, measured from the southern angle of the present hall to the point opposite Drummond's Bank, will be about 400 feet, and this is further characterised in a report by the establishment committee as constituting "a magnificent frontage." The clearance necessary for the carrying out of the entire plan will involve a considerable change in the neighbouring property. In the centre of the triangle there will probably be a large open space or courtyard.

As already suggested, so commanding and costly a site naturally lends itself to an architectural design of a somewhat ambitious character. So far as the opening up of the Mall is concerned, that could doubtless be accomplished without the aid of the County Council scheme. But the two projects harmonise with each other, and it is stated as having been distinctly ascertained, that the plan for the County Council buildings will be favourably regarded by the Office of Works as affording a desirable adjunct to the new avenue. In the Bill of the County Council, the clause which relates to this

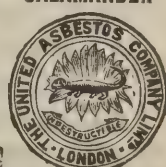
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matter provides that "if and when" the Commissioners of Works decide to form a new thoroughfare between St. James's Park and Charing Cross on the southern side of the land proposed to be utilised as a site for the County Buildings, it shall be lawful for the Council to enter into and carry into effect agreements with the Commissioners with respect to the formation of the thoroughfare, and to grant or convey for that purpose any portion of the lands acquired by them, and to effect changes of such lands or any part thereof with the Commissioners. The clause goes on to specify that "the said Commissioners may form a new thoroughfare," commencing in the Mall "opposite the south-eastern corner of Carlton House Terrace, and terminating by a junction with Charing Cross opposite the northern side of Drummond's Bank." Power is therefore given by this clause for the extension of the Mall, so as to form a thoroughfare leading up to Charing Cross.

With respect to the character of the structure which the Council contemplate erecting, assuming that they get the necessary powers, it is declared within the circle of the Council that there is no desire to erect a Municipal Palace. The high-sounding title of "county hall" is dropped, and all we hear of now is limited to the term "buildings" or "offices." The Act to be obtained is simply to be entitled "The London County Offices Act, 1897." But the existing structure at Spring Gardens is called the "County Hall," and it is difficult to see how the more extensive building can be designated by any lesser title. In regard to cost, there is the possibility of a reduction by allowing the ground floor and the basement of the Trafalgar Square frontage to be let for high-class businesses, such as those of banks and insurance and shipping offices. The Council's valuer considers that at a low estimate this arrangement would yield a rent which, if capitalised, would represent a recoupment of "considerably more than one-third of the whole cost of acquisition." This idea has been scouted in some quarters as altogether fatal to the dignity of a great municipal structure. But the expenditure of a sum approaching a million and a half in the establishment of a county hall demands a material set-off, in order to reconcile the scheme to the economical instincts of the ratepayer. It may also be asked whether it would not be possible to let off some portion of the ground floor on the southern side by the new thoroughfare. It will, perhaps, be replied that the Council cannot spare so much room.

Although the title to this Bill speaks of "buildings," and the Act is to have reference to "offices," it will be perceived

that nothing more is to be dealt with at present than the acquisition of "lands," necessarily including the buildings thereon. But it is impossible to separate the question of the site from that of the structure which is to be erected upon it. If the Council get the site, which is itself an excessively costly one, they are bound to build, and the merits of the Bill are directly affected by that which is only included in it by implication. The ratepayers ought to know the cost of the entire project, and it may be that even a million and a half will scarcely suffice.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

156. Thomas Pease and Thomas William Hudgell, for "Improvements in kiosks and like structures for advertising and other purposes."

229. Thomas Kemp, for "Improved inspection and sweeping inlets to drain-pipes, bends and junctions."

394. William Henry Hammond and Alfred Pickles, for "Improvements in the method of and in apparatus for automatically injecting fluids into the flush and waste pipes of closets, urinals, baths, sinks and the like."

630. Edward Pratt, for "Improvements in cesspools and other tanks for liquid or semi-liquid materials, and apparatus for emptying such cesspools and tanks."

162. Thomas Jones and John Charles Jones, for "Improvements in sash-window fastener," referred to and described in our Patent No. 12,848, 1894.

224. James Elijah Brindley, for "Improvement in the machinery used in the manufacture of ceramic tiles."

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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

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*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

ABERDEEN.—Jan. 29.—For erection of dwelling-house on the farm of Sunnyside, Drumoak. Messrs. Stronach, advocates, 20 Belmont Street, Aberdeen.

ASHTON-UNDER-LYNE.—Feb. 16.—For erection and extension of workrooms at the workhouse. Mr. Benjn. Seymour, clerk, Stamford Street, Ashton.

BACUP.—Jan. 30.—For erection of a caretaker's residence at the Maden Recreation Grounds. Messrs. Smith & Cross, architects, Bacup and Rochdale.

BARROWFORD.—Feb. 13.—For erection of a police-station. Mr. H. Littler, 21 Pitt Street, Preston.

BRADFORD.—Feb. 1.—For erection of a clothing establishment in Kirkgate. Messrs. Milnes & France, architects, Bradford.

BRIDGEND.—Feb. 1.—For alterations and additions to Glanogwr. Mr. T. J. Thomas, architect, Bridgend.

BROMLEY.—Feb. 8.—For additions to the Board schools at Raglan Road. Mr. Charles Bell, architect, 3 Salters' Hall Court, Cannon Street, E.C.

BROMYARD.—For erection of headmaster's house. Mr. F. R. Kempson, architect, 138 Widemarsh Street, Hereford.

BURTON-ON-TRENT.—For erection of Board schools, Church, Gresley. Mr. R. G. Clark, architect, Prudential Buildings, Queen Street, Nottingham.

CAMBRIDGE.—Feb. 3.—For erection of dwelling-house boundary walls, office, &c. Mr. John T. Wood, 3 Cook Street, Liverpool.

CARLISLE.—For erection of the Railway Tavern and implement warehouse, Botchergate. Mr. H. Higginson, architect, &c., 3 Lonsdale Street, Carlisle.

CARLISLE.—Feb. 1.—For alterations to cottages, Broad Guards. Mr. William Pogson, architect, 24 Devonshire Street.

CARLISLE.—Feb. 3.—For erection of three houses in South Street. Mr. George Armstrong, architect, 45 Lowther Street, Carlisle.

CHRISTCHURCH.—Jan. 30.—For adapting the school buildings at the workhouse into an infirmary. Mr. E. H. Burton, The Workhouse.

COCKERMOUTH.—Feb. 5.—For alterations to two shops. Messrs. W. G. Scott & Co., architects, Victoria Buildings, Workington.

COLCHESTER.—Feb. 5.—For erection of an infant school in St. Martin's. Mr. C. E. Butcher, architect, 3 Queen Street, Colchester.

CONISTON.—Feb. 6.—For erection of a shop, living-house, &c. Mr. Leake, Sawrey, Windermere.

CORNWALL.—Feb. 1.—For erection of four private dwelling-houses at Lostwithiel. Mr. William J. Jenkins, architect, Bodmin.

CORNWALL.—Feb. 1.—For erection of four private dwelling-houses at Lostwithiel. Mr. A. S. Liddicoat, Lostwithiel.

COWBRIDGE.—Feb. 8.—For reparation of Llantrithyd parish church, near Cowbridge. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

CROYDON.—Feb. 9.—For erection of an isolation hospital at Beddington Corner, in the parish of Carshalton. Messrs. R. M. Chart & Son, architects, Union Bank Chambers, Croydon.

DERBY.—Feb. 8.—For erection of hide, skin and fat market in the cattle market. Mr. R. J. Harrison, borough engineer, Babington Lane.

DEWSBURY.—Feb. 24.—For erection of hoist and covered way at warehouse, Wellington Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DONCASTER.—Feb. 2.—For erection of two additional stands on the race common. Borough steward's office, Mansion House.

DUKINFIELD.—Feb. 2.—For pulling-down and re-erection of two houses in Crescent Road. Messrs. Thomas George & Son, architects, Old Square, Ashton-under-Lyne.

DURHAM.—Feb. 11.—For erection and completion of twelve workmen's houses in Mitchell Street, and the levelling of site and the erection of boundary-walls, &c., on the Allergate Building Estate. Mr. George Ord, architect, 16 The Avenue, Durham.

ESSEX.—Jan. 30.—For additions to house at Heybridge, near Maldon. Mr. P. M. Beaumont, architect, Maldon.

EXETER.—Feb. 16.—For erecting and general fitting-up of the exhibition yard, Mount Pleasant, for the committee of the Exeter Horse Show Society. Mr. W. S. Croote, architect, 93 Paris Street, Exeter.

FALMOUTH.—Feb. 17.—For erection of a boys' school at Wellington Terrace. Mr. Swift, architect, Lemon Street, Truro.

FARNHAM.—Feb. 13.—For erection of a stone wall and iron fencing for enclosing the frontage of the new ground at the cemetery. Mr. Sidney Stapley, architect, West Street, Farnham.

HALIFAX.—Jan. 29.—For erection of two pairs of semi-detached houses at Lightcliffe. Mr. Joseph F. Walsh, architect and surveyor, L. and Y. Bank Chambers, Halifax.

HALIFAX.—Feb. 8.—For erection of Ovenden Ward Constitutional Club. Mr. Joseph F. Walsh, architect, L. & Y. Bank Chambers, Halifax.

HASTINGS.—Feb. 1.—For additions to the public convenience, White Rock. Mr. Philip H. Palmer, borough engineer, Town Hall, Hastings.

HASTINGS.—Feb. 3.—For alterations and additions to engine and boiler house in Waterworks Road. Mr. Philip H. Palmer, borough engineer, Town Hall, Hastings.

HAWES.—Feb. 1.—For erection of stabling, boundary walling, &c. Mr. J. P. Kay, architect, 34 Prudential Buildings, Park Row, Leeds.

HEXHAM.—For erection of buildings at Linnel Mill. Mr. Wm. Dixon, architect, St. John's Street, Newcastle.

HOLBORN.—Feb. 8.—For construction of an underground convenience. Mr. Henry C. Jones, clerk, 197 High Holborn, W.C.

HUDDERSFIELD.—Jan. 30.—For erection of two dwelling-houses, Victoria Road, Lockwood. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HULL.—For erection of an infants' home and a hospital. Mr. W. H. Bingley, architect, Custom House Buildings, Whitefriargate, Hull.

IRELAND.—Jan. 30.—For erection of five dwelling-houses in Moville. Mr. Foster Nolan, architect, Greencastle, co. Donegal.

IRELAND.—Feb. 27.—For renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

IRELAND.—For erection of male and female National schools at Upper Glasheen. The Presbytery, St. Finbarr's West.

KING'S LYNN.—Feb. 1.—For erection of an additional wing to the infectious diseases hospital at Horsley's Chase. Mr. E. J. Silcock, borough surveyor, King's Lynn.

KINGSTON-ON-THAMES.—Feb. 8.—For additions and alterations at Clattern House. Mr. Harold A. Windsor, town clerk, Clattern House, Kingston-on-Thames.



KINGSTON-ON-THAMES.—Feb. 10.—For erection of art and technical schools. Mr. Alfred Boxall, 6 John Street, Adelphi, W.C.

LEEDS.—For the enlargement of the Wingate Road Board schools. Mr. W. S. Braithwaite, architect.

LEEDS.—For erection of the new Brudenell Board schools. Norwood Grove. Mr. W. S. Braithwaite, architect.

LLANDUDNO.—Feb. 2.—For erection of a retort-house and other works at gasworks. Mr. E. P. Stephenson, engineer, Council Offices, Llandudno.

LLANELLY.—Feb. 1.—For alterations and additions to Felinfoel Board school, also for alterations and additions to the higher grade school, and for School Board offices, Llanelly. Mr. J. B. Morgan, architect, Llanelly.

LLANELLY.—Feb. 1.—For alterations and additions at workhouse. Mr. W. Griffiths, architect, Llanelly.

MANCHESTER.—Feb. 5.—For constructing two chimneys and raising the walls, &c., to No. 1 retort-house at Gaythorn Gasworks. Mr. C. Nickson, Gas Department, Town Hall.

MOGDEN.—Feb. 26.—For erection of an isolation hospital and other buildings in connection therewith. Mr. W. J. Ancell, architect, 3 Staple Inn, London.

MORECAMBE.—Feb. 3.—For erection of tramway stables and car-shed (wood and iron), for the Morecambe Tramways Company. Messrs. Harrison, Hall & Moore, Church Street, Lancaster.

MORLEY.—Feb. 1.—For erection of new premises for the London and Yorkshire Bank, Limited. Plans, specifications and bills of quantities may be obtained at the offices of Mr. William Bakewell, architect, Leeds.

MORPETH.—Feb. 12.—For alterations and extensions of the laundry at the County Lunatic Asylum, Morpeth, for the Northumberland County Council. Mr. John Cresswell, county architect, Moot Hall, Newcastle-on-Tyne.

MOULTON.—Feb. 8.—For erection of a cookery-room at the Board schools, for the Moulton School Board. Mr. Joseph Cawley, architect.

NEWHAVEN.—Feb. 2.—For erection of tramp wards, porter's lodge, board-room, &c. Messrs. Clayton & Black, architects, 152 North Street, Brighton.

NEWPORT.—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

NEWTON ABBOT.—Feb. 2.—For additions and alterations at the laundry buildings of workhouse, and for erection of a boundary wall on eastern side. Mr. S. Segar, architect and surveyor, Union Street, Newton Abbot.

NOTTINGHAM.—For enlargement of the Quarry Road Board school. Mr. A. H. Goodall, architect, Market Street.

NOTTINGHAM.—For erection of new corridors, &c., at the People's College Girls' school. Messrs. Evans & Son, architects, Wheeler Gate.

OBAN.—Feb. 5.—For erection of a residence, Isle of Rum. Messrs. Leeming & Leeming, architects, Victoria House, 117 Victoria Street, Westminster, S.W.

ORPINGTON.—Feb. 16.—For additions to the Board schools at Chislehurst Road. Mr. George St. Pierre Harris, architect, 8 Ironmonger Lane, E.C.

PONTYPRIDD.—Jan. 29.—For erection of a shop and dwelling-house. Mr. Thomas Rowland, architect, Market Buildings, Pontypridd.

PONTYPRIDD.—Feb. 8.—For erection of a church at Carnetown, Abercynon, to seat 500 persons. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

RADCLIFFE.—Feb. 2.—For erection of stables and other buildings at the Town's Yard. Surveyor, Council Offices, Radcliffe.

RAINHILL.—Feb. 19.—For additions and alterations to wards 10 and 11, main building, county asylum. Mr. Jas. Gornall, acting clerk, Rainhill.

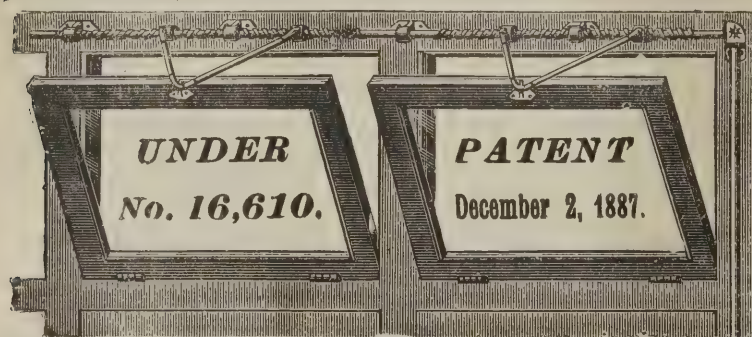
RAWTENSTALL.—Feb. 3.—For erection of nine cottages at Wood Top. Mr. Richard A. Buckley, 2 Gordon Street, Rawtenstall.

ROTHERHAM.—For erection of draper's shop at Treeton. Messrs. Edward Hutchinson & Son, surveyors, 18 Howard Street, Rotherham.

SHIPLEY.—Feb. 13.—For erection of wool-combing works, shed, warehouse, chimney, &c. Messrs. Walker & Collinson, architects, 227 Swan Arcade, Bradford.

SOUTHAMPTON.—Feb. 2.—For construction of a coal-barge dock at Woolston. Mr. Frederick Julius Macaulay, secretary, London and South-Western Railway Company, Waterloo Station, London, S.E.

SUTTON-ON-TRENT.—Feb. 1.—For erection of a boundary wall, iron rails and gates, making roads and paths in the new burial ground. Mr. Joseph Day, clerk, Sutton-on-Trent.



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SWANSEA.—Feb. 5.—For erection of Gendros Board school, for the Cockett School Board. Mr. D. Isaac, clerk, 7 Rutland Street, Swansea.

SWINDON.—Feb. 1.—For erection of small-pox hospital and caretaker's house at Gorse Hill. Mr. William Drew, architect, 22 Victoria Street, Swindon.

TINTAGEL.—Feb. 10.—For erection of the King Arthur's Castle Hotel. Mr. Silvanus Trevel, Truro.

TIVERTON.—Feb. 9.—For erection of station buildings, &c., at Tiverton Junction. Mr. G. K. Mills, secretary, G.W.R., Paddington Station, London.

WALES.—Feb. 6.—For additions to St. Margaret's Church, Mountain Ash. Mr. E. M. Bruce Vaughan, architect, 20 St. Mary Street, Cardiff.

WALES.—Feb. 10.—For altering and converting the boys and girls' Board schools, Glynccorwg, into one mixed department. Messrs. Lambert & Rees, architects, Bridgend.

WALES.—Feb. 12.—For erection of the Llandysul intermediate schools. Mr. John H. Phillips, architect, St. John's Chambers, Cardiff.

WALES.—Feb. 17.—For enlargement of Congregational chapel, Aberayron. Rev. T. Gwilym Evans, pastor.

WARRINGTON.—Feb. 3.—For erection of a urinal in Winwick Road. Mr. James Deas, sanitary engineer.

WINCHFIELD.—Jan. 29.—For erection of additional vagrant wards at the union house. Mr. F. S. Chandler, clerk, Oldham.

WOOLDALE (YORKS).—Feb. 3.—For erection of schools to accommodate about 270 scholars at Hade Edge. Mr. Joseph Smith, architect, Huddersfield Road, Halmfirth.

DURING the recent storm which raged at Sunderland a large brick chimney was blown down at the yard of the Sunderland Shipbuilding Company, and falling upon the frame-turning shed, a building 90 feet long, caused the entire structure to fall in. Had not the workmen employed inside the building received warning by the loud cracking of the chimney and made hasty escape, loss of life must inevitably have resulted. To add to the confusion, the exposed furnaces set fire to the wreckage, and the fire had to be extinguished by the workmen.

## TENDERS.

### ABERDEEN.

For Erection of a Public School at Chapel of Garioch. Mr. R. G. WILSON, architect, 181A Union Street, Aberdeen.

#### Accepted tenders.

J. Smith, mason.  
J. Watt, carpenter.  
A. Rhind, slater.  
R. Moir, plasterer.  
J. Laing & Sons, plumber.  
F. Hutton & Co., painter.  
Total, £954 18s.

### ALNWICK.

For new relief main sewer of 15-inch sanitary pipes, &c. Mr. GEOFFREY WILSON, town surveyor.

W. Thompson, jun. . . . . £275 0 0  
R. HUDSON, Sunderland and Alnwick (accepted) . . . . . 261 0 0  
D. Tait . . . . . 260 0 0

### BELFAST.

For pitching present avenue, making new avenue and footpath, laying 660 yards 12-inch sewer pipes, and constructing necessary sludge and outfall tanks on the Hampton Park Estate. Messrs. FORMAN & ASTON, engineers, 15A Donegall Place, Belfast.

D. Ireland . . . . . £1,000 0 0  
Workman & Co. . . . . 820 13  
S. Boyd . . . . . 801 1  
J. Graham, jun. . . . . 773 18  
W. Geddis . . . . . 752 10  
T. McMurray . . . . . 708 0 c  
J. Rose & Son . . . . . 630 0 0  
W. McLarnon . . . . . 619 10 0  
M. GREEN, 135 Donegall Street (accepted) . . . . . 581 2 5

### COCKERMOUTH.

For widening the road at Hawse Point in Buttermere, &c. Mr. J. B. WILSON, surveyor, Cockermouth.

Cowman & Sandy . . . . . £71 12 6  
J. Coulthard . . . . . 64 12 6  
J. Harrison . . . . . 62 15 0  
H. WALKER & SON, The Goat, Cockermouth (accepted) . . . . . 60 7 6

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Worthington & Pownall . . . . .	1,405	18	2
G. CLARKE & SON, Bristol Street, Hulme (accepted) . . . . .	1,233	9	7

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A. Kellett . . . . .	266	17	9
M. Naylor & Son . . . . .	243	10	6
Worthington & Pownall . . . . .	234	13	4
G. CLARKE & SONS (accepted) . . . . .	205	19	4

*Holland Road.*

A. Kellett . . . . .	1,379	1	6
M. Naylor & Son . . . . .	1,250	18	8
Worthington & Pownall . . . . .	1,257	7	9
G. CLARKE & SONS (accepted) . . . . .	1,104	1	10

*Cavendish Road.*

A. Kellett . . . . .	967	5	6
Worthington & Pownall . . . . .	887	6	9
M. Naylor & Son . . . . .	855	16	10
G. CLARKE & SONS (accepted) . . . . .	782	18	10

*Stockton Road.*

A. Kellett . . . . .	1,098	1	4
M. Naylor & Son . . . . .	1,014	11	6
Worthington & Pownall . . . . .	937	3	4
G. CLARKE & SONS (accepted) . . . . .	920	10	6

*Beechwood Avenue.*

A. Kellett . . . . .	550	18	0
Worthington & Pownall . . . . .	506	12	3
M. Naylor & Son . . . . .	483	15	3
G. CLARKE & SONS (accepted) . . . . .	471	6	8

*Lime Grove.*

A. Kellett . . . . .	460	5	7
M. Naylor & Son . . . . .	453	10	6
Worthington & Pownall . . . . .	424	12	8
G. CLARKE & SONS (accepted) . . . . .	394	10	1

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Winard & Western . . . . .	9,074	0	0
Galt & Farquharson . . . . .	8,948	0	0
G. Bevan . . . . .	8,940	0	0
G. Bugbird . . . . .	8,910	0	0
J. Biggs . . . . .	8,875	0	0
J. Jowett . . . . .	8,807	15	3
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Jones & Sons . . . . .	8,479	10	0
E. Evans & Co. . . . .	8,375	0	0
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G. Law . . . . .	8,177	0	0
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T. & S. Crawford . . . . .	2,977	16	7
J. Kirk . . . . .	2,954	6	6
C. McAndrew . . . . .	2,675	10	6
D. Whyte . . . . .	2,638	16	5
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J. Morris & Sons . . . . .	2,582	8	0
D. Gilmour . . . . .	2,528	7	8
J. Martin . . . . .	2,473	6	0
E. Gilmour . . . . .	2,407	10	4
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J. Stevens . . . . .	2,241	5	5
Wilkie & Gibb . . . . .	2,070	15	11

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For erection of villa residence, Whitehall. Messrs. STONES & GRADWELL, architects, Darwen and Blackburn.

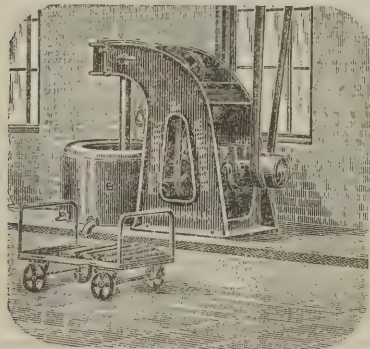
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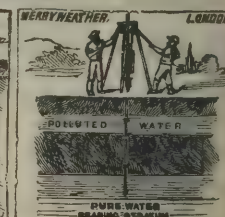
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J. McLaren . . . . .	£62	1	8
M. Heppel . . . . .	38	0	0
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T. Free & Son . . . . .	410	0	0
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E. Rogers & Co. . . . .	1,993	0	0
H. J. Greenham . . . . .	1,935	0	0
Nowell & Robson . . . . .	1,793	0	0
G. Wimpey & Co. . . . .	1,770	0	0
Surveyor's estimate . . . . .	1,763	0	0

## HEREFORD.

For completion of spire and other work at the church of St. Martin's. Messrs. NICHOLSON & HARTREE, architects, Hereford.

BEAVEN & HODGES, Hereford (*accepted*) . . . . . £175 0 0

## ILKLEY.

For erection of a gardener's cottage and laundry. Messrs. WALKER & COLLINSON, architects, 227 Swan Arcade, Bradford.

Waugh & Ripley, mason.  
Horsnell & Heald, joiner.  
T. Manwick, plumber.  
T. Bolton, plasterer.  
Hill & Nelson, slater.  
C. L. Leach, painter.

## INVERNESS-SHIRE.

For shooting lodge at Corrou. Messrs. WHARRIE, COLLEDGE & BRAND, architects, Glasgow.

*Accepted Tenders.*

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W. Wilson, mason.

Total, about £23,000.

## LEE.

For the construction and laying of an extension of a sewer in Blessington Road.

KILLINGBACK & Co., Camden Town (*accepted*) £159 0 0

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For alterations and additions. Messrs. W. SUGDEN & SONS, architects, Leek and Hanley.

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W. Griffith	1,253	4	4
W. T. Williamson & Sons	1,182	0	0
T. ADAMS, Wood Green (accepted)	1,116	2	10

*Wiesbaden Road.*

A. T. Catley	1,267	14	2
G. J. Anderson	1,175	14	0
W. Wadey	1,188	0	0
W. Griffith	1,167	7	0
W. T. Williamson & Sons	1,099	0	0
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For erection of shops and offices. Mr. ROBERT WILLIAMS,  
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J. Linton	1,450	0	0
W. Bowers & Co.	1,395	12	6
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Wenham & Waters	402	10	0
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Pearson & Co.	389	14	6
S. Grossmith	389	0	0
Williams & Sons	367	0	0
J. R. Penning	359	12	0
C. Forbes & Co.	319	11	0
NEW & MAYNE, Westminster (accepted)	248	0	0

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C. S. Mallet & Co.	846	0	0
T. Potter & Sons	810	0	0
Wenham & Waters	808	0	0
J. Biggs	796	7	6
J. R. Penning	779	0	0
New & Mayne	751	15	0
Portsmouth Water Fittings Co.	748	14	6
Davis & Sons	747	0	0
J. Shirvell	714	0	0
Williams & Sons	657	10	0
W. BEUTTELL, Landport (accepted)	549	17	6

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MILLER, jun., surveyor.

A. & J. Fail	£321	6	5
W. Wilson	289	13	1
C. McAndrew	255	14	0
T. BLACK & Co., Paisley (accepted)	251	2	0

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35, 36, 37, 38, 39 and 41 King Road, Southsea, for Mr. J.  
Bulpitt. Messrs. RAKE & COGSWELL, architects,  
Prudential Buildings, Landport.

W. Sumner & Co., Limited	£530	10	0
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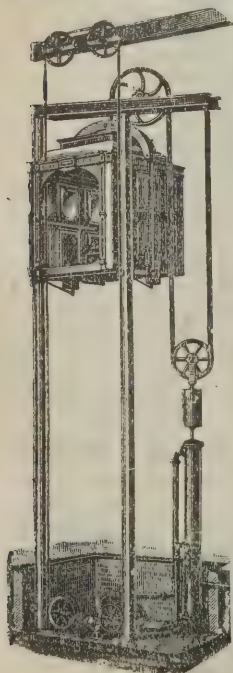
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For erection of industrial school buildings at Offerton Lane.  
Mr. T. H. ALLEN, architect, 39 St. Peter's Gate, Stockport.

J. Broadhurst	£8,373	6	0
Scattergood & Warrington	8,030	18	9
S. Warburton	7,994	0	0
M. Lane	7,972	0	0
W. C. Broadhurst & Co.	7,855	0	0
Groom & Co., Limited	7,792	0	0
T. & W. Meadows	7,641	0	0
J. BRIGGS, Heaton Norris (accepted)	7,605	0	0

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Worthington & Pownall	£5,807	10	5
P. D. T. D. Hayes	4,690	0	1
W. BRISCOE & SONS, Stockport (accepted)	4,688	17	0

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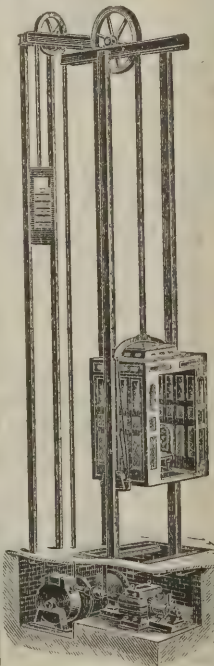
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Tomkinson, Liverpool	£15,000	0	0	£90	0	0
Wilson & Toft, Manchester	14,700	0	0	97	0	0
Brown, Manchester	14,500	0	0	96	0	0
RIDDOCK, Bootle ( <i>revised estimate accepted</i> )	13,150	0	0	130	0	0
Bland, Manchester	13,000	0	0	700	0	0
Lamble, London	12,127	0	0	198	0	0

A. Less if stone in lieu of granite.

**SUTTON.**

For sewerage, metalling and kerbing of Weston Road (A to B Section). Mr. C. CHAMBERS SMITH, surveyor.

H. Chatfield	£374	7	4
W. Jenner	326	5	3
W. H. Wheeler	299	18	11

**SWINDON.**

For alterations and additions to laundry buildings at work-house. Mr. W. H. READ, architect, Corn Exchange, Swindon.

H. LOOKER, Stratton St. Margaret, near Swindon (*accepted*).

**THORNBURY.**

For erection of a chapel, &c. Mr. SAMUEL FUDGE, architect, Thornbury.

E. Bruton & Sons	£496	0	0
J. B. Hudson	465	10	0
F. & G. Tucker	437	19	3
J. Daymon	411	10	0
L. Pitcher	400	0	0
W. W. PRITCHER ( <i>accepted</i> )	400	0	0

**WALES.**

For Erection of Two Shops, Dwelling-houses, Stables and Stores in Station Road, Port Talbot. Messrs. THOMAS & JAMES, architects, Port Talbot.

T. Jenkins	£2,891	0	0
J. Davies	2,380	0	0
C. & F. Gaen	2,375	0	0
J. & S. Rees	2,317	0	0
M. COX ( <i>accepted</i> )	2,276	0	0

**WATFORD.**

For Making-up Bushey Grove Road.

Trueman	£1,730	0	0
Killingback & Co.	1,590	0	0
J. Jackson	1,500	0	0
T. Adams	1,339	0	0
DUPONT ( <i>accepted</i> )	1,290	0	0

**WIMBLEDON.**

For alterations and additions to mortuary at cemetery. Mr. C. H. COOPER, surveyor.

E. P. Bulled & Co.	£279	0	0
J. Milledge & Sons	255	0	0
J. BURGESS, Norman Road, South Wimbledon ( <i>accepted</i> )	210	0	0

**WEST HAM.**

For making-up and paving the following streets, for the West Ham Town Council:—Cecil Road, Selwyn Road, Geere Road, Caistor Park Road, Haberson Road and Glenavon Road. Mr. LEWIS ANGELL, borough engineer.

W. Howard	£4,005	17	0
G. Wilson	3,998	15	2
A. & H. Ratty	3,888	12	4
W. Griffiths	3,366	9	9
T. Adams	3,297	1	5
W. Gibbs & Co.	3,236	15	8
J. JACKSON, Broadway, Plaistow ( <i>accepted</i> )	3,222	0	0

**TRADE NOTES.**

GROVE ACADEMY, which is being erected for the Broughty Ferry School Board from plans prepared by Messrs. James McLaren & Sons, architects, Dundee, is being ventilated by means of Cousland & Mackay's (ventilating engineers, Glasgow), patent direct-acting invisible roof ventilators and their improved air inlet panels, which have been made and supplied by them.

THE Bierley Small-pox Hospital for the county borough of Bradford is being warmed and ventilated by means of Shorland's patent Manchester stoves and Shorland's patent exhaust roof ventilators and special inlet tubes, by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. A. & S. COHEN, of 2 Bury Street, St. Mary Axe, London, have recently brought out a new lamp glass or globe,

**MCNEILL'S FELTS** (Roofing, Inodorous, Sarking, Dry Hair, Damp Course, &c.).

**MCNEILL'S SLAG WOOL** (Silicate Cotton), for Fireproofing and Soundproofing.

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which is certainly a most effective and inexpensive luxury. It is claimed, and we may add rightly, that if used in conjunction with Messrs. Cohen's new globe, the lighting effect of a Welsh-back incandescent mantle will be considerably more than doubled. The same, of course, refers to an ordinary eight-candle power electric lamp also. These patent globes are so made that without taking away from the light in the room a very great increase of light is thrown upon the table or desk underneath.

The Yost Typewriter Company, Limited, are to be congratulated on the continued success of the Yost writing-machine when in competition with other well-known typewriters. Last week they were awarded two gold medals, one at Bristol and the other at Manchester. Fifteen gold medals in a little more than five years is a record of which they may justly be proud.

### VARIETIES.

THE Thornton-Pickard Manufacturing Company have issued a prospectus inviting subscriptions for 60,000 shares of 1/ each, and consisting of 20,000 Five per Cent. Cumulative Preference and 40,000 Ordinary shares. Messrs. Morris, Gregory & Holmes's certificate shows that the net profits for the past three years have been respectively as follows:—2,752/., 6,442/., and 8,343/—and as the vendors, Messrs. J. E. Thornton & Edward Pickard, will remain with the company as managing directors, there is no apparent reason why this satisfactory rate of increase should not be maintained.

THE first ordinary meeting of the Society of Engineers for the year 1897 will be held on Monday, February 1, at the Royal United Service Institution, Whitehall. The president for the past year, Mr. Samuel Herbert Cox, will present the premiums awarded for papers read during the year. The president for the year 1897, Mr. George Maxwell Lawford, will deliver his inaugural address. The chair will be taken at 7.30 P.M. precisely.

ST. GEORGE'S CHURCH, Wolverhampton, which was closed for three months for alterations and repairs, has been reopened.

IN the course of excavating near St. Augustine's Church, South Croydon, the workmen came upon several human skeletons. In the skull of one the teeth were found to be quite perfect.

DURING the storm which prevailed at Darwen on Monday an iron chimney, 45 feet high, which was being erected at

Messrs. Place & Sons' Eccleshill Colliery and Pipe Work Darwen, was struck by lightning and fell with a loud crash into the yard. Fortunately, none of the workmen were near, and the surrounding buildings also escaped injury. The chimney plates were badly smashed.

AN interesting discovery has just been made at Woking by some workmen engaged in excavating earth for the purpose of laying-out a lawn-tennis court. A brick kiln, between 6 feet and 7 feet in diameter, was unearthed, and was found to contain several pieces of pottery which, with the kiln, are believed to date from the Roman period.

### BUILDING AND BUILDERS.

A MEMORIAL HALL and Sunday school have been erected at Sittingbourne in connection with the Baptist Church, at a cost of 1,500/.

THE new school just opened by the Hornsey School Board at Stroud Green has been erected according to the designs of Messrs. Mitchell & Butler, of 16 Finsbury Circus.

THE plate-glass of the roof light of Northwich County Court fell in at noon on the 25th inst. Several barristers had marvellous escapes, and a solicitor's clerk sustained a wound to his head necessitating his removal to a surgery.

PLANS of a new Board school to be erected in Carbrook Street, Paisley, at a cost of 8,000/., and to accommodate 836 pupils, have been passed in Paisley Dean of Guild Court.

THE Unitarian congregation at Kirkcaldy, which since its formation in 1890 has met in a hired hall, has decided to erect a school-chapel at a cost of 1,000/.

### MESSRS. ARNOTT & COMPANY'S NEW PREMISES, DUBLIN.

THE directors of Arnott & Company have not been overcome by the disastrous fire which consumed their premises in Henry Street. In a surprisingly short space of time temporary premises were constructed and opened. The rebuilding of the premises was likewise taken in hand by the directors, and the palatial structure in Henry Street has made such advances in its completion that it will be quite ready for opening at an early date. The architect for the entire works is Mr. George P. Beater. The contractors are Messrs. H. & J. Martin for the general building works; Messrs. Homan & Rogers for

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The most satisfactory Drawing Pen made. It never sticks. The ink always flows freely. It is easily used. Complete with three wheels to make various width lines ... 10s. 6d.  
New Depth Gauge for Engineers, 4 inches by 1/2 inch wide, in leather case. The slide and one side marked to read by verniers to 100ths of inches and 1-10th of millimetres. The other side marked for use as a rule, in inches and 64ths and millimetres and halves ... 5s. 6d.  
Watsons' celebrated 12-in. Boxwood Scales, "The Universal," 16 scales of an inch, 4 on each edge, all reading from the edge ... 1s. 6d., post free, 1s. 8d.  
"The Architect's" Scales, flat section, 16 scales, but each reading in its own line ... 1s. 6d., post free, 1s. 8d.  
"The Armstrong" oval section, 8 scales, 2 on each edge ... 1s. 6d., post free, 1s. 8d.  
Surveyors' Chain Scales, containing any two scales or chains and feet each edge, flat section ... 1s. 6d., post free, 1s. 8d.  
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No. 2388.—8-in. Oak Case, lined with Silk Velvet, containing the following finest quality Electrum Instruments:—6-in. needle pointed Compass with lengthening bar and ink and pencil points, hair dividers, needle pointed pen and pencil bows, two drawing pens, prickler, knife key, ivory protractors and parallel ... 44 12 6  
No. 2389.—8-in. Oak Case, similar to above and containing same Instruments, but with proportional Compass added ... 45 15 0  
No. 2390.—Morocco Pocket Case, lined with Silk Velvet, containing the following needle point Electrum Instruments:—4 1/2-in. double jointed Compass, with ink and pencil points and lengthening bar, hair dividers, ink and pencil bows, three plain point spring bows, two drawing pens, prickler, ivory protractor and parallel—an exceedingly compact set, suitable for the pocket of very finest quality ... 25 0 0  
IVORY POCKET RULES, ELECTRUM MOUNTED.  
One foot four-fold Pocket Rule ... 6s. 6d.  
Two feet, four-fold Pocket Rule ... 18s. 6d. and 21 1s.  
Prices of Drawing Instruments are subject to a Discount of Ten per Cent.

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STEAM FACTORIES, 9, 10, 11, 16, & 17 FULLWOOD'S RENTS, W.C.



the fireproof construction; Messrs. Cummins Brothers for the electric installation; Messrs. Waygood for the electric lifts; and Messrs. Haywood & Co. for the patent glazing of roofs.

The front building in Henry Street will have five windows for the show of goods, each over 10 feet wide by about 15 feet high. The main entrance is also in this section. It is under the central tower and will be used as soon as possible. On the completion of this first section the second will at once be commenced. It is the great desire of the directors to have the whole of the front buildings in Henry Street erected, and they hope that this will be an accomplished fact long before the close of the year. The ground floor will have an area of more than 35,000 square feet, and the basement wareroom will be of a still greater area.

The whole of the buildings are of fireproof steel and cement construction. The lifts, three in number, will be worked by electricity, and the heating will be supplied by hot air from furnaces placed in sub-basements. The ventilation is on a combined system of fresh-air inlets at low levels, with electric fans in the lantern roofs, to be used for the extraction of vitiated air.

## THE BUILDERS' MERCHANTS' ASSOCIATION OF LONDON.

THE third annual dinner, preceded by the annual general meeting, over which the president for 1896 (Mr. W. Sankey) presided, was held at the Midland Grand Hotel, St. Pancras, on Thursday, January 21, 1897. At the dinner there were forty members and guests present, who enjoyed the excellent repast provided.

The proceedings following the dinner were opened by the president for 1897, Mr. Clement Braby (who presided), proposing the health of the Queen and the Royal Family, which was heartily responded to. Following that came the toast of "The late president, Mr. W. Sankey, of Hammersmith," which was ably given by Mr. Erith, who commented upon the able manner in which the retiring President had carried out the arduous duties of that office. The late President replied to the toast, thanking those present for the hearty manner in which they had received it, and stated that in his endeavours to further the interest of the Association he had received much benefit and pleasure.

The toast of "The President for 1897" (Mr. Clement Braby)

was entrusted to the care of Mr. E. Montague Edwards, of Messrs. Young & Marten, Stratford, who remarked that an Association of this character needed in its president an experienced, determined and yet diplomatic individual to insure its successful working. It had prospered under the presidency of Messrs. Hughes, Broad and Sankey, and he felt in proposing the toast of the present chairman that the Association possessed in him the qualities necessary for such an important position. He would like to see the good points of the four presidents rolled into one, in order that the Association might materially benefit by the combined wisdom, energy and tact; but as this would be impossible, the next best course to pursue would be for the presidents to act conjointly as one.

Mr. Braby, in replying, said he appreciated the toast, and further said, the very fact of the Association existing, and of these annual dinners being held, giving the merchants an opportunity of meeting in good fellowship, had done, and is still doing, a great deal to further the interests of the trade generally. This Association had during the past year been working in a quiet way, but he felt sure that a very great deal more good work had been carried through than could be represented in black and white on the minute book.

The next toast was that of "The Builders' Merchants' Association and kindred Associations," coupled with the names of Messrs. Hughes and Wragge, proposed by Mr. Dobson (of Messrs. Godson & Dobson), who, in the course of a well-delivered speech, said:—"Since I have been in this building and have had the pleasure of listening to your annual report, and to the remarks that have been made concerning the work of your Association during the past year, I am filled with wonder and astonishment that you could go on so long without someone thinking of starting the Association years before you did. I believe you have done very good work indeed in the past, but I also believe there is far more to be done in the future. If only we can be brought together more often, as we have opportunities for being in an Association like this, I feel sure the result will be most beneficial to all."

Mr. Wragge (of Messrs. Eastwood & Co.) rose amid cheers to reply on behalf of himself and the kindred Associations, and said:—"There may be many Associations kindred to your Association, but the two with which I am personally most concerned are the Brick Masters' Association and the newly-formed Lime Merchants' Association. With regard to the Brick Masters' Association it is pursuing the even tenor of its way. I hear that several merchants belonging to your Associ-

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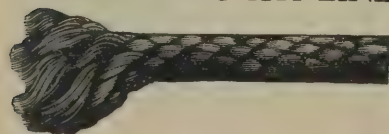
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ation are thinking of going into the brick trade, but I may tell them this, it is not such a flourishing business as it is made out to be. I can assure those present that there is no antagonism between the brick masters and merchants. What the former have done they have had to do in self-defence; and I think it is for the merchants to support them in it. It has been said by one speaker to-night that he hoped I should one day preside over this Association as I preside over the Lime Merchants Association. I beg to say that I do not preside over the Lime Merchants' Association, but am identified as its hon. secretary. I am entirely in sympathy with the Builders' Merchants' Association, and give it my support because it has been the means of my becoming acquainted with many merchants whom I only knew before by reputation. I quite agree with Mr. Dobson that the more we are brought together the better it will be for us. With reference to the Lime Merchants' Association, I think it will succeed because it is now so strong that no lime merchant or burner can place himself against it. I thank you very much for the way in which my health was proposed, and to the utmost of my ability I will work with the Builders' Merchants' Association."

Mr. Hughes then rose to reply for the Builders' Merchants' Association, and in the course of some spirited remarks said:—"With perseverance and pluck I believe we shall prove a great success. I dare say some of us remember the Midland Pipe Manufacturers' Association; the pipe manufacturers are now united as a body, and I do not see why we cannot get into touch with them, and as they are more consolidated I think we are in a better position to approach them; all they ask for is a *quid pro quo*. It has been a great pleasure to me to have Mr. Wragge here and to listen to his remarks this evening. We have heard his words, and I think they will have their effect upon all. If we only stick to our guns, by the end of this year I believe we shall be united in association for our mutual benefit, and I hope that when that does come our friend Mr. Wragge will 'boss.'"

Following this toast was that of "The Visitors," proposed by Colonel Sankey, who is one of the oldest merchants in the lime trade in London. Colonel Sankey said in proposing the toast that he was certain the Builders' Merchants' Association would succeed if only there existed combination and honesty of purpose amongst the members.

Mr. Joseph Cook (of Messrs. Freund & Co.) suitably responded for the visitors, and at the same time announced his intention of joining so useful an Association.

Music and songs were interspersed between the toasts.

There were several visitors present, amongst whom was the solicitor of the Association, Mr. Percy Braby.

The proceedings were brought to a close with the National Anthem.

### THE TIMBER TRADES' BENEVOLENT SOCIETY.

A WELL-ATTENDED meeting of the timber trade of the United Kingdom was held on Monday at the hall of the Carpenters' Company, for the purpose of forming a benevolent society for the timber trade in celebration of the Queen's long reign. The chair was taken by Mr. E. J. Morgan, who was supported by Mr. W. L. Foy, Mr. C. Churchill, the Hon. C. Lawrence, Mr. C. Bird, Mr. C. J. Wade, Mr. H. H. Green, Mr. T. Stevenson, Mr. A. Raffety, Mr. G. L. Renton, Mr. W. H. Rider, Mr. B. G. Elliott and Mr. T. Gabriel. The first resolution, pledging the meeting to promote the speedy formation of the Timber Trades' Benevolent Society, was proposed by Mr. C. Bird, who was responsible for the initiation of the movement. Mr. Bird pointed out that the timber trade was one of the few trades that had no benevolent society to help the poorer members of the trade in times of need or distress. The object of the meeting was to remedy that state of affairs, and he was pleased to be able to say that the idea had excited a considerable amount of interest, nearly 3,000*l.* having been already promised, either as donations or annual subscriptions. The proposed charity was to include in its scope the whole of the United Kingdom, and promises of support had been received from many of the largest firms in the provinces. A draft scheme had been drawn up, which, if approved of in principle by the meeting, would be submitted to a committee for consideration. Mr. C. J. Wade seconded the motion, which was carried unanimously. Mr. W. L. Foy was elected as the first president of the Society, Mr. E. J. Morgan was appointed treasurer, and Messrs. Bird and Wade undertook the duties of joint honorary secretaries. A representative committee was appointed to consider the scheme and to report to a general meeting of the subscribers. The proceedings terminated with the usual vote of thanks.

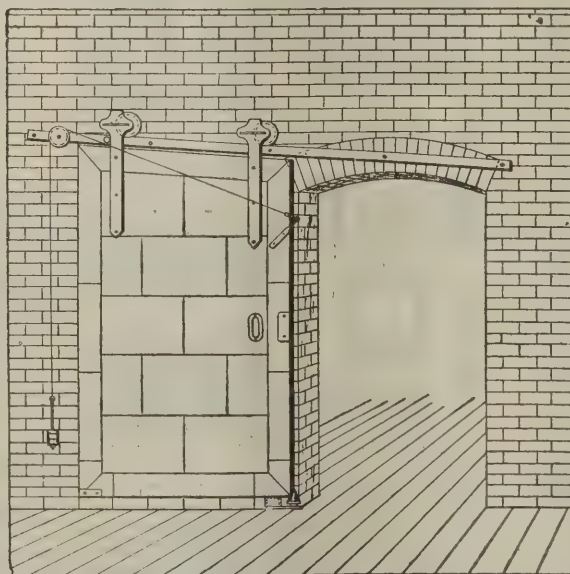
Among the subscriptions and donations received, which amount to 3,617*l.* 6*s.* 0*d.* and 396*l.* 6*s.* 6*d.* respectively, are the following:—Churchill & Sim, 262*l.* 10*s.* (21*l.*); Foy, Morgan & Co., 262*l.* 10*s.* (21*l.*); R. R. Dobell & Co., 262*l.* 10*s.* (21*l.*);

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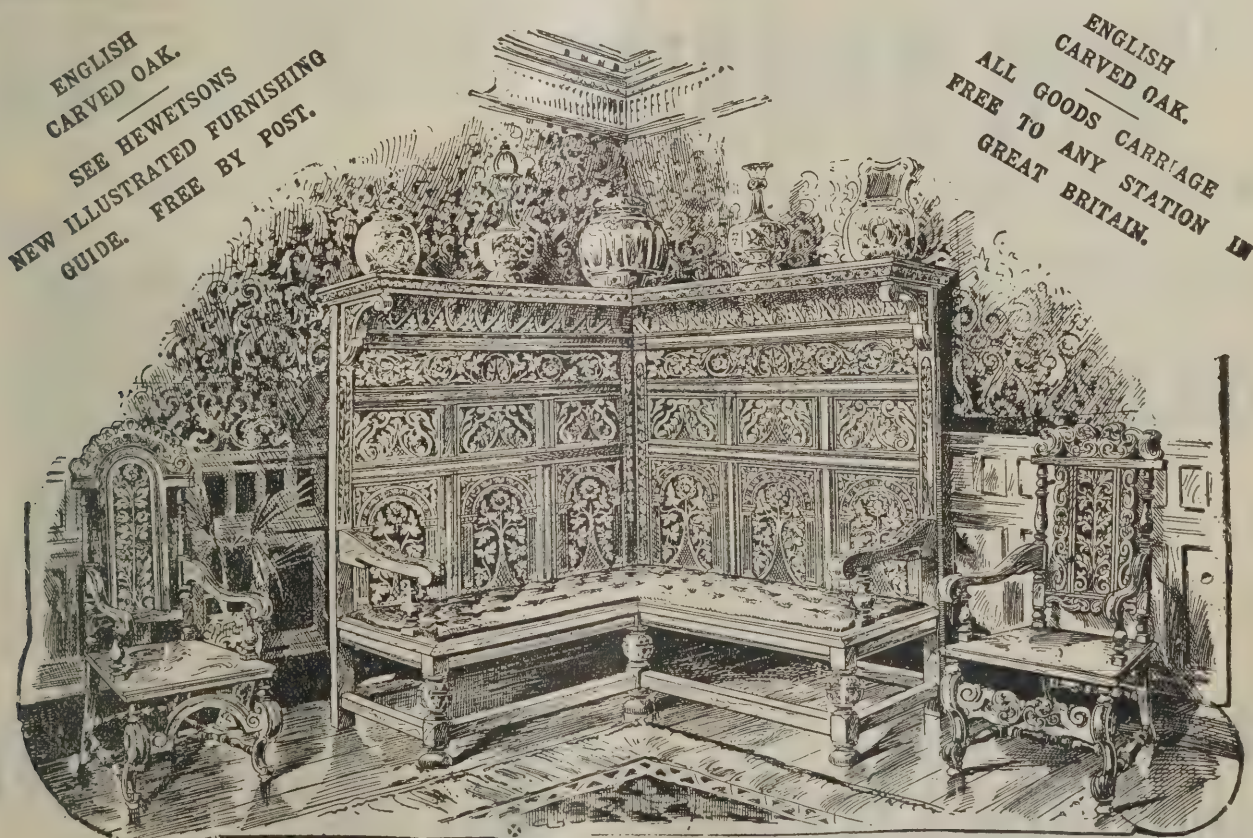
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## THE HISTORY OF ARCHITECTURE.

A LECTURE was lately delivered at Richmond (Surrey) by Professor Hulme, of King's College, London, on "Architecture." The subject, he said, covered a vast field. Naturally, architecture was the mother of the arts. In the early days there were no easel pictures, the artist finding scope for his work in the frescoes of the temples, &c. The sculptor, too, worked hand in hand with the architect. Painting and sculpture had not a separate existence in antiquity. He supposed that the simplest types of architecture would be the hut, the cave, and the tent dwelling of nomadic races. The primitive types had left their mark upon the present day. Even now one saw caves which were rock cut. In China the lines of the buildings had that concave scoop so suggestive of the tent. The first pre-occupation of primitive man was to shelter himself, but this earliest idea soon took development. Man was not satisfied with utility alone, but desired beauty. This desire for ornament or decoration was one of the earliest experiences through which man passed. With regard to the divisions of architecture, the first division would naturally be ancient architecture, which would include Greece, Rome, Egypt, Persia and Assyria. Then with the birth of Christianity we came to the Christian styles, while there was another great division—an outlying division—the art of the Hindoos, though, of course, there was really no art of the Hindoo any more than there was an art of Europe, owing to the vast size of India.

Then there were the Chinese and the Mohammedan styles. Again, the Japanese style must not be forgotten, also the Peruvian and Mexican work, which was an entirely different style and had evidently grown up very much without influence from outside. The last division was that of the moderns, who were more or less copyists, which was, perhaps, more or less unavoidable. A point which people did not sufficiently realise nowadays was that architecture was a continuous flowing stream. Some people were apt to regard the different styles as being isolated, but this was not the case—architecture was really one continuous flowing stream. Of course there were what were known as the transitional periods in architecture, which bridged over the intervals separating two distinct types. Art must be thought of as progressive. There was a life history and growth in architecture, the study of which was most interesting. Of the seven wonders of the world in antiquity, no fewer than four were architectural in character. The Pyramids, of course, were the first—the oldest buildings in the world. Another was the Tomb of Mausolus, built by the wife of Mausolus, from which we derived the name mausoleum. Then there were the great Temple of Diana at Ephesus and the Hanging Gardens of Babylon, the latter built by Nebuchadnezzar for his wife, who was a Mede. Architecture, continued the lecturer, had been greatly influenced by war, religion and commerce. Cambyses, in 523 B.C., plundered Thebes, and took away monuments and artists into Persia. Then, again, Egypt was conquered by the Romans. Darius, who had been with Cambyses, built Persepolis. Many of these plundering races were not artistic, but when they saw the art products of other nations they were delighted with them, and wished to see them in their own country. The Arabs of the desert had practically no art, being a nomadic race; but they were struck with the gorgeousness of Damascus and other Eastern cities, and so they pressed the various artists they came across into their service. In turning to the commercial influence the lecturer showed how the Phoenicians were great traders, and although without any particular art bent, they supplied all other nations. They were the first people to sail round Africa and were the first people to describe the gorilla. He mentioned this to show the pluck of these Phoenicians. Then the Etruscans were a very artistic people and they largely influenced art in Italy and Greece. Egypt, however, was the cradle of art. One of the great features of the Egyptian temples was their size. It was difficult to say what was the age of many of the buildings of Egypt, as the



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rulers had a knack of rubbing out the names of their predecessors which are found on them, and inscribing their own names. One characteristic of the Egyptian buildings was their extreme massiveness. Another feature of their work was its flatness, the effect of which they counteracted by the obelisk. The Egyptian temples grew by accretion; they began in a small way, and each monarch added hall after hall, and thus many of them had an irregular shape. Another feature of Egyptian art was the colouring. Then great use was made of the plants of the land, many of them being introduced as symbols. The Assyrian work was very similar to that of Egypt, but the details were much more elaborate; it lacked, however, the grandeur of the Egyptian. The Ionic was a Greek refinement on the Assyrian in the same way that the Doric was a refinement upon the Egyptian. We heard of the proto-Doric, but he thought this was simply an accidental form. With regard to the art of Rome, it was never indigenous; the Romans simply borrowed from their neighbours. They were a grand people in their way, but they were not an art people. They did, however, build noble aqueducts and temples, but the work, after all, was not of a refined character. When the Roman Empire broke up into two empires, one with its capital in Constantinople and the other in Rome, the Byzantine art was developed in the Eastern empire. It was more original than the art of Rome and much richer in colouring. The lecturer then passed on to show the effects on art of the rise and spread of Christianity, and by means of copious blackboard illustrations showed the chief characteristics of the Gothic, Norman, Early English, Decorative, the Perpendicular. In bringing his lecture to a close with a hurried reference to the moderns, the lecturer said that in modern architecture we had a bit of everything; there was no special style.

#### THE CHELTENHAM SPA SCHEME.

THE Cheltenham Town Council held a special meeting on the 22nd inst. to consider the improvement committee's scheme for converting the Winter Garden into municipal offices and a palmery, and the erection of a kursaal on the south end of the site at an estimated cost of 45,000*l.* The mayor (Alderman Colonel Rogers) presided.

Alderman Lawrence referred to the criticisms passed on the committee's scheme, and brought forward a suggestion by one of Cheltenham's most prominent citizens to the effect that the present Winter Garden structure should be pulled down, that

on its site a kursaal should be erected, and that on the piece of ground alongside the New Club (at the spot where it was proposed to make the entrance to the municipal buildings under the committee's scheme) should be erected new municipal offices, which would have no connection whatever with the kursaal. Other suggestions had been made, such as the purchase and utilisation of the assembly-rooms for the purposes of municipal buildings, at an estimated outlay of 30,000*l.*; the purchase of the houses adjacent to the public library unused site, and the erection of offices at a total cost of 26,000*l.*; or the utilisation of the site of the old post office in Clarence Street, at a cost of 20,000*l.* or 30,000*l.*, and it would be well that the committee should have an opportunity of considering these suggestions. The elevation of the kursaal according to the committee's scheme was not considered by many to be a desirable one, and if the kursaal were put on the site of the Winter Garden, or a little further back, the prominent characteristics of the scheme could still be retained. He proposed that before the Council came to a final decision on the recommendation of the committee, they (the committee) be asked to submit an alternate plan and elevation, with an approximate estimate of the cost, for an entirely new building on the site of the present Winter Garden, to provide, as far as possible, similar accommodation to that offered by the committee's plan. Mr. Skillicorne seconded this proposition.

A lengthy discussion ensued, in the course of which Mr. Margrett argued that the cost of carrying out the committee's scheme would involve an addition to the rates of 9*d.* in the pound.

This was ridiculed by Major Griffith and others, who contended that the improvements on which money had already been spent had proved of great advantage to the town, and that the prospects of enhancing the prosperity of the town by some such scheme as that proposed were most hopeful.

In the end, Alderman Lawrence's amendment was accepted by the committee, and agreed to *nem. con.*

#### BOLSOVER CHURCH.

ONE of the most ancient churches in Derbyshire, that dedicated to SS. Mary and Laurence at Bolsover, was completely destroyed by fire on Sunday. Bolsover is a mining village between Chesterfield and Welbeck Abbey, and is mainly the property of the Duke of Portland, who is lay rector and patron

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of the living. The church, which was built about 1200, was a large plain structure, partly in the Norman style, with later additions, and had a tower surmounted by a low spire. The church has been the burial-place of the Cavendish family since 1618, a chapel and vault having been added to the church in that year within the chancel, and this is the only portion of the building saved. In it are two costly monuments—one to Sir Charles Cavendish, who died in 1617, and to his lady, and another to the memory of Henry Cavendish, Duke of Newcastle. The fire was discovered about three o'clock in the morning. The heavily-timbered roof was then in full blaze. There was plenty of evidence to show that the outburst originated in the vestry, situated at the north-east end of the building, and directly over the heating apparatus, where towards midnight on Saturday the verger banked his fires for the night. Adjoining the vestry was the organ chamber, and when this caught the flames would easily be conveyed to the roof, which had all fallen in by four o'clock. The lead on the roof melted and spurted all over the walls, so that the charred remains of what was the south aisle are all sprayed with lead in small particles. What made the matter worse was that the supply pipe to the gas meter melted, and the flames were further assisted by the escape of gas, which swept everything before it. A stained-glass window, presented by Mrs. Charlesworth, was destroyed to the last fragment, much of it being melted by the intense heat. No sign is left of the organ and pulpit, nor of a handsome carved oak screen. The brass lectern, presented to the church by the late Rev. Brabazon Hallows, was burnt almost beyond recognition. The pillars, which were of limestone, were eaten away almost completely by the flames, and not a sign of the seating remained after five o'clock. All the mouldings throughout are destroyed; the windows and the carvings are completely ruined, and several important memorial tablets are in ruins. An ancient piece of sculpture, which was found about 165 years ago, and placed in the south aisle, has, though not in the midst of the flames, been much cracked, but it is hoped that it can be restored. At about a quarter to five o'clock the flames found their way into the tower, where the oak beams and the case of the clock, which faced in two directions, were soon in a great blaze, lighting up the surrounding country. At 5 o'clock the bells chimed out as usual, and, as the awe-stricken spectators waited to hear the clock strike for the last time, three of the bells fell to the ground with a tremendous crash, and the clock then gave way. A messenger had been despatched to Welbeck Abbey to call up the fire

brigade. He arrived at Welbeck about 7 o'clock, and the new steam fire engine was despatched, arriving about 8 o'clock, but there was little left to be done, the church being then a smouldering mass of ruins. The credit of saving the Cavendish Chapel and the monuments is due to the local people. The Rev. T. C. Hills (the vicar), the Rev. A. B. Maughan (his curate), and a corps of willing workers rendered valuable services, and had practically saved this portion of the edifice before the arrival of the brigade. The building was insured for 3,150*l.*, the amount having been doubled only a few weeks since, but it is estimated that it will cost at least 10,000*l.* to rebuild the church. A committee has already been formed with a view to erecting immediately a temporary iron church.

### NEW GENERAL HOSPITAL, BIRMINGHAM.

PRELIMINARY arrangements for the opening of the new General Hospital were made on Monday at a meeting of the general committee. Her Majesty was unable to add this function to her other engagements, and in these circumstances has deputed Her Royal Highness Princess Christian to open the hospital on her behalf. The expeditious manner in which the work of building the new hospital has hitherto proceeded has, says the *Birmingham Daily Post*, been such as to entirely satisfy expectations. An inspection of the work which we had the opportunity of making fully bears out what was said in this connection, and we fancy that could the citizens generally enjoy a like privilege, the prevailing impression would be one of astonishment that in such a comparatively short space of time the forest of scaffolding should have given place to a majestic pile of buildings, dominated by two handsome towers, flanked on every side by turrets and studded with spirelets. Fortunately the weather has been open till within the last few days, and there has been no suspension of the operations of the large staff of workmen engaged in various departments of the work. At present there are about 400 men employed there, including bricklayers, plasterers, carpenters, plumbers, hot-water and electrical engineers, and craftsmen too numerous to be classified. A number of Italian workmen are busily occupied in laying down the *terrazzo* paving in halls, corridors and other places, this being a class of work demanding the skill and experience of specialists. Then the laying of about 14 miles of wire for electric lighting, and probably nearly half this length for telephonic communication, is no slight task. Again, it is to



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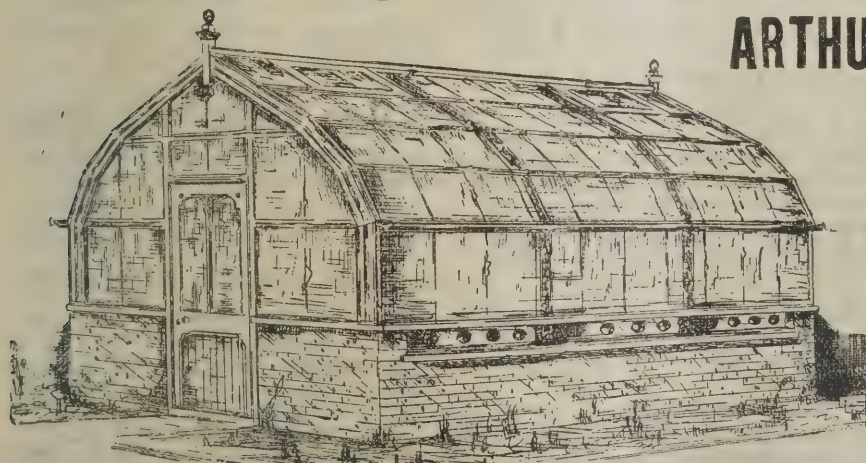
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be noted that the men actually employed on the site represent only a proportion of the artisans and artificers whose hands and brains are occupied in the work of rearing the immense edifice, as we were reminded in the course of our inspection by not a few inquiries which passed between the clerk of the works (Mr. J. Parsons) and his subordinates as to prospective supplies of materials, arrangements for transit and such-like details, all involving the employment of skilled or unskilled labour. The actual building work which has yet to be done is confined within a very small compass, comprising the completion of the boiler-house and small laundry, the pathological department, the porter's lodge and carriage-shed, and an open cloister, all one-storey buildings. The interior work is also well advanced, and when the days lengthen the progress made will be even more rapid.

First try to realise the magnitude of the site. Its longest frontage is towards Weaman Row, and measures 490 feet; next towards Steelhouse Lane, 340 feet; Loveday Street, 390 feet; Whittall Street, 125 feet; and with the remaining boundaries not abutting upon the streets a total of 1,470 feet, or over a quarter of a mile. The principal entrance is from Steelhouse Lane, under a triple arch, the centre one for carriages, and side ones for foot passengers. To the left is the porter's lodge, to the right a carriage shelter, all designed to harmonise with the architectural features of the main buildings, but subordinate thereto. Flanking this comparatively low building, a dwarf wall and piers, with railing between, surrounds the site, except in Loveday Street, where it has been found necessary to erect a boundary wall. Passing through the archways already mentioned, we find ourselves in a spacious quadrangle, and in front of us a series of arches form an open cloister, which connects, under cover, three entrances to the building. That in the centre is marked by a triangular carriage porch, the outer pier of which is adorned by a group of figures which have been excellently modelled by Mr. J. Wenlock Rollins, a former student of the Birmingham School of Art, who is now making his way to fame as a sculptor in London. On the right-hand side of the quadrangle is another triangular porch with three detached piers, each embellished by a single figure, also by Mr. Rollins. In addition to the artistic value of these figures the idea of the architect has been to convey a poetic meaning. The group of three represents the art of medicine on one side and the science of surgery on the other; and these together hold high the lamp of life, supported by the central figure philanthropy, who is

trampling under foot the serpent, symbolising death. The other three individual figures represent three essentials to health—light, air and purity. The central block of building contains the administrative department, *i.e.* sitting and bedrooms for the resident medical and surgical staff and the house governor in front; dining halls for the staff, the nurses, and the servants in the rear of the main corridor, which runs from about the centre of Loveday Street on one side nearly to Whittall Street on the other. Sleeping-rooms for the servants occupy the upper portion at the back. The whole of the basement is for stores, and the top storey is devoted to the kitchen department, where all cooking is arranged to be done by either steam or gas. In the centre of this department there are two lifts, one of which will be constantly employed for gaining access to the several floor levels, for transferring patients on beds or stretchers when necessary, and for the distribution of meals. Each floor of the hospital is free from steps, so that patients and meals can be readily conveyed from one portion of the building to another with the aid of wheeled trolleys assisted by the lifts. However, we are supposing that the buildings are still being surveyed from the quadrangle, and now note in the gable of the central block the city arms and in the panels below the arms of the counties of Warwick, Stafford and Worcester. The connecting buildings between the central block and the two lofty and massive towers are the main corridors, which form the links between all the pavilions on each floor. Within each of the two large towers there are staircases from the basement to the top floor of the wards, divided from the corridors by doors having check-springs so as to prevent the air ascending from one floor level to another. In the upper portion of the towers are placed large circular steel cisterns, into which water will be pumped from the artesian well near to the boiler-house, and thence distributed throughout the buildings. On a line with the towers and at right angles to the main corridor are the four principal pavilions, giving three storeys of wards at the back and two in front; the ground-floor on the left of the quadrangle being devoted to board and committee-rooms and business offices, and that on the right to the out-patients' department, the entrance to which is under the side triangular porch. It consists of a large waiting hall, lighted by clerestory windows, with a row of columns on either side supporting the walls of the wards above. The columns and surrounding walls will be lined with majolica and faience ware, having a rich brown dado, with ivory white above picked out in blue and green grays. On the entrance side are arranged male

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and female surgical and medical consulting-rooms, with retiring-rooms and a splint-store, and on the opposite side are medical and surgical consulting-rooms for ordinary cases, together with special consulting-rooms for gynaecological cases, ear, throat and eye, also with retiring-rooms attached. Two rooms, isolated as regards the transmission of sound to other wards, are provided for noisy patients, and another room is set apart for massage and electric treatment.

We will now continue our inspection around the exterior. Passing the end of the south pavilion we notice the chapel on the first floor adjoining the main corridor. The west end displays a rose window, with seven small windows below, filled with stained-glass, in memory of the late Dr. Bartleet, and one other three-light window is also of stained-glass as a memorial to the late Dr. Jolly. The interior of the chapel, although of very simple design, has a rich appearance, the walls being lined with alabaster, the gift of Mrs. J. C. Holder, the roof being panelled in oak. On the ground floor below the chapel are the matron's and linen-rooms. At the end of the main corridor is another staircase, which gives access to each floor close by the small north-west and south-west pavilions, which, in addition to six associated wards for special cases, including children, provides two operating-rooms, a room specially fitted up for gynaecological cases, single wards and ward kitchens. Opening off the staircase is a large conservatory, which will be used for tending plants to be placed in the wards, and forms a covered way to the nurses' home, which otherwise is an entirely detached building fronting towards Whittall Street. It contains over a hundred separate sleeping-rooms for the nursing staff, as well as sitting, writing and lecture-rooms.

In passing around we see in the centre of the front three panels, containing modelled figures, representing Perseverance, Patience and Prudence, three essential attributes to efficient nursing. They are the work of Mr. J. W. Neatby.

Two detached one-storey buildings at the Weaman Row end of the north-west pavilion are for infectious and septic cases, the symptoms of which now and then develop after a patient has been admitted for some other ailment. Here they can be nursed without danger to the other inmates of the hospital.

Near to the end of the west pavilion there is a stores entrance from Weaman Row, provided with weighbridge and office, and next come the boiler and well-house, small laundry, and disinfecting and destruction chambers, together with a well-proportioned octagonal chimney stack. Beyond is the pathological

department, containing the mortuary, with waiting and viewing-rooms, post-mortem and pathologists' rooms, this building being provided with a gate entrance from Weaman Row for the removal of bodies, without the proceeding being brought into view from the wards. The heating and ventilating appliances for this portion of the building are in a spacious chamber under the lecture theatre, the openings in the walls being provided with shutters for regulating purposes. Then come series of steam coils, and next the large surface of moistened screen, through which the incoming air is filtered. The air then passes through or under hundreds of feet of steam coils, according as the outside temperature demands, and is then forced onwards by rotary air propellers, one over 9 feet in diameter for the east pavilion, and another about 8 feet in diameter for the north pavilion. These are turned by electric motors, and there are six other propellers rather less in diameter for the remaining portions of the building. The heating and ventilating appliances are being provided by Mr. William Key on the plenum system, his contract being to provide for a maximum change of air up to ten times per hour, at a uniform general temperature from 60 to 62 degrees Fahr. winter and summer, with power to raise the temperature of any of the rooms above that of others when desired. The air is propelled along large ducts in the basement, and at the base of the vertical flues by which the air ascends to the several rooms are additional steam-heating coils and regulating valves. No apparatus whatever except the inlets for the cleansed and tempered air and the outlets for same are placed in any habitable portions of the building, yet every ward, room and corridor will receive a constant supply, which in due course passes up the outlet flues into roof ducts, and passes into the open through flapped and louvred turrets, these latter being prominent features on the several roofs.

So far we have failed to direct attention to an important feature situate above the lecture theatre, namely, the large operating theatre. It is in appearance semicircular in form, with windows all round the outer circumference, and partly top-lighted. On the flat side is a students' gallery, approached by outer stairways from the corridors. The floor is laid with terazzo and the walls lined with marble and alabaster, specially treated to make them non-absorbent, while the ceiling is finished in waterproof cement. The smaller operating-rooms are to be treated in similar manner, and a surgical committee has made visits of inspection to several metropolitan and other hospitals, in order to be in a position to select the most

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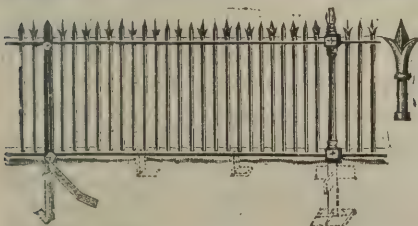
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approved modern appliances and fittings. Artificial lighting throughout the buildings will be by electricity, the current being obtained from the mains of the Electric Supply Company, who also have contracted to give a supply for the electric motors. A complete telephone exchange is provided within the buildings. Having now made a circuit of the buildings, we will attempt to convey some little idea of the appearance of the exterior.

The materials employed are a deep-coloured red brick obtained from the neighbourhood of Cradley, with plum-coloured bands and red terra-cotta for the decorative features, the roofs generally being covered with Westmoreland green slates.

The predominating idea in the design is the employment of octagonal forms in the towers, the turrets, the buttresses and the angle and gable terminals, the vertical lines of all these features being counterbalanced by horizontal bandings and panelled work. Although the ornamentation is obtained by simple means and frequent repetition, the general effect is that of richness, held in reserve by frequent plain surfaces, which give a pleasing contrast and prevent the eye being over-satiated by elaboration. All the modelled ornament has been executed under the direction of the architect, Mr. W. Henman, by a staff of modellers employed by Messrs. Doulton, who have manufactured the terra-cotta principally at their works at Rowley Regis. A noticeable peculiarity of the terra-cotta was insisted upon by the committee, on the advice of the architect, viz. that, contrary to popular prejudice, it should have a roughened surface. It is interesting to compare the effect with other red terra-cotta employed in buildings erected in the city. Mr. Henman gave scientific reasons for this departure in terra-cotta manufacture which certainly are justified by the improved appearance and probable durability of the material so treated. Mr. Henman informs us he has frequently been asked what particular style of architecture has been adopted for the buildings, and assures us of his inability to define it. His endeavour has been to adopt the spirit and not the letter of ancient work, to make the buildings a living monument of the time in which we live, using the materials determined upon in a sensible and legitimate manner without despising modern methods of construction. His plan has been to first determine what seemed most appropriate to the requirements of the institution, and then cause the ornamental features to grow naturally out of the construction, or so place them to emphasise particular parts while preserving

the general unity of the scheme. Certainly a critical examination of the building will evidence to any one the care bestowed even upon the minutest detail, and he has, fortunately, imparted to all engaged upon the works that enthusiastic interest which has resulted in each giving of his best in workmanship and material.

### ACETYLENE GAS.\*

(Concluded from page 16, Jan. 15.)

THE gas obtained from the English carbide is very pure, the chief impurity being 2·3 per cent. of sulphuretted hydrogen, due to sulphur in the coke and gypsum in the lime, whilst with many of the continental samples 6·9 per cent. of impurities is by no means uncommon, one of the principal and most dangerous impurities being phosphuretted hydrogen, which is evidently due to the use of phosphatic lime in the manufacture of the carbide, and also traces of siliciuretted hydrogen. So bad is this with some samples that the acetylene produced from one batch obtained from Denmark actually gave a haze when burnt for some time in a small room.

It is manifest that if the carbide is contaminated with calcic phosphide, the action of the water on it must give rise to a certain quantity of spontaneously inflammable liquid phosphuretted hydrogen as well as the gaseous compound, and the liquid condensing during compression or in the storage holder is a very grave source of danger. No lime or coke should be used in the manufacture of carbide which contains more than the smallest trace of phosphates, and if this point is not more carefully attended to than it is at present in some of the continental works, serious accidents are sure to follow, whilst if this be done as is the case in the manufacture of English carbide, no danger from this cause need be apprehended.

Ammonia is also found as a frequent impurity in acetylene, and gives it the power of attacking copper with the formation of an explosive compound.

In the paper which I read before the Society of Arts in January 1895, on acetylene, I pointed out the ease with which

\* From the Cantor Lecture by Professor Vivian B. Lewes, published in the *Journal* of the Society of Arts.

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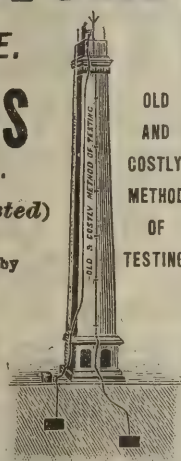
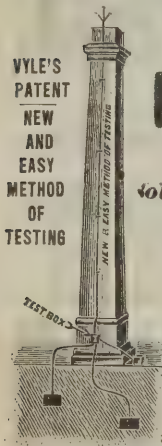
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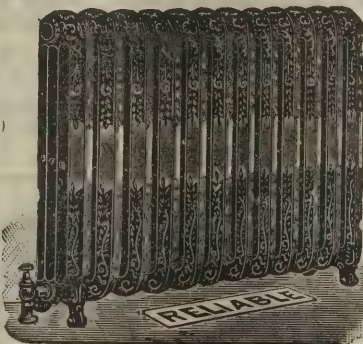
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the acetylene was liberated from the carbide by the action of water, and suggested several forms of apparatus in which such decompositions might be brought about. These suggestions were followed by a rush of would-be inventors upon the Patent Office, the literature of which has been increased to an alarming extent during the past two years by patents, many of which are characterised neither by novelty nor utility, and which, moreover, are in cases fraught with considerable danger. With the further experience which I have gained in the production and properties of this gas, I now see that many of the hints which I threw out in that paper as to the construction of apparatus would be fraught with many drawbacks, as although most of the dangers with which acetylene was then credited have disappeared into thin air, some other totally unexpected ones have taken their place, and most manufacturers of acetylene apparatus being still ignorant of these, a lively time may be expected for those who employ apparatus constructed by people who, possessing a limited mechanical knowledge, know absolutely nothing of the properties of the gas with which they are dealing, and these are certain to give rise to many troubles in use, and so retard the utilisation of this beautiful illuminant.

In the generation of acetylene from calcic carbide, far too little attention is being paid to the high temperature evolved when any considerable quantity of it is brought into contact with water, and the effect which this has upon the gas. Several attempts are being made to introduce automatic machines for the generation of acetylene on the principle of the ordinary "Kipp's" sulphuretted hydrogen apparatus, indeed several of them are only modified copies of this in metal, and the idea of the manufacturers is evidently that the action will cease and the evolution of acetylene be stopped when the pressure of the gas drives the water back from the carbide; but this is not so, as the heat of the action saturates the gas present with water vapour, and, as the apparatus cools, this recondenses on the carbide and produces more gas, whilst the unchanged carbide will decompose the vapour before condensation and even dehydrate the calcic hydrate which was formed on its surface when the water was in contact with it. The result of this is that after the gas has once been made, no automatic arrangement will stop the slow generation of the gas from the carbide in the apparatus.

When the gas is being continually used this does not matter much, as the slowing down of the evolution of the gas is sufficient to allow the consumption to catch up the make; but

when the gas is turned off, if any quantity of carbide be undecomposed, the automatic generator with its small holder becomes an active danger, as it will either "blow" or generate dangerously high pressures.

In any form of generator where the quantity of carbide is large, the heat generated by the action of the water on the material is quite sufficient to polymerise some of the acetylene into tar-like products which will sometimes cause trouble and stoppages in the pipes, whilst in any case the high temperatures cause a large amount of steam to go forward with the gas, and unless special precautions are adopted to prevent it, such as using a sufficiently large holder, some of this is carried forward to the service pipes.

There is no doubt that for the use of the gas in country houses, a holder large enough for the evening's supply should be provided, and the generators not charged with more carbide than is necessary to yield a volume of gas equal to the capacity of the holder.

The dangers of acetylene, of which a good deal have been heard lately, are almost entirely dependent upon the use of impure carbide and improper apparatus. Pure acetylene has now been shown to be less poisonous than ordinary coal gas, and far less so than coal gas enriched with carburetted water gas, whilst the action of the pure dry gas on metals is practically nil.

It is well known that acetylene can be resolved into its constituents by detonation, and the idea has arisen from this fact that acetylene is itself an explosive of great power. This is, however, an error, as it has been clearly shown that when the gas is under ordinary atmospheric pressure, if detonation is started in acetylene by a charge of mercuric fulminate, the explosion only extends a few inches from the detonator, whilst the explosion in acetylene of acetylde of copper is insufficient to set up detonation of the gas under these conditions.

This, however, only applies to acetylene under ordinary pressure, and any attempts to liquify acetylene by the pressure created by the evolution of the gas from calcic carbide is an extremely dangerous operation, as, if the heat of generation be added to the heat evolved during compression, an action akin to detonation is very likely to take place with the resolution of the acetylene into carbon and hydrogen.

Out of the many forms of generator which have been patented in this country and abroad, there are some which, although there is no very startling novelty in construction, yet afford safety in use, and intending users of acetylene apparatus

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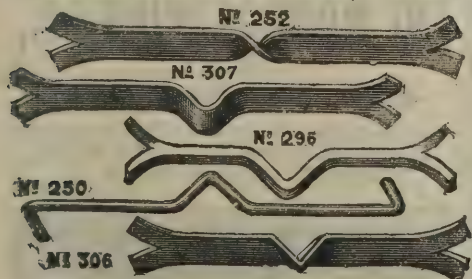
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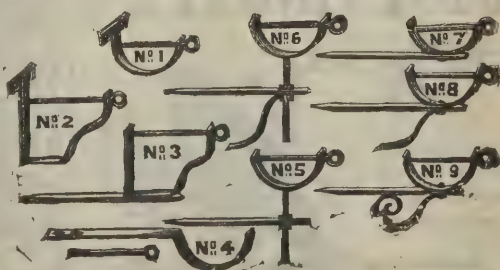
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should make sure that the generators they employ have been examined and certified as safe by some competent authority.

I have pointed out some of the troubles existing in the generation of acetylene on a commercial scale, but given a good form of generator, the trouble which still exists is that there are but few burners at present manufactured which can be relied upon to consume it in such a way as to develop from it its wonderful illuminating power for any great length of time without smoking, and when the burner itself starts smoking it can easily be realised that its capabilities in that way are immense.

For domestic illumination a burner consuming more than 1 cubic foot of the gas per hour would have too intense a light to be practically usable, and I have found it possible to make a burner which, for this consumption, shall emit a light of from thirty-two to thirty-four candles, which is ahead of the duty obtained for the same consumption by any other burners which I have tested; but with all burners, good and bad alike, after a certain period of perfect burning, which may extend to several hundred hours, a time is sure to arrive when the burner commences to smoke, and, as a rule, all that can be done with it is to take it out and put in a fresh one. The cause of this is that in all burners fitted for the consumption of acetylene the holes or slits through which the gas issues have to be excessively fine, and in time the heat of the burner causes the polymerisation of some of the acetylene into liquid hydrocarbons, which, being decomposed in the hole or slit, give rise to a slight carbonaceous deposit and the growth of carbon filaments from the outlet. The carbon filaments can easily be removed when they make their appearance, but the partial stoppage in the fine aperture of the burner itself upsets the balance of the burner and causes smoking.

The fact that burners can be obtained cheaply, which for a limited time gives satisfactory results, enables dealers to sell burners and to declare that no such trouble exists, but the public who are induced to buy will soon discover the facts for themselves.

Acetylene is soluble in water and many other liquids. At ordinary temperature and pressure ten volumes of water will absorb eleven volumes of the gas, but unless the gas be bubbled through the water the absorption is hardly noticeable in the case of an ordinary receiver or gas-holder, as the surface of the water rapidly becomes saturated, and after that the absorption is very slow, whilst when the whole bulk of the water is completely saturated the absorption stops.

The solubility of the gas may also be largely done away with

by dissolving salt in the water surrounding the gas-holder, but this has a destructive action upon the metal of the holder, and it is therefore better to use ordinary water as the liquid over which the gas is collected and stored.

The gas can be condensed to a liquid under a pressure of 21·53 atmospheres, or 323 lbs. at a temperature of 0 deg. C., whilst at ordinary temperatures the pressure necessary to keep it in the liquid state is from 500 to 600 lbs. on the square inch, so that the liquefied gas can readily be stored and transported in steel cylinders of the kind employed for liquid carbon dioxide.

The liquid so produced is mobile and highly refractory, and when sprayed into air the conversion of the liquid into the gaseous condition absorbs so much heat that some of the escaping liquid is converted into a snow-like solid, which takes fire on applying a light to it, and burns until the solid is all converted into gas and consumed.

The possibility of liquefying acetylene at pressures about those at which liquid carbon dioxide is produced so largely enables considerable volumes of gas to be compressed into the liquid state in small wrought-iron or steel cylinders, and in this condition by means of suitable reducing valves and burners of the right construction it may be stored and burnt. The small cylinders can also be arranged in the form of portable lamps, whilst for use in the country, where no gas is available, a large cylinder of the liquid gas placed in an outhouse would supply a country house with light for a very long period.

It is now well recognised that all luminous hydrocarbon flames owe their light-giving properties to fine particles of carbon liberated within the flame by various processes of decomposition, and raised to incandescence partly by the heat of the flame and partly by the heat generated by the same actions which caused the separation of the carbon, and it is to the formation of small traces of acetylene in all hydrocarbon flames that a large amount of their luminosity is due. We should, therefore, expect that acetylene when burnt by itself would be the most brilliant of all gaseous illuminants, an expectation which is fully borne out by the results in practice.

Acetylene gas when burnt gives a flame of intense brilliancy, and owing to its richness it can only be consumed in small burners. Under these conditions it emits a light greater than that given by any other known gas, its illuminating value when properly developed, calculated to a consumption of 5 cubic feet an hour—the average consumption of ordinary coal gas—being no less than 240 candles. It is thus seen that when acetylene

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is burnt in suitable burners it develops an illuminating value fifteen to twenty times greater than that obtained by the combustion of the same volume of coal gas, so that for all practical illuminating purposes a very small consumption of acetylene, in the burners which practice has shown to be best suited for the purpose, does the illuminating work of a very large volume of coal gas, with the result that the air of the room is but little contaminated with the products of combustion, and the excessive heating of the upper portions of the air is reduced to a minimum.

The following table contrasts the products of combustion evolved from London coal gas when consumed in various forms of burners, and giving an illumination of forty-eight candles, which may be presumed to be the amount of light required in a fair-sized London dining-room, and contrasted with this is the amount of the products of combustion which acetylene would evolve in giving the same amount of light, whilst to make the meaning clearer, I have added the number of adults who would exhale the same amount of carbon dioxide in the same time:—

Burner.	Gas Consumed.	Carbon Dioxide.	Adults.
Flat flame, No. 6 . . .	19.2	10.1	16.8
" " 5 . . .	22.9	12.1	20.0
" " 4 . . .	25.3	13.4	22.3
London Argand . . .	15.0	7.9	13.1
Acetylene . . .	1.25	2.50	4.5

If we obtained the same amount of light from paraffin lamps, the carbon dioxide evolved would be equivalent to 22.5 adults; whilst as far as carbon dioxide goes, you might as well invite 32.7 more guests to dinner as use 48 sperm candles to supply the needed illumination.

It has been said that the danger of an explosion from a leakage of acetylene is far greater than with coal gas. This is, I think, a mistake. Mixtures of air and acetylene are explosive over a slightly wider range than is the case with mixtures of coal gas and air; but it must be remembered that if a leakage were caused by a tap being left on, the largest acetylene burner would probably only pass 1 cubic foot of gas per hour, whilst an ordinary No. 4 or 5 union jet burner would pass 5 to 6 cubic feet of coal gas in the same period of time, and from this cause therefore would be far more dangerous than acetylene, whilst if the leak were from a small crack or a leaky joint in a pipe, the rate at which the gases diffuse out would be dependent upon their specific gravity. Coal gas has a specific gravity

of 0.4 as against 0.9 for acetylene; so that through a crack or fissure of the same size only two volumes of acetylene would escape, whilst three volumes of coal gas would find their way into the air, a difference in rate which would more than cover the slight difference in the limiting proportions of explosion, and very little experiment will clearly prove that acetylene cannot in any way be looked upon as more dangerous to property than coal gas.

The field for acetylene at the present time is simply enormous, as not only is it specially adapted for the lighting of country houses and small villages and towns where no coal-gas supply at present exists, but it will probably in the near future take the place of existing forms of lighting in railway carriages, tramcars, floating buoys, &c., whilst as an auxiliary to the electric light for lighthouses, search-lights and coast defence it will, I believe, be of the greatest possible value.

### MOTOR DUST COLLECTORS.

THE Urban District Council of Chiswick is among the first of local authorities to adopt the steam motor-car for the purposes of the collection of dust and house refuse. Hitherto the Council has followed the course pursued by its predecessor, the Chiswick Local Board, and has let the dust collection to contractors. Under this system the cost has increased yearly, while the work has been very inefficiently performed, complaints being constantly received of the non-removal of dust. At a recent meeting the Council received tenders for dust collection for the year from April 1 next at 2,000*l.* and 1,900*l.* respectively, the latter sum being 460*l.* in excess of the sum for the year ending on March 31 next. Before accepting either of these tenders the Council instructed the surveyor, Mr. Arthur Ramsden, to report as to the saving likely to be effected by the purchase for dust-collecting purposes of a steam motor tip-car, a design for which, prepared by Mr. John I. Thornycroft, had been submitted by the Steam Waggon and Carriage Company, of Chiswick. This could be purchased for 350*l.* The Surveyor reported that if two of the motor-cars were purchased at the price stated, and the payment spread over three years, he estimated that there would be an immediate saving of 50*l.* a year, and that at the end of the three years the saving would be about 250*l.* per annum. The Council has decided to purchase two of the motor-cars on the terms suggested, to be delivered on March 31 next.

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## THE MONIER SYSTEM OF CONSTRUCTION.

AT a meeting of students of the Institution of Civil Engineers on the 15th inst. a paper on "The Monier System of Construction" was read by Mr. Walter Beer.

In the brief historical account of the Monier system, with which the paper opened, the author showed how it originated in the attempts of a Parisian florist of that name to obtain large vessels of a material more durable than wood and lighter than concrete.

The principle of the system was stated to be the combination of Portland cement concrete with iron or steel in such a manner as to develop in the same material the high resistance to compression and binding of the former, and the great tensile strength of the latter. It had been found that in such a combination the good qualities of both materials were retained, and no chemical action was found to occur between the iron and the moisture in the concrete. The latter adhered firmly to the smooth surface of the metal, and the co-efficients of expansion of the two constituents were for all practical purposes identical. The economy of the system in the construction of girders and arches was considerable, owing to its great strength and compactness, and further it was absolutely fireproof. Large spans might be used for floors, and the small amount of head-room required was a factor often of great value. Arches of 150 feet or even greater span might be constructed, and the rise need not exceed one-tenth of the span, so that the system could be used in situations where brick and stone would be impossible.

The author dealt with the practical details and cost of the method, stating the particular qualities of materials most advantageously used; and he also entered into a mathematical consideration of the relations existing between the dimensions and quality of the different portions of the structures and the stresses in them under known loads.

The paper concluded with an account of tests to destruction of three Monier arches, with a span of 12 feet and a width of 4 feet. They were composed of three to one concrete, for which crushed granite, coke breeze and crushed brick were respectively used, with a simple netting of 4 inch mesh, formed of  $\frac{3}{8}$ -inch longitudinal rods and  $\frac{1}{4}$ -inch transverse rods, embedded 1 inch above the undersides of the arches. The first arch was loaded uniformly, and after a central deflection of 2 inches, failed when the load reached 11.7 cwt. per square foot. The second was loaded at one side of the centre only, and failed under a load of 4.8 cwt. per square foot, when the deflections at the un-

loaded and loaded sides and centre were respectively 3.16 inch 1.16 inch and  $\frac{1}{8}$  inch. The third arch was also broken by a load on one side only, but withstood a pressure of 7.0 cwt. per square foot.

The paper was accompanied by drawings illustrating several examples of the system, including the arches upon which the author's tests were performed.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

719. Gustav Mann, for "Improved sanitary covers for water-closet seats."

724. George Crapper and Robert Marr Wharam, for "Improvements in or relating to automatic syphon flushing-tanks."

750. William Woodland, for "An improved sanitary supply cistern."

766. Daniel Thomas Bostel, Frederick James Bostel and Ernest Bostel, for "Improvements in urinals."

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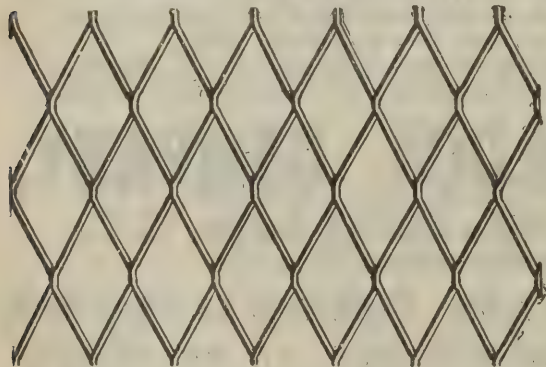
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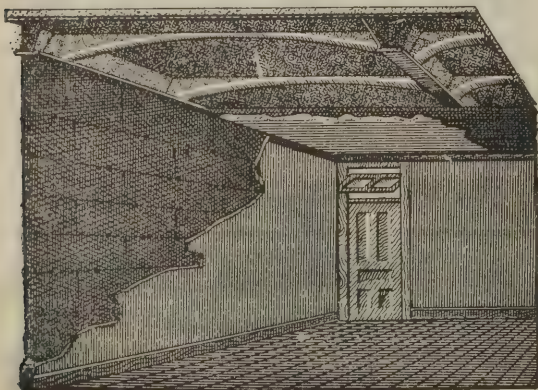
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

ABERDARE.—Feb. 11.—For infants' department to the Aberaman Board schools. Mr. T. Roderick, architect, Clifton Street, Aberdare.

ABERDEEN.—Feb. 15.—For additions and alterations at the branch asylum. Mr. G. Taylor, clerk of works, Aberdeen Asylum.

ABERTILLERY.—Feb. 17.—For erection of intermediate school. Messrs. Swash & Bain, architects, 3 Friars' Chambers, Newport.

ARMLEY.—For slating six houses and shop, Armley Ridge Road. Messrs. Fenton Bros., Gipton Wood.

ASHTON-UNDER-LYNE.—Feb. 16.—For erection and extension of workrooms at the workhouse. Mr. B. Seymour, clerk, Stamford Street, Ashton.

BARROWFORD.—Feb. 13.—For erection of a police-station. Mr. H. Littler, 21 Pitt Street, Preston.

BLACKBURN.—Feb. 15.—For erection of shop premises in Simmons Street. Messrs. Simpson & Duckworth, architects, Richmond Chambers, Blackburn.

BRADFORD.—Feb. 8.—For erection of a detached house. Mr. Abm. Sharp, architect, Albany Buildings, Market Street, Bradford.

BROMLEY.—Feb. 8.—For additions to the Board schools at Raglan Road. Mr. Charles Bell, architect, 3 Salters' Hall Court, Cannon Street, E.C.

COCKERMOUTH.—Feb. 20.—For erection and completion of gate lodge and museum in Fitz Park. Mr. Thos. Hodgson, Station Road.

COCKERMOUTH.—Feb. 5.—For alterations to two shops. Messrs. W. G. Scott & Co., architects, Victoria Buildings, Workington.

COLCHESTER.—Feb. 5.—For erection of an infant school in St. Martin's. Mr. C. E. Butcher, architect, 3 Queen Street, Colchester.

CONISTON.—Feb. 6.—For erection of a shop, living-house, &c. Mr. Leake, Sawrey, Windermere.

CORNWALL.—Feb. 13.—For erection of a boys' school at Fowey. Mr. S. Trevail, architect, Lemon Street, Truro.

CORNWALL.—Feb. 14.—For erection of villa residence at Gulval. Mr. Oliver Caldwell, architect, Penzance.

COVENTRY.—Feb. 13.—For erection of a small-pox hospital at Pinley, near the city. Messrs. G. & I. Steane, architects, Little Park Street, Coventry.

COWBRIDGE.—Feb. 8.—For reparation of Llantrithyd parish church, near Cowbridge. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

CROYDON.—Feb. 9.—For erection of an isolation hospital at Beddington Corner, in the parish of Carshalton. Messrs. R. M. Chart & Son, architects, Union Bank Chambers, Croydon.

DERBY.—Feb. 8.—For erection of hide, skin and fat market in the cattle market. Mr. R. J. Harrison, borough engineer, Babington Lane.

DEWSBURY.—Feb. 24.—For erection of hoist and covered way at warehouse, Wellington Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DURHAM.—Feb. 11.—For erection and completion of twelve workmen's houses in Mitchell Street, and the levelling of site and the erection of boundary-walls, &c., on the Allergate Building Estate. Mr. George Ord, architect, 16 The Avenue, Durham.

ELY.—Feb. 9.—For adapting premises at Ely for use as a Crown post office, &c. The Secretary, H.M. Office of Works, &c., 12 Whitehall Place, London, S.W.

EXETER.—Feb. 16.—For erecting and general fitting-up of the exhibition yard, Mount Pleasant, for the committee of the Exeter Horse Show Society. Mr. W. S. Croote, architect, 93 Paris Street, Exeter.

FALMOUTH.—Feb. 17.—For erection of a boys' school at Wellington Terrace. Mr. Swift, architect, Lemon Street, Truro.

FALMOUTH.—Feb. 22.—For the restoration of Falmouth parish church. Mr. Edmund Sedding, architect, Plymouth.

FARNHAM.—Feb. 13.—For erection of a stone wall and iron fencing for enclosing the frontage of the new ground at the cemetery. Mr. Sidney Stapley, architect, West Street, Farnham.

GLAMORGAN.—Feb. 8.—For reparation of Llantrithyd parish church, near Cowbridge. Mr. George E. Halliday, architect and surveyor, 14 High Street, Cardiff.

GREAT YARMOUTH.—Feb. 13.—For erection of two houses, The Cliffs, Gorleston. Mr. Wm. B. Cockrill, architect and surveyor, Gorleston, Great Yarmouth.

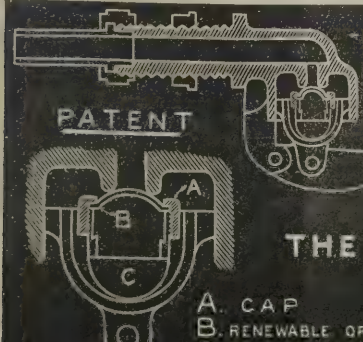
GREENWICH.—Feb. 17.—For construction of an underground public convenience and lavatory at New Cross Gate. Mr. J. Spencer, clerk, 141 Greenwich Road, Greenwich.

HALIFAX.—Feb. 8.—For erection of Ovenden Ward Constitutional Club. Mr. Joseph F. Walsh, architect, L. & Y. Bank Chambers, Halifax.

HALIFAX.—Feb. 15.—For erection of Liberal club. Mr. Medley Hall, architect, 29 Northgate, Halifax.

HARROGATE.—For alterations and additions to the old post office buildings. Mr. T. E. Marshall, architect, Prince's Street, Harrogate.

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**HOLBORN.**—Feb. 8.—For construction of an underground convenience. Mr. Henry C. Jones, clerk, 197 High Holborn, W.C.

**HULL.**—Feb. 8.—For repairing, cleaning and renovating Primitive Methodist Chapel. Rev. C. Leafe, 26 Lister Street.

**IPSWICH.**—For alterations and additions to offices, Tower Lane. Mr. John S. Corder, architect, Wimbourne House, Ipswich.

**IRELAND.**—Feb. 27.—For renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

**IRELAND.**—Feb. 24.—For erection of a dispensary house and medical officer's residence, for the Guardians of Athy Union. Mr. T. P. Orford, clerk, Board-room, Workhouse, Athy.

**IRELAND.**—Feb. 15.—For erection and completion of a schoolhouse at Meenatale, near Ramelton. Rev. Thomas Slevin, P.P., Ramelton.

**KENDAL.**—Feb. 15.—For pulling-down the old and rebuilding new schools at Selside. Mr. John Hutton, architect and sanitary engineer.

**KINGSTON-ON-THAMES.**—Feb. 8.—For additions and alterations at Clattern House. Mr. Harold A. Windser, town clerk, Clattern House, Kingston-on-Thames.

**KINGSTON-ON-THAMES.**—Feb. 10.—For erection of art and technical schools. Mr. Alfred Boxall, 6 John Street, Adelphi, W.C.

**LEEDS.**—For building Hoffman kiln and other buildings. Mr. F. Rhodes, Upper Wortley, Leeds.

**LEEDS.**—Feb. 10.—For erection of a shaft for passenger lift in municipal buildings. Town Clerk, Town Hall.

**LEEDS.**—Feb. 10.—For alterations necessary for erection of a shaft for passenger lift in the municipal buildings. Town Clerk, Town Hall.

**LIVERPOOL.**—Feb. 9.—For pulling-down and removal of all materials and debris of buildings in North John Street and Princes Street, Liverpool. Mr. J. Francis Doyle, 4 Harrington Street, Liverpool.

**LONDON.**—Feb. 12.—For pulling-down the present board-room, offices, stores, and for erection of iron and glass roof and for paving to extension of the market. Messrs. H. Jarvis & Son, 29 Trinity Square, Southwark.

**LONDON.**—For erection of four shops in South London. Mr. E. Tompkins, architect, Crofton Park, Brockley, S.E.

**MANCHESTER.**—Feb. 5.—For constructing two chimneys and raising the walls, &c., to No. 1 retort-house at Gaythorn Gasworks. Mr. C. Nickson, Gas Department, Town Hall.

**MIDDLETON JUNCTION.**—For rebuilding the Firwood Tavern. Mr. Charles H. Openshaw, architect, Fleet Street, Bury.

**MOGDEN.**—Feb. 26.—For erection of an isolation hospital and other buildings in connection therewith. Mr. W. J. Ancell, architect, 3 Staple Inn, London.

**MORPETH.**—Feb. 12.—For alterations and extensions of the laundry at the County Lunatic Asylum, Morpeth, for the Northumberland County Council. Mr. John Cresswell, county architect, Moot Hall, Newcastle-on-Tyne.

**MOULTON.**—Feb. 8.—For erection of a cookery-room at the Board schools, for the Moulton School Board. Mr. Joseph Cawley, architect.

**NEWPORT.**—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

**NEW TREDEGAR.**—Feb. 8.—For building three villas. Mr. H. Sketch, architect, New Tredegar.

**OBAN.**—Feb. 5.—For erection of a residence, Isle of Rum. Messrs. Leeming & Leeming, architects, Victoria House, 117 Victoria Street, Westminster, S.W.

**ORPINGTON.**—Feb. 16.—For additions to the Board schools at Chislehurst Road. Mr. George St. Pierre Harris, architect, 8 Ironmonger Lane, E.C.

**OTLEY.**—Feb. 10.—For erection of thirty-two houses in Leeds Road. Messrs. Fairbank & Wall, architects, 3 Manor Square, Otley.

**PONTYPRIDD.**—Feb. 8.—For erection of a church at Carne-town, Abercynon, to seat 500 persons. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

**RAINHILL.**—Feb. 19.—For additions and alterations to wards 10 and 11, main building, county asylum. Mr. Jas. Gornall, acting clerk, Rainhill.

**SCOTLAND.**—For erection of a brick building at Cramond Brig Station. Mr. Aitken, clubmaker, Cramond Brig.

**SHEFFIELD.**—Feb. 13.—For additions to the infants' and girls' departments at Springfield School. Mr. C. J. Innocent, 17 George Street, Sheffield.

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**SHEFFIELD.**—For erection of seven houses in Whitehouse Road. Mr. William J. Taylor, architect, 38 Bank Street, Sheffield.

**SHIPLEY.**—Feb. 13.—For erection of wool-combing works, shed, warehouse, chimney, &c. Messrs. Walker & Collinson, architects, 227 Swan Arcade, Bradford.

**SHROPSHIRE.**—March 1.—For restoration of Culmington Church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

**STAINING.**—For erection of four cottages. Apply Rowcroft, Staining.

**STEEPLE GIDDING.**—Feb. 15.—For erection of a farm-house. Mr. Noel Villiers, 15 Great George Street, Westminster.

**SURREY.**—Feb. 22.—For foundations of the seventh county lunatic asylum, to be erected on the Horton Estate, Surrey. Mr. G. T. Hine, architect, 35 Parliament Street, S.W.

**SWANSEA.**—Feb. 5.—For erection of Gendros Board school, for the Cockett School Board. Mr. D. Isaac, clerk, 7 Rutland Street, Swansea.

**SWANWICK.**—Feb. 12.—For erection of a dwelling-house at Swanwick. Mr. R. Argile, architect.

**TAUNTON.**—March 1.—For erection of public closets and urinals in Castle Green. Mr. James H. Smith, borough surveyor, Municipal Buildings, Corporation Street.

**TINTAGEL.**—Feb. 10.—For erection of the King Arthur's Castle Hotel. Mr. Silvanus Trevel, Truro.

**TIVERTON.**—Feb. 9.—For erection of station buildings, &c., at Tiverton Junction. Mr. G. K. Mills, secretary, G.W.R., Paddington Station, London.

**WALES.**—Feb. 6.—For additions to St. Margaret's Church, Mountain Ash. Mr. E. M. Bruce Vaughan, architect, 20 St. Mary Street, Cardiff.

**WALES.**—Feb. 10.—For altering and converting the boys and girls' Board schools, Glyncoirwg, into one mixed department. Messrs. Lambert & Rees, architects, Bridgend.

**WALES.**—Feb. 12.—For erection of the Llandysul intermediate schools. Mr. John H. Phillips, architect, St. John's Chambers, Cardiff.

**WALES.**—Feb. 8.—For erection of a church at Carnetown, Abercynon, near Pontypridd, to seat 500 persons. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

**WALES.**—Feb. 17.—For enlargement of Congregational chapel, Aberayron. Rev. T. Gwilym Evans, pastor.

**WALES.**—Feb. 15.—For erection of a school to accommodate 200 children at Cwmtillery, near Abertillery, Mon., and for erection of two classrooms and extensions of cloakrooms to the Nantyglo School and renovation of caretaker's cottage. Mr. George Rosser, architect, Victoria Buildings, Abercarn.

**WALES.**—Feb. 13.—For erection of three dwelling-houses at Cesarea. Mr. O. J. Roberis, Bodfeurig, Upper Llandwrog.

**WESTON-SUPER-MARE.**—Feb. 8.—For alterations to ladies' and gentlemen's lavatories on the Marine Parade. Mr. Hugh Nettleton, surveyor.

**WOMBWELL.**—Feb. 9.—For erection of four houses off Main Street. Mr. John Robinson, Wombwell.

**WOODHOUSE.**—For plastering, painting, slating, plumbing and glazing of three houses in Glossop Street. Mr. A. Ingham, 66 Melville Place, Woodhouse.

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CROSS & CROSS, Walsall (accepted)	206 0 0

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Curral & Lewis	£512 0 0
Jones & Fitzmaurice	500 0 0
G. Trenham	493 0 0
J. White, jun.	490 0 0
J. Biggs	485 0 0
G. LAW, Kidderminster (accepted)	461 0 0
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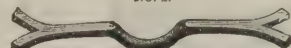
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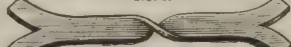
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For additions to the Queen's Hotel. Mr. ARTHUR J. LACEY, architect, 6 Upper King Street, Norwich.  
 S. Chapman & Son . . . . . £899 0 0  
 Downing & Sops. . . . . 898 0 0  
 Carter & Wright . . . . . 840 0 0  
 G. W. Beech . . . . . 824 0 0  
 W. CORK, Northgate Street, Yarmouth (accepted) 733 0 0

**HARROGATE.**

For painting and decorating interior of Methodist Free Church. JONES & JACKSON, 57 Cannon Street, Manchester (accepted). . . . . £109 0 0

**HULL.**

For erection of warehouse in Newland Avenue. Messrs. WELLSTED & EASTON, architects, Prince's Dock Chambers, Hull.  
 Curtis & Son . . . . . £300 1 0  
 Good . . . . . 277 9 9  
 Hockney & Liggins . . . . . 272 8 9  
 Drury . . . . . 264 4 0  
 W. Curtis . . . . . 260 17 0  
 Beilby . . . . . 247 0 0  
 Blackburn & Son. . . . . 242 0 0  
 Finch . . . . . 239 18 0  
 Nicholson . . . . . 238 16 6  
 Harper . . . . . 235 13 0  
 Hall . . . . . 233 11 0  
 Lison & Son . . . . . 233 7 4  
 Woods . . . . . 232 15 0  
 Stephenson . . . . . 225 0 0  
 W. ROWLAND (accepted) . . . . . 224 0 0

**KENT.**

For erection of a villa in Balmoral Road, New Brompton. Mr. E. J. HAMMOND, architect, 111 High Street, New Brompton.  
 J. H. Park . . . . . £507 0 0  
 J. L. Trueman . . . . . 460 0 0  
 H. Harris . . . . . 395 0 0  
 F. A. Hammond . . . . . 375 0 0  
 C. E. SKINNER, Chatham (accepted) . . . . . 335 0 0

**LEEDS.**

For erection of nine houses and house and shop at Woodhouse Hill. Messrs. SWALE & MITCHELL, architects, 98 Albion Street, Leeds.

*Accepted tenders.*

F. O'Donnell, brick, stone and joiner's work.  
 J. Atkinson & Son, slater.  
 H. Carter, plumber.  
 Brown & Brook, plasterer.  
 J. Scott, painter.

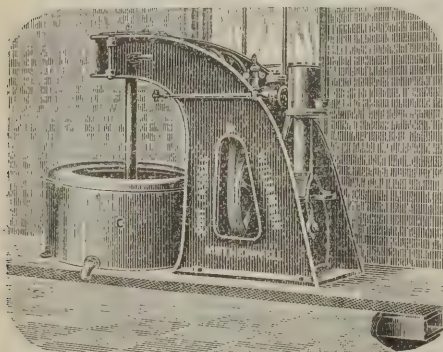
For plastering four houses in Markham Avenue. Senior & Son . . . . . £10 2 6  
 T. H. MITCHELL & SON, 9 Dent Street (accepted) . . . . . 6 15 0  
 per house . . . . .

**LEYTONSTONE.**

For erection of a boiler-house on the workhouse premises at Leytonstone, for the Guardians of West Ham Union. W. NEIL, Burdett Road, Bow, E. (accepted) . £1,440 0 0

**LONDON.**

For alterations at the Cooper's Arms public-house, St. Luke's, E.C. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.  
 W. Hawtrey & Son . . . . . £763 10 0  
 J. H. Pugh . . . . . 742 0 0  
 A. Porter . . . . . 704 0 0  
 G. Veale . . . . . 699 0 0  
 J. J. Thompson . . . . . 685 0 0  
 T. OSBORN & SONS (accepted) . . . . . 655 0 0  
 For repairs and decorations at the King's Head, Bow Road, London, E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.  
 G. LUCK (accepted) . . . . . £206 10 0

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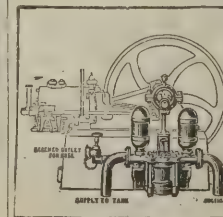
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Richardson Bros.	.	.	.	.	.	.	.	£387	0 0
Rugg & Son	.	.	.	.	.	.	.	321	7 0
Lidstone & Son	.	.	.	.	.	.	.	320	0 0
Steven Bros.	.	.	.	.	.	.	.	244	0 0

For erection of a bottling shed at George Yard, Whitechapel, E., for the Victoria Wine Co. Mr. GEO. WAYMOUTH, architect.

Richardson Bros.	.	.	.	.	.	.	.	£465	0 0
Lown & Son	.	.	.	.	.	.	.	397	0 0
Barlow & Roberts	.	.	.	.	.	.	.	373	0 0

For alterations and repairs at Percy House, Notting Hill, W., for the Victoria Wine Co. Mr. GEO. WAYMOUTH, architect.

Lown & Son	.	.	.	.	.	.	.	£280	0 0
Richardson Bros.	.	.	.	.	.	.	.	254	0 0
Barlow & Roberts	.	.	.	.	.	.	.	219	0 0
Bristow & Sons	.	.	.	.	.	.	.	204	0 0

For superstructure to warehouses at Ratcliff Cross Wharf, for Messrs. Pinchin, Johnson & Co. Messrs. BRADSHAW, BROWN & Co., architects, Billiter Square Buildings, E.C.

Scrivenor & Co.	.	.	.	.	.	.	.	£10,450	0 0
Porter	.	.	.	.	.	.	.	10,269	0 0
Gammon	.	.	.	.	.	.	.	10,200	0 0
Kirk & Randall	.	.	.	.	.	.	.	10,060	0 0
Peacock Bros.	.	.	.	.	.	.	.	9,862	0 0
H. L. Holloway	.	.	.	.	.	.	.	9,100	0 0
W. Gladding	.	.	.	.	.	.	.	8,953	0 0
Munday & Son	.	.	.	.	.	.	.	8,831	0 0
Chafen & Newman	.	.	.	.	.	.	.	8,724	0 0

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W. Sharp	.	.	.	.	.	.	.	605	0 0
G. F. TOMLINSON, Derby (accepted)	.	.	.	.	.	.	.	536	0 0

## MANNINGHAM.

For extension of Westfield Road, Manningham, and the sewer thereunder. Messrs. JACKSON & PRIESTMAN, surveyors, Exchange, Bradford.

NAYLOR & SON, Cleckheaton (accepted)	.	.	.	.	.	.	.	£437	0 0
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## NEWCASTLE-ON-TYNE.

For erection of Primitive Methodist Church, Kingsley Terrace. Messrs. MARSHALL & DICK, architects, North Street, Newcastle.

## Main building.

W. Baston	.	.	.	.	.	.	.	£4,790	0 0
J. Ferguson	.	.	.	.	.	.	.	4,671	0 0
J. Jackson	.	.	.	.	.	.	.	4,558	0 6
A. Pringle	.	.	.	.	.	.	.	4,536	0 0
T. Weatheritt	.	.	.	.	.	.	.	4,494	0 0
Middlemiss Bros.	.	.	.	.	.	.	.	4,430	0 0
A. Bruce	.	.	.	.	.	.	.	4,396	18 6
S. Easton	.	.	.	.	.	.	.	4,297	0 0
T. HUTCHINSON, Elswick Lane (accepted)	.	.	.	.	.	.	.	4,129	6 6
G. H. Mauchlen	.	.	.	.	.	.	.	4,106	6 0

## Spire and tower.

J. Jackson	.	.	.	.	.	.	.	817	0 0
Middlemiss Bros.	.	.	.	.	.	.	.	800	0 0
S. Easton	.	.	.	.	.	.	.	767	0 0
A. Pringle	.	.	.	.	.	.	.	754	0 0
J. Ferguson	.	.	.	.	.	.	.	715	0 0
T. Weatheritt	.	.	.	.	.	.	.	700	0 0
A. Bruce	.	.	.	.	.	.	.	669	10 0
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J. POOL, Littleborough (accepted)	.	.	.	.	.	.	.	896	0 0

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 W. E. Samuel . . . . . 3,370 0 0  
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 JENKINS & JONES, Johnstown (accepted) . . . . . 3,190 0 0

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 Haycock . . . . . £430 10 0  
 Barton . . . . . 410 0 0  
 BUCKLEY (accepted) . . . . . 400 0 0

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For erection of two houses. Mr. W. J. SMITH, architect.  
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 Haycock . . . . . 381 16 0  
 BUCKLEY (accepted) . . . . . 368 10 0

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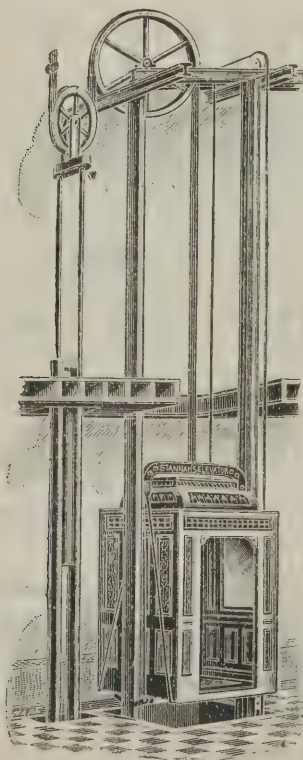
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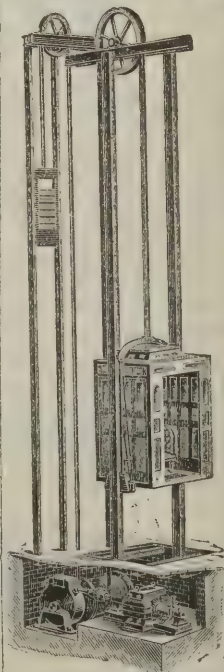
For erection of new boundary wall, Castle Yard. Mr. JOHN ATKINSON, borough surveyor.  
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F. Dupont . . . . . 2,854 14 4

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W. Judge, Watford . . . . . 2,770 0 0

T. Adams . . . . . 2,677 2 10

J. Jackson . . . . . 2,615 8 7

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T. P. Barry . . . . . 1,448 17 0

J. & T. Biscomb . . . . . 1,447 0 0

W. Bellerby . . . . . 1,340 19 0

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## VARIETIES.

EXCELLENT progress is being made with the work of restoration of Canterbury Cathedral, which, it is hoped, will be almost complete in those portions of the cathedral at present under treatment by the time (next July) of the great gathering of Pan-Anglican Bishops in Canterbury.

A NEW Wesleyan chapel has been erected at Airton, a village near Skipton, the site for which and the greater part of the cost (which amounts to 1,200*l.*) has been given by Mr. William Illingworth, of Newfield Hall.

THE Octagon Chapel at Bath, of which Archbishop Magee was for some years the incumbent, has ceased to exist as a place of worship, and is to be converted into a furniture store, all the fittings having been sold by auction.

NEW National schools at Langley Mill, Derbyshire, were opened on Saturday last.

THE Tsar has assigned a sum of 65,000 roubles from the Imperial Treasury for the erection of residential quarters for the female students attending the St. Petersburg Medical Institute for Women. The building will be opened this year.

A BOILER explosion occurred at Mountford & Co.'s engineering works, Manchester. The building in which the boiler stood was demolished. One large piece of boiler was lifted over a tower 80 feet high, and other pieces were found embedded 500 yards away.

THE statue of the Emperor William I. on horseback, with a female figure of Peace leading the steed, has just been removed from the workshop to its destination in Berlin, where it will be formally unveiled on March 22. There is still a considerable amount of work to be done before the statue is completed, and in order to finish it by the date in question operations will be frequently pursued throughout the night by electric light.

WINDSOR CASTLE is to have a museum for the reception of some of its historical relics which, owing to the want of a suitable place for their exhibition, have hitherto been inaccessible to visitors. The place selected for their arrangement is the spacious vestibule between the grand staircase and the Master of the Household's Office. Here the walls are being fitted with handsome oak and plate-glass cabinets, and in these the numerous interesting curios will be displayed.

THE President of the Board of Trade has appointed a committee to inquire into the existing system of ventilation of tunnels on the Metropolitan Railway and report whether any,

and if so what, steps can be taken to add to its efficiency in the interest of the public. The committee will consist of Major F. A. Marindin (chairman), Earl Russell, Sir Douglas Galton, Sir Charles Scotter and Dr. John Scott Haldane. Mr. Robert S. Lendrum, of the Board of Trade, has been appointed to act as secretary to the committee.

THE work of renovation of Ravenfield Church, which was commenced in 1894, has just been satisfactorily completed. The old pews have been replaced by open pitch pine seats and oak choir stalls. An elaborate carved oak reredos, in the centre of which is a valuable old oil painting of the Spanish school, has been added. The walls of the sanctuary have been decorated, and the dome ceiling painted blue and studded with gold stars. A beautiful carved oak pulpit, the open panels being filled in with delicate tracery, and an oak font to correspond, have just been added. All the work has been executed from the designs and under the superintendence of Mr. E. Isle Hubbard, M.S.A., of Rotherham, architect, by Mr. J. Wortley, of Rotherham. Great credit should be given to Mr. Robert Glenn, the contractor's foreman, for the beautiful execution of the work.

CONSIDERABLE alterations are in progress at Waterloo Junction, which will be greatly enlarged and in every way improved, while an overhead access to the South-Western Station will replace the present subway.

MR. W. ADAMS, C.E., has been appointed Manager of the Works Department of the London County Council at a salary of 1,500*l.* per annum.

ARTISANS' dwellings designed to accommodate 1,200 persons are to be erected on part of the land rendered vacant by the demolition of the Millbank Prison.

## TRADE NOTES.

THE new County School, Portmadoc, is being warmed and ventilated throughout by means of Shorland's patent Manchester grates, by Messrs. E. H. Shorland & Brother, of Manchester.

MR. W. CASSELS, Kirkintilloch, near Glasgow, has designed a wash-basin range for schools, factories, public works, &c., for which he claims that it gives the greatest possible facility for rapid and efficient washing, without danger of conveying infection, and economises time, space and water in a greater degree than any other. The time required by school children to wash their hands is, on an average, thirty seconds per scholar, and the amount of water only 1½ pint!

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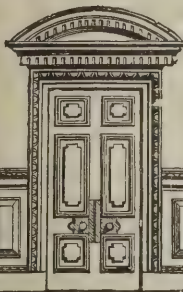
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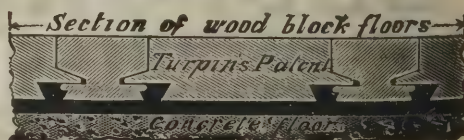
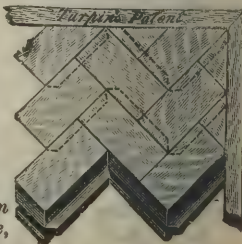
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**ELECTRIC NOTES.**

A SERIES of alarming explosions occurred on the Grande Place, Brussels, and in the neighbouring streets on Monday night, causing quite a panic among the inhabitants and doing some damage to property. The explosions were caused by overheating of the underground electric wires, and followed each other with great rapidity and with deafening noise. Paving stones, bricks and tin plates covering the approaches to the wires were thrown several yards into the air.

CROYDON Parish Church was, on Sunday, lighted for the first time by electricity.

**BUILDING AND BUILDERS.**

THE Primitive Methodists have obtained a site opposite the Manchester, Sheffield and Lincolnshire new station, Wigan, for the erection of a hall and schools. The scheme will cost about 2,400*l*.

THE foundation-stone of a Friends' adult school has been laid by the Mayor of Barnsley. The total cost of the building will be 2,000*l*.

**SANITARY ASSOCIATION OF SCOTLAND.**

THE board of examiners of the Sanitary Association of Scotland held their winter examination in the hall of the Faculty of Physicians and Surgeons, 242 St. Vincent Street, Glasgow, on January 27, 1897. The examiners were:—Dr. John C. M'Vail, M.D., D.P.H., Camb.; Dr. Eben Duncan, M.D., C.M.; Mr. Peter Fyfe, F.R.S.E.; Mr. A. B. Allen, C.E.; with Mr. J. C. Stobo, secretary. There were twenty-eight candidates, of whom the following received certificates of competency in sanitary science to discharge the duties of a sanitary inspector, viz.:—Messrs. Robert L. Ashford, Glasgow; Robert J. Taylor, Surrey; Walter R. Nicholl, Perth; John S. Dickson, Perth; David Ronald, Falkirk; James Duncan, Leith; John Gilfeather, Maxwelltown; Alexander Martin, Arran; Andrew Thomas, Glasgow; John Hillis, Lenzie; John Skelly, Duneskin; Kenneth Macdonald, Ayr; William Watson, Arbroath; Alexander Macdougald, Glasgow; William Adam, Paisley; William Rennie, Carlisle; James Robertson, Kilmarnock; John O. Ferguson, Glasgow; David Porter, Glasgow; William Martin, Patna; and Francis Docherty, Glasgow.

**MUNICIPAL OFFICERS' ASSOCIATION.**

THE annual meeting will be held in the Council Chamber, Guildhall, E.C., on Tuesday, February 9, 1897, at 8 o'clock P.M. Mr. J. L. Wanklyn, M.P., who has taken charge of the Local Authorities Officers' Superannuation Bill, which was read a first time on January 25, will address the members on that subject. The Right Hon. the Lord Mayor of London will preside at the annual dinner to be held on Saturday, February 27, at the Holborn Restaurant, when he will be supported by the Right Hon. Lord Balfour of Burleigh, Chief Secretary for Scotland; Sir J. Blundell Maple, M.P.; Mr. J. L. Wanklyn, M.P.; the Clerk to the London County Council, the Town Clerk and City Solicitor of London, the Town Clerks of Birmingham, Crewe, Devonport, Douglas, Huddersfield, &c., and many others holding important municipal and local government positions.

Early application for tickets (price 5*s*. each) should be made to the hon. secretary, Mr. C. J. F. Carnell, 33 Paulet Road, Camberwell, S.E.

**GLASGOW SCHOOL OF ART NEW BUILDING.**

IT having been decided to erect a School of Art in connection with the Art Gallery and Museum in Kelvin Grove, twelve architects were invited to compete, with the result that the designs of Messrs. John Honeyman & Keppie were selected.

The building is to be erected on a piece of land lying immediately to the north of the Panorama buildings in Sauchiehall Street, between Dalhousie Street on the east and Scott Street on the west, and having a frontage to Renfrew Street. The building itself will face due north, with a length of 250 feet and a depth of 77 feet. The plans show a three-storeyed building—a basement and two floors—the ground to the north being excavated to form an area for lighting the lowest floor. The entrance is in Renfrew Street, the main door being situated in the centre of the façade. A service door has also been made in Dalhousie Street for access to a janitor's house and for the reception of material. The staircase of the building is situated in the rear centre, and access to all floors is gained from and by it. The upper floor contains the life rooms (male and female), antique rooms (elementary and advanced), a school museum and a board-room. The middle floor is occupied by ornament, still life and design rooms, and the school library and lecture theatre. The basement holds the accommodation for modelling (large antique and ornament), architectural rooms and the technical rooms. In these will be

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placed a forge, a kiln and a muffle. The basement also contains a house for a caretaker, the heating apparatus and various store-rooms. The administration is situated in the centre of the building, and on the first floor. The elevation presents the appearance of a plain business-looking edifice. The upper floor is lighted by large square-headed windows, and every care has been taken to secure a sufficiency of light for every room in the school. All rooms in which instruction is to be given are lighted from the north, the only light taken from the south being that available for the corridors, which on each floor run from one end of the building to the other, at the southern side of the edifice. The light from the south is obtained by the use of wells, there being no reservation in favour of windows in the southern wall. The whole of the plans will be on view in the Corporation Galleries till February 16.

### PROPOSED ASYLUM FOR NOTTS.

At the last meeting of the Notts County Council Alderman W. E. Denison, in moving the adoption of the report of the lunatic asylums building committee as to a report from the Lunacy Commissioners with respect to the new asylum, referred to the demand made upon them in respect of the accommodation to be provided. The committee, having regard to the existing number of patients in the present lunatic asylum, thought that accommodation for 400 patients, with administrative capacities for 500, would be amply sufficient, and this was referred to the Home Secretary. The Lunacy Commissioners, however, made a minimum accommodation of 500 beds, with administrative capacity of 600. That demand, they thought, was too large, but they had reconsidered the matter, and now requested that they should provide beds for 450, with administrative capacity for 550. To that they had not received any answer, and he was rather afraid that the Lunacy Commissioners, who had somewhat extravagant ideas, would adhere to their former decisions. Until they got their final decision they were, to a certain extent, at a standstill. Mr. Hooley and Mr. Sander had sketched out most admirable and original plans, but they could not proceed with details until it was known exactly what accommodation they had to provide. The only other question was with regard to the farm. Originally the tenant did not seem inclined to come to terms or to go on with his farm. In some ways, perhaps, it would be better for the Council to take

the matter in hand and to farm the land, but there was a great difficulty with regard to supervision, and they were now discussing with the tenant whether he should not continue his farm, farming as the committee directed, for a length of time. He rather thought that the tenant might do so. If he would not, they would be obliged to take it in hand, but he did not think the cost would be very much. The greater part of the land would be laid down to grass, and they could let it.

It was mentioned by Mr. Francklin that the original estimate of the cost of the building was 70,000*l.*, and they might fairly assume that it would expand itself to 100,000*l.*, but if they had to provide room for 600 patients it would greatly exceed that sum.

After considerable discussion upon the question of who should carry out the architectural work, the report was adopted.

### A STEEL PIPE PRISON.

A REALLY new idea deserves credit for its rarity, if for no other reason. The San Francisco papers give Mr. Frank T. Shea the credit of originating one in prison construction which we learn the Patent Office, that refuge of new ideas, has never known before. To be brief, says *Architecture and Building*, Mr. Shea, architect of the Hall of Justice, proposes to construct the cells of steel pipes to be filled with water at high pressure. At the desk of the sergeant in charge of the prison will be a gauge similar to a steam gauge on a boiler, by which the exact pressure of the water will be registered. If a prisoner should attempt to cut his way out of the prison by filing one of the steel bars a stream of water would escape as soon as he filed through the pipe. Simultaneously with the escape of the water an electric bell on the gauge at the sergeant's desk would ring and the indicator would show the number of the cell where the prisoner was trying to escape. This would seem to put an effectual stop to future gaol deliveries, and if generally adopted any future Jack Sheppard stories will lack foundation; but they say no lock has ever been made but some one has been found smart enough to pick it. But another question arises as to the value of these tubes, that is, how long before the action of water upon them would render them defective and perhaps deluge the prisoners. While we cannot fail to appreciate the ingenuity of the scheme or its novelty, still before its adoption it might be well to look for possible defects, for to be good at all it must be very good and very permanent.

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## ILLUSTRATIONS.

ELY CATHEDRAL.—GENERAL VIEW OF CHOIR.

ELY CATHEDRAL.—CHOIR FROM OCTAGON.

THE LIBRARY.—HALTON, HERTS.

GARDEN ENTRANCE.—HALTON, HERTS.

## NEW CATALOGUES.

MESSRS. THOS. CRAPPER & CO., Marlborough Works, Chelsea, are sending out a copiously illustrated catalogue of some 150 pages, showing all their various specialties, such as air-tight manhole covers, air inlet valves, automatic flushing tanks, cast-iron and porcelain baths, cast-iron drain pipes and junctions, elastic valve closets, enamelled fire clay sinks, grease traps, gully traps and galvanised iron tanks and cisterns. Some of their bathroom fittings are particularly noteworthy, No. 1 for instance, a cast-iron bath, enamelled inside, with galvanised supply and waste pipes, spray enclosure with shower and douche in copper, combined hot and cold nickel-plated supply valves, with mahogany or walnut enclosure and hand-painted tiled-back skirting, is a very handsome and comprehensive fitting. Many designs are given of plain and ornamental lavatories, the firms' well-known specialties in closets, &c., and the prices are all as moderate as is consistent with excellent materials and workmanship.

MESSRS. EASTON, ANDERSON & GOOLDEN, of Erith Iron-works, Kent, and 3 Whitehall Place, S.W., have also issued a catalogue, which contains nearly eighty illustrations (many of them full-page ones) of pumping machinery, water works, centrifugal pumps, water wheels, turbines, hydraulic rams, boilers, steam engines, cordite machinery, Grafton high-speed engines, hydraulic and electric lifts, hydraulic presses, electric mining machinery, electric tramways, electric lighting, dynamos and motors, cranes, pulverisers, &c., as well as views of important works executed by the firm for public bodies in England and abroad; and the prices of machinery for different purposes are given.

MESSRS. WATSON, LAIDLAW & CO., engineers, millwrights and machine makers, Glasgow, whose specialties are their hydro-extractors, send us a catalogue containing illustrations of the different varieties of these, both hand and power driven. There are also sketches of the firm's self-balancing oil separator, patent centrifugal friction pulley, &c.

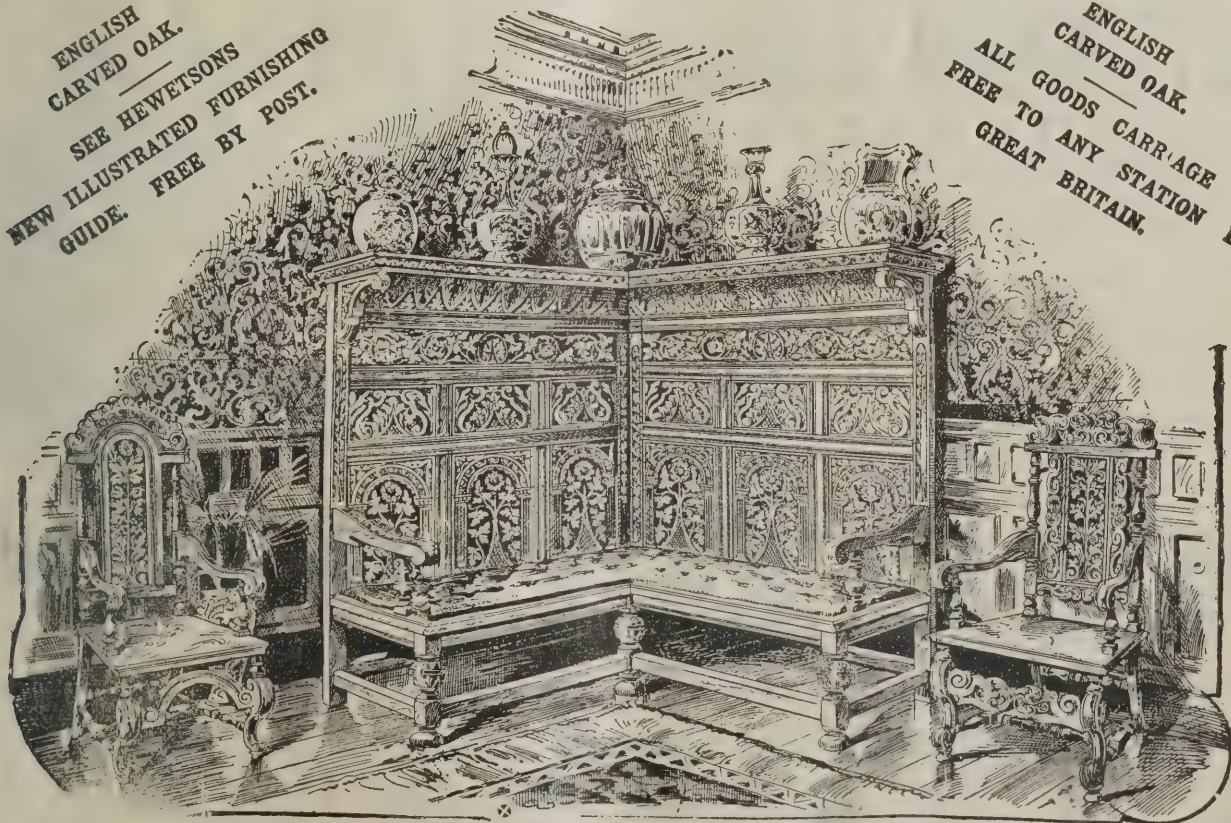
## MINERAL WOOL.

ACCORDING to Consul Merritt, of those who know mineral wool, or silicate of cotton as it is sometimes called, probably only a small number are familiar with the simple process by which it is made. The wool itself, serving a variety of useful purposes, as a non-conducting covering against heat and cold, alike for steam-pipes and cold storage-room walls, as a sound deadener in floors of buildings, and as a means of fireproofing, is, as its name implies, a soft and woolly substance, consisting of a mass of very fine mineral fibres interlacing one another in every direction, and thus forming an endless number of minute air-cells. The wool appears on the market in a variety of colours, principally white, but often yellow or gray, and occasionally quite dark, and is made by converting scoriæ and certain rocks, while in a molten state, into a fibrous condition by a steam blast directed against the liquid material. Blast furnace slag forms the raw material for one variety of the wool and sandstone for another, yielding respectively slag wool and rock wool, the latter being preferable for pipe covering because of the absence of sulphur, which, with moisture present, becomes an active corroding agent. The furnace slag or the rock, as the case may be, is melted in a large cupola, and as it trickles out at the tap-hole in a somewhat sluggish stream it meets a high-pressure steam jet, which atomises the woollen material, if it may be so termed, blowing it in fleecy clouds into the storage-room provided for it.

Soft and downy, the stuff settles wherever a resting-place offers itself, the heavier wool coming down first, while the lighter portions are blown further along by the force of the steam, and settle in the more distant parts of the room. The material thus naturally grades itself into varieties of different qualities. A thousand pounds of wool per hour are turned out by one of the cupolas, and after the storage-room has been blown full the flocculent mass is pressed into bags, ready for the market. The whole process, says the consul, affords an admirable and interesting illustration of the utilisation of a formerly waste product.

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## AN AMENITY COMMISSION FOR NEW YORK.

A CHARTER for "Greater York" is under the consideration of special commissioners. The Fine Arts Federation have submitted the following proposals to insure the erection of sculpture and other memorials in the public places of the city which shall have some claim to be considered works of art:—

Section 1. There shall be an art commission for the city of New York, composed as follows:—

1. The mayor of the city of New York.
2. The president of the Metropolitan Museum of Art.
3. The president of the New York Public Library (Astor, Lenox and Tilden foundations).
4. The president of the Brooklyn Institute of Arts and Sciences, *ex-officio*.

One painter, one sculptor, one architect, all residents of the city of New York, and three other residents of the city of New York, none of whom shall be a painter, sculptor, architect, or member of any other profession in the fine arts. All of the six last mentioned shall be appointed by the mayor from a list of not less than three times the number to be appointed, proposed by the Fine Arts Federation of New York.

The head of each of the city departments shall, *ex-officio*, act as a member of the commission in all matters of which it takes cognisance pertaining to work under the special charge of his department.

Section 2. The painter, sculptor and architect members of the commission shall choose by lot one, two and three-year terms of office; the three other appointed members of the commission shall also choose by lot one, two and three-year terms of office, and the appointment of their successors, after the expiration of the first year of this commission, shall be for a term of three years. All appointments to fill vacancies shall be for the unexpired term.

In case any vacancy shall occur in the commission by reason of death, resignation, incapacity, refusal to serve, or otherwise, the vacancy shall be filled by appointment, as provided in section 1 of this chapter. In case the Fine Arts Federation shall fail to present a list of nominees as aforesaid within three months from the time when any appointment is to be made, the mayor shall appoint without such nomination.

Section 3. The commission shall serve without compensation as such, and shall elect a president, vice-president and

secretary from its own members, whose terms of office shall be for one year and until their successors are elected and qualified. The commission shall have power to adopt its own rules of procedure; five commissioners shall be a quorum.

Section 4. Suitable offices shall be provided by the city for the commission. The expenses of the commission shall be paid by the city; the amount of the same shall be fixed annually by the Board of Estimate and Apportionment.

Section 5. Hereafter no work of art, namely, no paintings, mural decorations or stained-glass, no statues, bas-relief or other sculpture, no monuments, fountains, arches or other structures of a permanent character, whether for ornament or commemoration, when the property of the city or intended so to be, or which shall extend over or upon any street, avenue, square, common, park, municipal building or other public place belonging to the city, shall be erected by or become the property of the city of New York, whether by purchase, gift or otherwise, unless the location and design (and if requested by the commission a complete model) for the same shall first have been submitted to and approved by this commission. Neither shall any existing work of art in the possession of the city be removed, relocated or altered in any way without the similar approval of this commission, except as provided in section 7. When so requested by the mayor or the City Council the commission shall act in a similar capacity, with similar powers, in respect to the designs of municipal buildings, bridges, approaches, gates, fences, lamps or other structures upon land belonging to the city, and in respect to the lines, grading and plotting of all public ways and grounds, when the property of the city or intended so to be, and located as above mentioned; also in respect to all arches, underground or elevated ways, bridges, approaches, the property of any corporation or private individual within the boundaries of the city, which shall extend over or upon any street, avenue, park or public place belonging to the city.

Section 6. If the commission shall fail to decide upon any matter submitted to it within sixty days after such submission, its decision shall be deemed unnecessary.

Section 7. In case the immediate removal or relocation of any existing work of art shall be deemed necessary by the mayor, the commission shall, within forty-eight hours after notice from him, approve or disapprove of such removal or relocation, and in case of their failure to so act within forty-eight hours after the receipt of such notice, they shall be deemed to have approved of the same.

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**A BRICK COUNTRY ROAD.**

THE first brick country road laid in the United States has been put down in Monmouth township, Warren county, Ill. The road is the culmination of a series of experiments in road-building, and though it is regarded as more or less on probation, the utmost confidence in its success is expressed. When hard-road building began in the township, four years ago, it was decided to expend the money in hand in an experimental way. Monmouth township had long been a sufferer from bad roads. In winter the town had often been completely blockaded by mud too deep for waggons. Even within the town itself the streets were so poor that at times the "bus" lines were obliged to suspend business, and mail and baggage were carried to the railway station on wheelbarrows. The manner in which the roadway was laid is described as follows:—The ground was prepared for it by grading, and being allowed to stand for two months. It was treated to an occasional scraping, so that it would pack evenly, and when the contractors were ready to lay brick it was as hard and even as a floor. The first thing was setting the curbing. This was made by 2 inch by 6 inch oak plank, set 7 feet apart, and held by oak stakes 18 inches long and put down every 4 feet. Inside this was put a 5-feet bed of sand. This was evened up and the single course of No. 1 paving-brick was put down. They were set on edge and make a fine road-bed. Outside of the curb 2 feet of crushed rock was laid, graded up to make an easy approach. This makes a road 11 feet wide. The earth on each side was graded and worked, making it all 40 feet wide, and affording tracks on each side for use in dry weather. The average cost of the stone roads has been 70 cents per foot. The brick road cost 2,600 dols. for 3,000 feet, or about 90 cents a running foot.

**CLEVELAND HOUSE.**

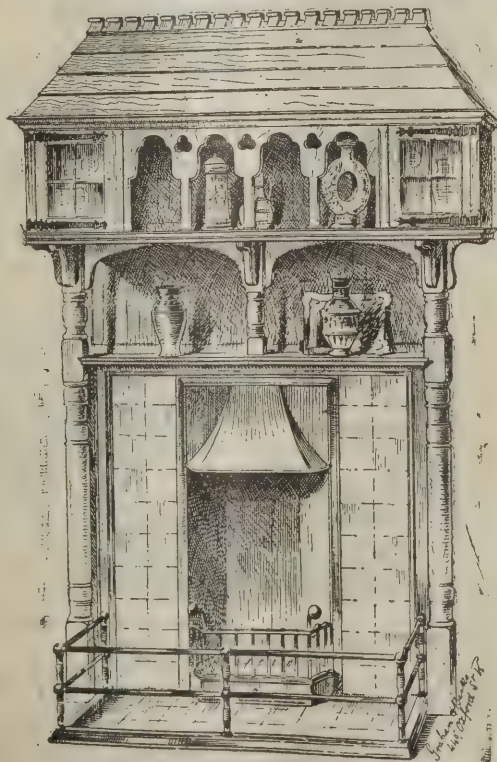
ON Tuesday Mr. Tewson, of Messrs. Debenham, Tewson, Farmer & Bridgewater, offered for sale at the Mart, Tokenhouse Yard, the freehold site formerly occupied by the historic mansion known as Cleveland House, 19 St. James's Square. The area is about 11,300 square feet. The house itself has been completely demolished, the portico alone remaining. The property, with Raby Castle and other estates of large value,

was comprised in a settlement made by the first Duke of Cleveland in the year 1809. In 1866 these estates were charged with an annuity of 4,000*l.* for the life of the Duchess of Cleveland, who is still living. In 1872 the then duke, who was tenant for life, purchased the reversion in fee in Cleveland House. On the death of the last duke Lord Barnard became entitled to the house. The land tax on the premises has been redeemed, but it is one of the conditions of sale that the purchaser will, under an Act of 12 George II., be liable to contribute to the expense of cleaning, adorning and beautifying St. James's Square, and the property is subject to a perpetual annuity of 16*l.* 19*s.* 2*d.* per annum. The bidding started at 40,000*l.*, and reached 57,500*l.*, at which price the property was declared to be unsold. It is understood that the purchase price was 65,000*l.* It may be interesting to point out that, even in so exclusive a square as St. James's, the shopkeeper has recently set his foot, and one of the attractions of the site offered for sale is that it is "adapted for the erection of a series of handsome shops."

**NATIONAL ASSOCIATION OF MASTER BUILDERS.**

THE National Association of Master Builders of Great Britain has held its thirty-eighth half-yearly meeting at Blackburn, and representatives were present from Liverpool, Blackburn, Bolton, Southport, Wigan, &c. Mr. Thomas F. Rider, who presided, said that though the state of trade generally was good, they had to deplore ruinous competition in all trades throughout the country. It seemed to him that competition up to a point was a very valuable thing, but he objected to "cutting each other's throats." This competition seemed to increase as years went on. Another thing that they had to consider was the old complaint of the "British workman," whose desire seemed to be to give the smallest possible amount of work for the largest amount of wage. The only remedy seemed to be a revival of the system of payment for piece work. As regarded the Employers' Liability Bill, no doubt this would be of a considerably more stringent character than ever. It seemed probable they would be held liable for accidents of every description, whether caused by negligence or otherwise, and he thought that this liability might be met by joint insurance. The question of arbitration had taken up a great deal of time with many of the associations. The President spoke at length as to the best form of contract, and stated that the

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old form agreed upon more than twenty-five years ago still continued in use in face of a new and more elaborate one prepared by the Institute of Architects, and this principally because of the unfairness of the arbitration clause, which, he said, was the most important part of a contract. Finally, he wished to increase the scope of the National Association of Master Builders, and make it in every sense a "national" association. The form of apprenticeship indentures was discussed, and it was decided to leave the matter over. The secretary read a resolution of the London Central Association as to the scarcity of plasterers. The President said they had had considerable trouble in London, and one thing had been proved to them, viz., that the supply of plasterers was insufficient. Various ways had been suggested of increasing their numbers. Among them were:—(1) To increase the number of apprentices; (2) to find a substitute for plastering; and (3) to maintain schools of plastering. It was decided to refer the matter to the Council. Mr. T. F. Rider (London), Mr. J. Stevenson Jones (Liverpool), and Mr. Alderman W. Holdsworth (Bradford), were re-elected to the positions of president, senior vice and junior vice-president respectively for the ensuing year. Mr. A. Krauss (Bristol) was elected hon. auditor for the ensuing year. Mr. G. Hardington (Leicester) and Mr. R. Jenkin (Plymouth) were elected as members of the Council for their respective towns. Mr. C. A. Hayes (Bristol) invited the members of the Association to hold their next half-yearly meeting in his city, which was unanimously agreed to.

### BIRMINGHAM SURVEYOR'S DEPARTMENT.

A REPORT of the public works committee on the reorganisation of the city surveyor's department has appeared. After conference with Mr. Price, the new city surveyor, the committee have approved a plan, the chief features of which may be briefly stated as follows:—1. The formation of a secretarial department, in order that all correspondence, reports and other documents relating to the several branches in the department may come directly under the cognisance of the city surveyor. 2. The gathering together in the accountant's department of all the accountant's work, instead of some portion being kept in one and some in another department, as previously. 3. The filling up of vacancies in the drawing and surveying department, the work of which, especially in connection with the survey of the city and the terrier of Corporation property, is in

arrears. 4. The reorganisation of the building surveyor's department, by the division of the city into five districts, each under the charge of a district building surveyor responsible for carrying out the Acts of Parliament and bye-laws in his own district; the district surveyors reporting to and receiving instructions through the chief building surveyor or his deputy, who will remain at the Council House, receive and examine plans, &c. 5. The formation of a department called the Sewerage and Rivers Department. The importance to the health of the city of a thorough and systematic supervision of the 260 miles of sewers cannot be over-estimated, and the committee considered that the system best calculated to ensure satisfactory results was that of dividing the city into five districts, each under the charge of an inspector responsible to the superintendent of the department for the proper maintenance, flushing, &c., of all sewers and drains, and the supervision of the construction of all new sewers and drains. 6. The reorganisation of the roads and scavenging department. Prior to 1884 the city was divided into three districts, each of which was under the charge of a district road surveyor; but for reasons then stated to the Council it was thought advisable to abandon this system, and place the supervision of the whole of the roads under one official. With the increased area of the city, consequent upon its extension, and the ever-increasing mileage of streets, which has risen from 192 in 1884 to 254 at the present time, it is manifestly impossible for one person to properly supervise between 500 and 600 men employed over so large an area. The committee have therefore divided the city into five districts, each of which they have placed under a district surveyor, who is responsible for supervising the construction of new streets, and for the maintenance and scavenging of all streets within his district. Mr. Buckley, the present road surveyor, will take charge of the central district and will supervise the work of the other district surveyors. 7. The committee have not found it necessary to make any material alteration in the public lighting (lamps) department, but the superintendent and clerical staff will be brought from Park Street to the Council House. 8. They have formed a new department, called the mechanical and electrical department, which will have charge of works connected with the tramways, electric lighting, &c. Up to the present the office of electric inspector, the appointment of whom, under the electric lighting orders, is obligatory upon the Council, has been held by Mr. Henry Lea, of Bennett's Hill, at a salary of 150*l.* per annum. Mr. Lea has informed the committee that, owing to the increase in the work since his

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appointment, and having regard to the increased duties cast upon him by the order of 1894, the salary was inadequate. The fees received last year by Mr. Lea, and paid to the borough fund, amounted to 171*l.* 16*s.* 6*d.*, and the committee, considering the growth of this work, and the probable adoption of electric motor power in connection with the tramways, which would require skilled supervision, concluded that the time had arrived when the whole time of a capable electrician could be utilised in the service of the Corporation. In this conclusion they are confirmed by the practice in other principal towns of the United Kingdom. The work hitherto performed by Mr. Piercy in connection with the tramway engines and the steam road-rollers, the payment for which amounts to about 250*l.* per annum, would be also transferred to this department. By a rearrangement of duties and promotion of present officials, the carrying out of this plan will involve an addition of about twelve persons to the staff of the department. The committee have appointed Mr. W. H. Worthington, who has been nineteen years in the department, to the office of secretary, and Mr. A. M. Rose, the deputy accountant, with eighteen years' service, to the office of accountant. Mr. Collins, the late accountant, has been placed in charge of the clerical staff of the lamp department. Mr. A. G. Reid, who has been in the drawing office thirteen years, has been retained as superintendent of that branch. Mr. F. W. Lloyd having resigned the office of building surveyor, the committee advertised for candidates, and appointed Mr. Henry Price, chief assistant inspector of buildings of Liverpool, in his place, at a salary commencing at 220*l.*, and rising by annual increments of 10*l.* to 300*l.* per annum, the amount of Mr. Lloyd's salary. Mr. John Knight has been appointed engineer in charge of, and superintendent of, the sewers and rivers department. Mr. Buckley is retained at the head of the roads and scavenging department, and Mr. W. Green, sen., at the head of the public lighting department. Mr. T. Arnall has been given the office of superintendent of the mechanical and electrical department, and Mr. W. J. R. Thomas, A.I.E.E., electrical engineer to the St. Pancras Vestry, has been appointed electric inspector at a salary of 200*l.*, rising by 10*l.* per annum to 230*l.* The offices of district surveyors and inspectors have been filled up, after advertisement and careful inquiry, and the committee believe that this department—which has the expenditure of nearly 200,000*l.* per annum, and should therefore, in the interests of economy and efficiency, be properly officered—is now in a better position to carry out its important duties according to

the requirements of modern sanitation. In making these changes the committee have had regard to their cost, and are convinced that the additional cost, if any, will be but slight, while a much more effective service will be insured.

### THE CHELSEA FORESHORE.

AMONGST the schemes before Parliament which in one way or another affect open spaces, that which will perhaps most keenly interest London is, says the *Times*, the Bill of the County Council to extend the Chelsea Embankment from Battersea Bridge to the bridge of the West London Junction Railway. At first sight it would seem that nothing but benefit would arise from the prolongation of so delightful a promenade as the Chelsea Embankment, but there are features of the Council's proposal which are open to serious objection. Above Battersea Bridge the river bank on the Middlesex side describes a wide curve, and in the shallow bight of the Thames thus formed barges sail at high water and cargoes are discharged alongside a wooden jetty. When the water is out there is all the picturesque disorder incident to riverside wharves at low tide, and the broad stretch of wet mud reflects the sun's rays in many colours. Turner's house, of which much was recently said, stands about half-way up the curve, and from the roof where he used to work he must often have studied the varied scene below him. So constantly frequented, indeed, is the spot for artistic purposes that a small garden at the north end of Battersea Bridge has been set aside for sketching. The design of the Council is to carry an embankment wall from this very spot in a straight line to a point near the railway bridge, thus canalising the river on its north side and completely destroying the outline of the natural waterway. The river will be much narrowed, and one would imagine that the effect must be to throw the water at high spring tides on to the Surrey side and thus aggravate the flooding from which the low lands of Lambeth have already suffered. However this may be, the river will certainly be deprived of all beauty of line between the two bridges, and London will lose a picture of much charm. But this is not all. The Council take power to lease for building all surplus lands acquired for the purpose of the embankment. As the total area taken will extend to several acres, and there is no provision for the formation of embankment gardens, or even for the setting out of a road of any prescribed width, there cannot be a doubt that the Council would be entitled to line their

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new embankment with rows of high houses, accentuating the hard line to be given to the river-bank, shutting out from their river view the houses at present standing in Cheyne Walk—amongst them the beautiful Lindsey House—and occupying a considerable area which London now enjoys as an open space. It is really a happy touch of humour that the Council propose to levy a betterment rate on the persons interested in the houses which may thus be thrown into a back street.

It is said that the mud which is so dear to painters is insanitary, and the vestry of Chelsea are, we believe, supporting the Council's proposal on this ground. This is a question which can, of course, only be decided upon evidence; but, even if we assume that there may be good grounds for some embankment, there seems to be no reason why it should be carried in a hard straight line from point to point, and there is every reason why all reclaimed land should be preserved as an open space. The charm of the existing Chelsea Embankment consists in its broad roadway and ample gardens. A similar treatment should be applied to the proposed extension, and not an acre of land now free from building should be covered with bricks and mortar. These are conditions which depend on general principles, and which the House of Commons might reasonably be asked to impose before the Council's Bill goes to a committee.

Amongst other private Bills affecting open spaces the most objectionable is that of the East London Waterworks Company, which contemplates the absorption of 100 acres of Tottenham Marshes for the purpose of reservoirs. The open marshes along the Lea are pre-eminently the playing-fields of London, and should be preserved inviolate. If waterworks are required in the neighbourhood, land in private ownership should be taken for the purpose. The promoters of waterworks, indeed, are now more dangerous enemies to commons than railway companies. The Leeds Corporation, for instance, wishes to put hands on more than a hundred acres, while the total area affected by railway Bills is under fifty. Two of the great companies, the Great Western and the London and North-Western, recognise the sound principle that where the interests of the railway demand that common-land should be taken an equivalent area should be given elsewhere. On the other hand, there are one or two instances in which commons are bisected and thus seriously injured. Parliament has of late years uniformly condemned such proposals, and the Commons Preservation Society may be trusted to see that they do not escape notice.

## SOCIETY OF ENGINEERS.

THE first ordinary meeting of the Society of Engineers for the present year was held on Monday evening, February 1, at the Royal United Service Institution, Whitehall. Mr. Samuel Herbert Cox, the president for 1896, occupied the chair, and presented the premiums awarded for papers read during that year, viz.:—The President's Gold Medal to Mr. George Thudichum, for his paper on "The Ultimate Purification of Sewage;" the Bessemer Premium to Mr. D. B. Butler, for his paper on "The Effect of Admixtures of Kentish Ragstone, &c., upon Portland Cement;" the Rawlinson Premium to Mr. W. G. Wales, for his paper on "Discharging and Storing Grain;" and a Society's Premium to Mr. M. A. Pollard-Urquhart, for his paper on "Examples of Railway Bridges for Branch Lines."

Mr. Cox introduced the president for the present year, Mr. George Maxwell Lawford, to the meeting, and retired from the chair, receiving a hearty and unanimous vote of thanks for his services during the past year.

After briefly reviewing the work of the Society during the past year, the President drew attention to the steady reduction in the general death-rate of this country during the last fifty years and the comparative freedom from zymotic diseases, both of which were attributed to the progress of sanitary science and the impetus given to the practice and study of hygiene by the Public Health and River Pollution Prevention Acts. The provision of pure water and efficient drainage was the duty of the engineer, and on these two subjects, which are of such vital importance to all communities, the President based his address.

After alluding to the discoveries of Pasteur and the influence of biology in its relation to the purification of water, he contrasted the system of lake supplies, as instanced by the water undertakings of Glasgow, Manchester, Liverpool and Birmingham, with the metropolitan supply, which, coming from such polluted sources as the Thames and Lea, was entirely dependent for its bacterial purification on sand filtration. He further contrasted the successful municipal enterprise of the four cities mentioned with the working of the London companies, which are managed solely in the interests of the shareholders, finally expressing the opinion that the London supply should be managed in the consumers' interests by a body from which party and political feeling should be entirely excluded.

A short description was then given of the Zurich waterworks,

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which he had recently visited, and which are of exceptional interest to engineers by reason of the striking example they afford of "the conversion of the great sources of power in nature to the use and service of man," the river flowing from the lake being utilised not only to pump the entire water supply of the town, but to generate both hydraulic power and electricity for lighting, motors and traction. Drainage was then dealt with in its relation to water supply under the three headings of the house, the sewer and the outfall. Special reference was made under the second heading to Mr. Parry Laws and Dr. Andrewes's researches on sewer air and the organisms in flowing sewage, the conclusions arrived at tending to show that both sewer air and sewage were hostile to pathogenic (or disease-producing) organisms. The third heading, the outfall, opened up the great problem of sewage disposal, and after again alluding to the important part played by bacteria in the purification of sewage, the President emphasised the fact that there could be no universal panacea for sewage purification, and that every case must be dealt with entirely on its own merits and with special regard to the local conditions and surroundings. Reference was made to sludge and its disposal, and to the generation of steam power by the utilisation of two hitherto waste products—sludge and domestic refuse in combination with the refuse destructor. In conclusion, the President stated that in his opinion no scheme of water-supply could be considered complete unless it was supplemented by an efficient drainage system, and that by devoting their attention to the hygienic requirements of all classes of the community, engineers contributed their share to the health, and consequently the prosperity, of the nation.

#### ART v. UTILITY.—THE CHICAGO POST OFFICE.

The correspondent of the *American Architect* in Chicago writes:—

The supervising architect for the new post office in Chicago, Mr. Henry Ives Cobb, and Mr. Hesing, the postmaster, seem not to have reached a common understanding about that building. Apparently, from letters exchanged between them, Mr. Hesing has not been consulted by the architect concerning the needs of the post office, which Mr. Hesing is naturally more familiar with than Mr. Cobb. When the latter carried his plans to the Postmaster-General, he refused to accept or endorse them until they had been submitted to Postmaster Hesing and Inspector J. E. Stuart, who has charge of all rents

and leases relating to the postal service. Mr. Cobb returned to Chicago, had several conferences with these two gentlemen, and the above-mentioned letter was the result. As Mr. Hesing's letter has a bearing on the general question of how to plan a post office, it seems worth while to make the following extracts from it:—

"I am compelled to state, from the standpoint of a practical post-office official, that while you have perfectly solved the question of light and ventilation, and have drawn plans for a building that are beautiful and that will be a monument to your genius as an architect from a strictly æsthetic point of view, the interior arrangements as laid out will not at all suffice.

"I realise the great difficulties to be surmounted when you are asked to construct a building that will do, as it were, for a factory and for a residence. As I have always contended, the post office should be in a building devoted solely to post-office purposes, where the entire business could be done on two floors.

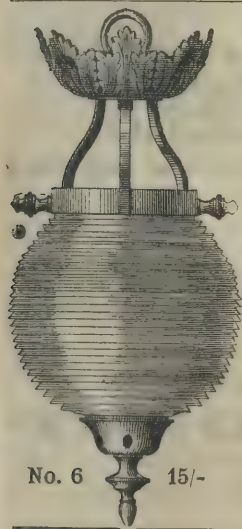
"After a thorough study of the situation I am convinced that to make the best use of the plans submitted by you, the following points must be conceded, and if any one of these points is not conceded, the building, as far as the arrangements of the post-office department are concerned, will be a total failure.

"The points upon which I must insist are:—

"1. The entire first and second floors and a portion of the basement must be given up to the post office to be arranged to suit its necessities. I mean to say by that that this space must be kept absolutely clear of all partitions and obstructions not required for postal business.

"These two floors and basement should be left by you for the time being simply as a great space. You cannot, as an architect, be expected to know what the post-office needs are, nor how it desires to lay out the floor-space. Give that department the space, and it will cheerfully assist in laying it out.

"2. All mail must be received and despatched from the street level, and no mail shall be received or handled in the basement. The very idea of asking a man to work in the basement is itself enough to condemn the plans submitted. It was this fact more than any other that prompted me to take the interest I did in agitating for the erection of the new building. Men should not and must not be expected to do accurate post-office work and quick work in a basement. The basement can be utilised for file-rooms, lockers, cashier's stock-room, supplies, janitor's shops, and postal-card sub-agency.



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See ARCHITECT, December 4 and 11, 1896, pages 359 and 374.

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"3. I insist that the Government should construct this building to suit its business, to satisfy its officials and not to be mutilated to gratify the whims of adjoining property-owners.

"I know that architects are great sticklers for symmetry, but symmetry must sometimes give way to utility.

"4. The railway mail-service, post-office inspectors and Civil Service Board must have convenient quarters above the second-floor and some additional room may be required for the use of the post office proper."

Mr. Hesing further stated, "I have always contended that the Government made a mistake in locating the new building on the old site. But it is too late to change that now, but the interior plans drawn by Mr. Cobb will have to be changed as I refuse to 'O. K.' them.

"I insist that the basement and the first and second floors, which are designated for post-office use, shall be turned over to the practical official in charge of the office, without any walls, rooms, partitions, elevators, or pillars. Then these practical men can divide the space allotted to the service to the best advantage."

The letter is called by one of the papers "friendly, but emphatic," which very accurately describes it, for to say that it breathes a spirit of firm determination is a mild manner of putting it.

### AMERICAN FIRE ESCAPES.

The following regulations for fire escapes have been adopted in Philadelphia:—

In accordance with the Act of Assembly, approved June 3, 1885, and the Ordinance of Councils, approved December 10, 1896, and supplemental thereto, the following formula will govern the matter of the design, construction and erection of all fire escapes hereafter required within the city of Philadelphia.

**Platforms.**—The platforms shall consist of iron balconies not less than 4 feet in width, the length of the platform to be dependent upon the size of the building and the number of its occupants. The inspector of the district will designate the length of such platform, which shall extend in front of, and not less than 9 inches beyond, at least two windows, except in the case of a doorway leading from the floor level of the building to the floor level of the platform, in which case such doorway opening will suffice. Each platform shall be provided with a

landing at the head and foot of each stairway of not less than 24 inches. The stairway opening of the top platform to be no longer than sufficient to provide clear headway. The floors of balconies must be of wrought-iron or steel,  $1\frac{1}{2}$ -inch by  $\frac{5}{8}$ -inch slats, not more than  $1\frac{1}{4}$  inch apart, and be securely rivetted to frame and brackets. Outside angle frame to be not less than  $2\frac{1}{4}$ -inch angle iron. If flooring is made of wire, same to be not less than No. 6 wire gauge,  $\frac{3}{4}$ -inch mesh, securely fastened to frame and brackets. All stair openings to be sufficient to provide clear headway. In all cases platforms must be designed, constructed and erected to safely sustain in all their parts a safe load at a ratio of four to one, of not less than 80 lbs. per square foot of surface.

**Railings.**—The outside top railing to extend around the entire length of the platform and through the wall at each end, and to be properly secured by nuts and washers, or otherwise equally well braced and bolted. The top rail of the balcony must not be less than 1-inch pipe iron, or material equally as strong. The bottom rail must not be less than  $\frac{3}{4}$ -inch pipe iron, or material equally as strong, well leaded into the wall. The standards must be not less than 1-inch pipe iron, or material equally as strong, and must be securely connected with top and bottom rail and platform frame. Standards must also be securely braced by means of outside brackets at suitable intervals. Railings in all cases to extend around the stairway openings, and be continuous down the stairway. The height of the railing to be not less than 3 feet.

**Stairways.**—Stairways must be designed, constructed and erected to safely sustain in all their parts a safe load, at a ratio of four to one, of not less than 100 lbs. per step, with the exception of the tread, which must safely sustain at a ratio of four to one a load of 200 lbs. per tread. The treads to be not less than 6 inches wide and the rise not more than 10 inches. The stairs in all cases to be not less than 24 inches wide, and the strings or horses to be not less than 3 inch channels of iron or steel, or other shape equally as strong, and to rest upon and be fastened to a bracket, said bracket to be fastened through the wall as otherwise provided for brackets. The strings or horses to be also securely fastened to the balcony at the top. The steps in all cases to be double rivetted or bolted to the strings or horses.

**Brackets.**—Brackets must not be less than  $2\frac{1}{4}$ -inch angle iron, or material equally as strong, not more than 3 feet apart, braced by means of not less than 1 inch square, or  $1\frac{1}{4}$ -inch round iron, let into the wall at least 4 inches, with shoulders on brace, and 3-inch washer between shoulder and wall, and to

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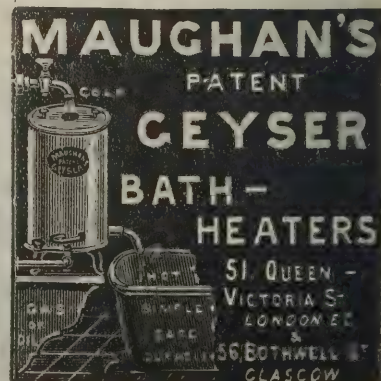
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extend down the wall 4 feet from the top of the bracket and out on the bracket angle 3 feet from the wall. In all cases the bracket angle directly under the balcony must be secured to the wall by means of bolts of suitable size passing through the wall and 4-inch washers. There must also be a bar of wrought-iron or steel, 2 inches by  $\frac{3}{8}$  inch, let into the wall 4 inches edgewise between the brackets and rivetted to the balcony for the floor to rest upon. Whenever the bottom balcony is supported by means of suspension rods (rivetted or bolted) to the balcony above, the brackets (of the above balcony) shall be increased in size to meet the increased strain occasioned thereby. The bottom balcony to have a drop ladder of same construction as the stairway, to be hinged and hung with a counter weight. Whenever the drop ladder is upheld by means of a counter balance weight suspended to a chain, such weight shall hang within the platform railing if practicable.

In all cases the bolts, rivets and other material used shall be proportioned so as to develop the full strength of the members connected by them.

All the parts of such fire escapes must receive not less than two coats of paint—one coat in the shop and one after erection.

### THE TRADE MUSEUM OF NUREMBERG.

IN the report on technical education by Sir P. Magnus and Messrs. Redgrave, Swire Smith and Woodall, M.P., is the following account of the Nuremberg Trade Museum:—

On the occasion of our visit to the Gewerbe Museum, Nuremberg, we were met by Herr L. Erhard, the curator of the mechanical and technical division of the Museum, and Dr. P. J. Ree, the librarian and secretary. Handsome new buildings were nearly completed to replace the old ones in the centre of the town, which have been lately given up. This institution, described by us in our former reports, is somewhat on the model of that of Stuttgart, but contains certain features which are peculiar to it. The director of the Museum is Herr Th. v. Kramer, who is also the architect and director of the exhibition. According to the prospectus the work of this institution is carried on under eight different divisions:—

1. The collection of patterns or samples, which consists of 10,000 specimens of ancient and modern examples of works in wood, metal, glass, clay, leather and paper. Also woven fabrics, embroideries, laces, &c. Certain of these objects can be obtained on loan. This section is really the applied art

museum, as the specimens comprise examples of workmanship from all countries and of the best periods of art.

2. The collection of designs, which consists of some 60,000 sheets of illustrations of art industries of all periods and all nations. These mounted sheets are classified under various heads and arranged in glass cases for easy reference by manufacturers and students. To procure these designs recourse has been had to illustrated works on ornament and art workmanship and to the best serial publications of all countries. Opportunity is afforded for consulting them and for copying them, and the officials undertake to prepare special designs and sketches for fees to be arranged.

3. The library and reading-room contains upwards of 13,000 volumes of art, industrial and technical works, also about 136 journals and periodicals relating to these subjects which are taken in regularly and filed. In connection with this section we noticed an extensive series of foreign directories, trade catalogues and address books of other countries.

All the above departments are open free to the public.

4. The mechanical and technical division may be said to include two chief departments:—

Section I.—The office for specialised trade information relative to:—

(a) Patents, merchandise marks and trade marks. In this section applicants can have patents secured for them at fixed charges, and trade marks can likewise be registered.

(b) For furnishing information of all kinds on motors, machines, tools, raw products and manufactured goods.

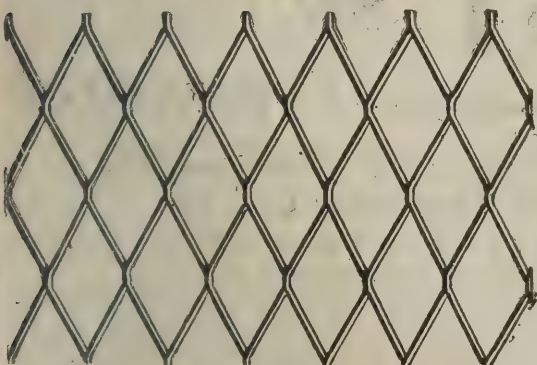
(c) For supplying literary advice and references from technical works. Replies to general technical questions.

Section II.—This constitutes the experimental research department, arranged for the trial and testing of gas, benzine and petroleum motors, steam-engines, water-wheels, turbines and electro motors, as also all labour-saving machinery at agreed charges.

5. The chemical laboratory, which occupies itself with investigations of all kinds relative to technical and industrial chemistry, and further, is prepared to undertake analysis, and to carry out more extensive researches for fees to be arranged. The official testing station for paper is in connection with this branch.

6. A permanent exhibition of modern industry and art. Temporary exhibitions of special departments of manufactures. Distribution of prizes to meritorious exhibitors out of a fund founded by King Ludwig of Bavaria.

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7. Issue of the Bavarian trade journal delivered to subscribers of the institution at the price of 10 marks; to non-members 16 marks per annum. This is the official organ of the Bavarian Industrial Museum.

8. The delivery of public lectures and addresses during the winter months, embracing information on all subjects of art applied to industry and every branch of manufacturing activity. Lectures to the members of allied societies in other towns. Classes for technical drawing for adults engaged in industrial pursuits.

An interesting feature in the activity of this Museum which was brought under our notice was the so-called Gewerbe-Archiv, or factory register, which includes a brief account of all the more important industrial establishments in Bavaria, contributed by the manufacturers themselves on a special form. The particulars given are as follows:—The name and address of the firm; when founded; articles produced; whether special to this undertaking; character of motive power employed; nature of machinery used, and the number of each kind of machine; patents, trade marks, &c., owned by the firm, with indication of registered number, &c., of the same; exhibitions in which the firm have taken part, and prizes and medals awarded. Further, as optional information, the number of workpeople employed and the annual value of productions. Many thousands of manufacturers have already contributed to this register, and every effort is made to keep it up to date and to render it accurate and complete as a record of the whole of the industries of Bavaria.

The assistance in the matter of patents, merchandise marks and trade marks offered by this establishment seems very comprehensive and embraces much of the work done by the patent agent in this country. The payments received in remuneration for these and similar services by the staff are placed to the credit of the Gewerbe Museum, and are employed in amplifying the collections and extending the work of the mechanical and technical sections. We were conducted over the new building and saw the museum-rooms, library and lecture hall. The chemical department will be in a separate building, and it is at present housed in temporary premises. The various departments are well arranged and the Museum is very extensive. The cost so far is upwards of 40,000*l*. The collections at the time of our visit were for the most part stowed away in consequence of the building operations. We were much pleased with the design and fittings of the libraries and museum-rooms, which are admirably adapted to their

purpose, and the building, when finished, will serve as a model for institutions of this character, which appear to be multiplying in Germany. The officials and staff of this Museum have been largely engaged in connection with the Nuremberg exhibition, and to them and to the able director of the Gewerbe Museum, Herr von Kramer, the success of the undertaking is largely due.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

- 1289. Jeshurun Coulthurst, for "Improved means for joining sanitary pipes."
- 1292. Henry Hocking, for "Improvements in liquid supply taps."
- 1299. Carl Erlinghagen, for "Improvements in sheet-iron corrugated roofings."
- 1650. Percy Hugh Pritchett, for "Improvements in stoves or fireplaces."
- 1705. Thomas Smart, for "Improvements in or relating to wire-cutting apparatus for cutting bricks or the like."
- 1785. Alexandre Edmond Thomine, for "Improvements in pipe joints."
- 1805. Samuel Acton, for "A new or improved expansion joint for steam and hot-water pipes, also applicable as an ordinary joint."
- 1815. Edward George Highton, for "Improvements in water-waste preventers for flushing purposes."
- 1839. James Smith, for "Improvements in chimney-pots."
- 1844. Joseph Schoberl, for "Improvements in or relating to smoke-consuming furnaces."

To INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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## Architect and Contract Reporter.

## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page 31.*

## CONTRACTS OPEN.

ABERDEEN.—Feb. 15.—For additions and alterations at the branch asylum. Mr. G. Taylor, clerk of works, Aberdeen Asylum.

ABERTILLERY.—Feb. 17.—For erection of intermediate school. Messrs. Swash & Bain, architects, 3 Friars' Chambers, Newport.

ALPHINGTON.—For restoration of the tower and other work at St. Michael's Church, Alington, near Exeter. Mr. James Jerman, architect, 5 Bedford Circus, Exeter.

ARKHOLME.—Feb. 17.—For erection of chancel and vestries and restoration of church. Messrs. Austin & Paley, architects, Lancaster.

ASHTON-UNDER-LYNE.—Feb. 16.—For erection and extension of workrooms at the workhouse. Mr. B. Seymour, clerk, Stamford Street, Ashton.

BARROWFORD.—Feb. 13.—For erection of a police-station. Mr. H. Littler, 21 Pitt Street, Preston.

BATH.—Feb. 20.—For erection of a corn merchant's shop and stores. Mr. Henry Hookway, solicitor, 15 Old Bond Street, Bath.

BEDFORD.—Feb. 16.—For construction of an underground convenience in Tavistock Street. Mr. T. S. Porter, town clerk, Town Hall, Bedford.

BELFAST.—Feb. 19.—For erection of school buildings and caretaker's house, Ravenhill Road. Messrs. Young & Mackenzie, architects, Donegall Square E., Belfast.

BELFAST.—Feb. 18.—For pulling-down, building and clearing site for new block of offices in Donegall Square West and Wellington Place. Messrs. Young & Mackenzie, architects, Donegall Square E.

BELMONT.—Feb. 15.—For erection of Board school for 235 scholars. Messrs. Bradshaw & Gass, architects, Silverwell Street, Bolton.

BLACKBURN.—Feb. 15.—For erection of shop premises in Simmons Street. Messrs. Simpson & Duckworth, architects, Richmond Chambers, Blackburn.

BLAYDON-ON-TYNE.—Feb. 15.—For pulling-down old and rebuilding new premises at Harper's Ferry Inn, also for building a dwelling-house adjoining. Mr. T. C. Nicholson, architect and surveyor, Blaydon-on-Tyne.

BLAYDON-ON-TYNE.—Feb. 15.—For pulling-down old and rebuilding new premises at the Station Hotel. Mr. T. C. Nicholson, architect and surveyor, Blaydon-on-Tyne.

BRENTFORD.—Feb. 16.—For erection of a fire station in High Street, and a mortuary at the Town Meadow. Mr. Nowell Parr, engineer, Clifden House, Boston Road, Brentford.

BRENTWOOD.—Feb. 20.—For renewing the roof and various works of improvement at the Congregational Church. Mr. Wm. Richardson, High Street, Brentwood.

BRIDLINGTON.—Feb. 15.—For erection of a lavatory at the corner of Queen Street and Ship Hill. Mr. Chas. Gray, clerk, Bridlington.

BRISTOL.—Feb. 22.—For erection of a new school at Fairfield Road, Montpelier. Mr. W. L. Bernard, 3 St. Stephen's Chambers, Baldwin Street, Bristol.

BRECONSHIRE.—Feb. 27.—For erection of a parish church, Brynmawr. Messrs. Nicholson & Hartree, architects, Hereford.

BURNLEY.—March 6.—For erection of an infectious diseases hospital at Kibble Bank. Mr. F. S. Button, Blannel Street, Burnley.

CARDIFF.—Feb. 15.—For erection of residence and stables at Fairwater. Mr. Edwin T. Jones, architect and surveyor, Caledonian Chambers, St. Mary Street, Cardiff.

CARLISLE.—Feb. 17.—For erection of two houses in Warwick Road. Mr. W. Batey, Crescent Joinery Works, Carlisle.

CASTLEFORD.—Feb. 13.—For erection and completion of a house and workshop, Smawthorne Lane, and for painting and decorating of the Wesleyan Chapel, Whitwood. Mr. George F. Pennington, architect, Bridge Street, Castleford.

CELBRIDGE (IRELAND).—Feb. 19.—For erection of labourers' cottages, one at Rathcoole, two at Tootenhill. Mr. Samuel Manning, executive sanitary officer.

CLAYTON.—For erection of semi-detached villas at Chri-shaben Park. Messrs. H. & E. Marten, 5 and 7 Charles Street, Bradford.

COCKERMOUTH.—Feb. 20.—For erection and completion of gate lodge and museum in Fitz Park. Mr. Thos. Hodgson, Station Road.

COLCHESTER.—For erection of pair of semi-detached villas in Cressfield Road. Mr. J. W. Start, architect, Colchester.

COMBS.—Feb. 19.—For erection of six cottages on the Needham Road. Mr. Henry Geo. Bishop, architect, Market Place, Stowmarket.

CORNWALL.—Feb. 13.—For erection of a boys' school at Fowey. Mr. S. Trevel, architect, Lemon Street, Truro.

CORNWALL.—Feb. 14.—For erection of villa residence at Gulval. Mr. Oliver Caldwell, architect, Penzance.

COVENTRY.—Feb. 13.—For erection of a small-pox hospital at Pinley, near the city. Messrs. G. & I. Steane, architects, Little Park Street, Coventry.

CREWE.—Feb. 18.—For rebuilding club, Edleston Road. Mr. J. F. Marsden, secretary, 139 Walthall Street, Crewe.

CULMINGTON.—March 1.—For the restoration of church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

DEWSBURY.—Feb. 17.—For the enlargement and alteration of Trinity Congregational Church. Messrs. John Kirk & Sons, architects, Dewsbury.

DEWSBURY.—Feb. 24.—For erection of hoist and covered way at warehouse, Wellington Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DUKINFIELD.—For erection of thirty-two houses in Park Road. Mr. Sidney Stott, architect, York Chambers, Oldham.

DURHAM.—Feb. 18.—For building eight-roomed house at Langley Moor. Mr. George Rhymer, Tudhoe Colliery.

EXETER.—Feb. 16.—For erecting and general fitting-up of the exhibition yard, Mount Pleasant, for the committee of the Exeter Horse Show Society. Mr. W. S. Croote, architect, 93 Paris Street, Exeter.

FALMOUTH.—Feb. 17.—For erection of a boys' school at Wellington Terrace. Mr. Swift, architect, Lemon Street, Truro.

FALMOUTH.—Feb. 22.—For the restoration of Falmouth parish church. Mr. Edmund Sedding, architect, Plymouth.

FARNHAM.—For erection of three pairs of semi-detached cottages at Badshot Lea. Messrs. Nash & Son, architects, Farnham.

FARNHAM.—Feb. 13.—For erection of a stone wall and iron fencing for enclosing the frontage of the new ground at the cemetery. Mr. Sidney Stapley, architect, West Street, Farnham.

FISHGUARD.—Feb. 17.—For erection of a dwelling-house at Fishguard, Pem. Mr. Ernest Collier, architect, 4 Quay Street, Carmarthen.

GOSPORT.—For alterations at workhouse in Park Road. Mr. H. A. F. Smith, architect, Star Chambers, High Street, Gosport.



GREAT YARMOUTH.—Feb. 13.—For erection of two houses, The Cliffs, Gorleston. Mr. Wm. B. Cockrill, architect and surveyor, Gorleston, Great Yarmouth.

GREENWICH.—Feb. 17.—For construction of an underground public convenience and lavatory at New Cross Gate. Mr. J. Spencer, clerk, 141 Greenwich Road, Greenwich.

HALIFAX.—Feb. 15.—For erection of Liberal club. Mr. Medley Hall, architect, 29 Northgate, Halifax.

HORTON.—Feb. 22.—For the foundations of the seventh county lunatic asylum, to be erected on the Horton Estate, Surrey, for the asylums committee of the London County Council. Mr. G. T. Hine, architect, 35 Parliament Street, S.W.

IRELAND.—Feb. 15.—For erection and completion of a schoolhouse at Meenatale, near Ramelton. Rev. Thomas Slevin, P.P., Ramelton.

IRELAND.—Feb. 18.—For erection of two staircases, additional buildings, &c., at workhouse. Mr. Richard Evans, 53 South Mall, Cork.

IRELAND.—Feb. 24.—For erection of a dispensary house and medical officer's residence, for the Guardians of Athy Union. Mr. T. P. Orford, clerk, Board-room, Workhouse, Athy.

IRELAND.—Feb. 27.—For the renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

IRELAND.—For erection of new wing, Longford County Infirmary. The County Surveyor, Longford.

KENDAL.—Feb. 15.—For pulling-down the old and rebuilding new schools at Selside. Mr. John Hutton, architect and sanitary engineer.

KENDAL.—Feb. 18.—For pulling-down shops and dwelling-houses in Little Capper, Stricklandgate, and the erection of a corner shop, renovating seven cottages, remodelling Dr. Parker's house, erecting boundary walls, &c. Mr. John Stalker, architect, Kendal.

KENDAL.—Feb. 20.—For extensions to Netherfield Works. Mr. Robert Walker, architect, &c., Windermere.

LANGTHORPE.—Feb. 22.—For erection of four cottages. Mr. Seth Shaw, clerk to Parish Council.

LIMERICK.—Feb. 20.—For additions and alterations in convent. Mr. William E. Corbett, 28. Glentworth Street, Limerick

LONDON.—Feb. 12.—For pulling-down the present board-room, offices, stores, and for erection of iron and glass roof and for paving to extension of the market. Messrs. H. Jarvis & Son, 29 Trinity Square, Southwark.

LONDONDERRY.—March 1.—For additions to, repair, and alterations in the County Court House. Mr. A. C. Adair, architect, Londonderry.

MOGDEN.—Feb. 26.—For erection of an isolation hospital and other buildings in connection therewith. Mr. W. J. Ancell, architect, 3 Staple Inn, London.

MORPETH.—Feb. 12.—For alterations and extensions of the laundry at the County Lunatic Asylum, Morpeth, for the Northumberland County Council. Mr. John Cresswell, county architect, Moot Hall, Newcastle-on-Tyne.

NEWPORT.—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

ORPINGTON.—Feb. 16.—For additions to the Board schools at Chislehurst Road. Mr. George St. Pierre Harris, architect, 8 Ironmonger Lane, E.C.

RAINHILL.—Feb. 19.—For additions and alterations to wards 10 and 11, main building, county asylum. Mr. Jas. Gornall, acting clerk, Rainhill.

SCOTLAND.—March 6.—For erection of a school at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

SHEFFIELD.—Feb. 13.—For additions to the infants' and girls' departments at Springfield School. Mr. C. J. Innocent, 17 George Street, Sheffield.

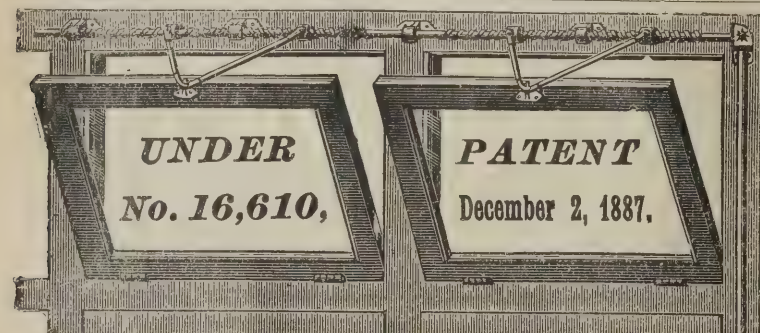
SHIPLEY.—Feb. 13.—For erection of wool-combing works, shed, warehouse, chimney, &c. Messrs. Walker & Collinson, architects, 227 Swan Arcade, Bradford.

SHROPSHIRE.—March 1.—For restoration of Culmington Church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

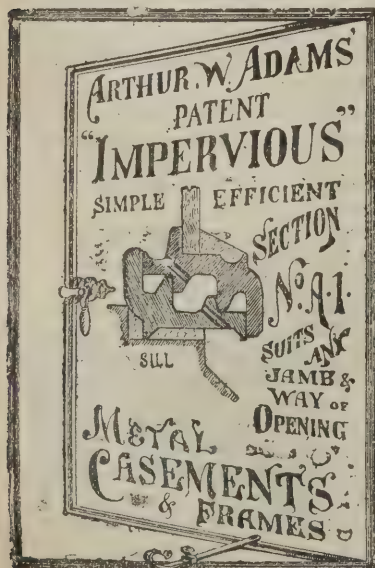
STEEPLE GIDDING.—Feb. 15.—For erection of a farm-house. Mr. Noel Villiers, 15 Great George Street, Westminster.

SURREY.—Feb. 22.—For foundations of the seventh county lunatic asylum, to be erected on the Horton Estate, Surrey. Mr. G. T. Hine, architect, 35 Parliament Street, S.W.

SWANWICK.—Feb. 12.—For erection of a dwelling-house at Swanwick. Mr. R. Argile, architect.



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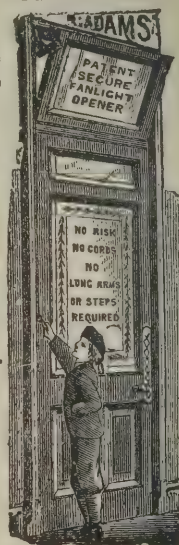
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TAUNTON.—March 1.—For erection of public closets and urinals in Castle Green. Mr. James H. Smith, borough surveyor, Municipal Buildings, Corporation Street.

WALES.—Feb. 12.—For erection of the Llandyssul intermediate schools. Mr. John H. Phillips, architect, St. John's Chambers, Cardiff.

WALES.—Feb. 17.—For enlargement of Congregational chapel, Aberayron. Rev. T. Gwilym Evans, pastor.

WALES.—Feb. 15.—For erection of a school to accommodate 200 children at Cwmtillery, near Abertillery, Mon., and for erection of two classrooms and extensions of cloakrooms to the Nantyglo School and renovation of caretaker's cottage. Mr. George Rosser, architect, Victoria Buildings, Abercarn.

WALES.—Feb. 15.—For erection of a school at Gilfach-fargoed, near Bargoed. Messrs. James & Morgan, architects, Charles Street Chambers, Cardiff.

WALES.—Feb. 13.—For erection of three dwelling-houses at Cesarea. Mr. O. J. Roberts, Bodfeurig, Upper Llandwrog.

## TENDERS.

### ALDERSHOT.

For carrying-out sewerage works in Lower Farnham Road and Church Road. Mr. Banks Rushford, surveyor.

Lee & Son . . . £299 0 0  
T. TURNER, Blackwater, Hants (accepted) . . . 262 19 0

### ALFRETON.

For erection of public urinals. Mr. E. Houghton, surveyor, Council Offices, Alfreton.

J. Roe & Sons . . . £196 8 11  
F. LEE, Nottingham Road (accepted) . . . 176 0 0

### ASHTON-UNDER-LYNE.

For taking-down and rebuilding the Red Lion Hotel. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

For all Trades except Plumbing and Glazing.

GARSDIE, BARNES & CO., Stalybridge (accepted).

Plumbing and Glazing.

G. H. COOP, Stamford Street, Ashton-under-Lyne (accepted).

Eight tenders for each department were received.

### ASHTON-UNDER-LYNE—continued.

For erection of hotel in Market Place. Messrs. JOHN EATON, SONS & CANTRELL, architects, Ashton-under-Lyne.

Accepted Tenders.

J. Ridyard, Railway Sawmills, general work, £4,300.  
G. H. Coop, Stamford Street, plumbing and glazing, £530.

### BIRKENHEAD.

For erection of an additional ward pavilion in connection with the infectious diseases hospital at Flaybrick Hill. Mr. CHARLES BROWNIDGE, borough surveyor.

R. ALLEN, Birkenhead (accepted) . . . £1,725 0 0

### BIRMINGHAM.

For alterations and improvements to the Bloomsbury School.

SAPCOTE & SON, Birmingham (accepted) . . . £2,878 0 0

### BRADFORD.

For erection of stables and coach-house in Morley Street. Messrs. EMPSALL & CLARKSON, Architects, 7 Exchange, Bradford.

Accepted tenders.

J. Moulton & Sons, mason and joiner.

R. Townend, plumber.

T. Cordingley & Sons, plasterer.

J. Smithies, slater.

J. Roome, painter.

Total, 756l.

### BROMLEY.

For erection of refuse-destructor buildings and cart-sheds, stores, &c.

Beaman & Deas . . . £10,044 0 0

Manlove, Alliott & Co. . . . . 8,734 1 0

GODDARD, MASSEY & WARNER, Nottingham

(accepted) . . . . . 7,998 14 0

### CARDIGANSHIRE.

For erection of a farmstead for Mr. Titus Evans, Llanwnen.

Mr. DAVID JENKINS, architect, Llandilo.

DAVID EVANS, Llwynbedw, Llanybyther, R.S.O.

(accepted) . . . . . £780 0 0

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For construction of about three miles of tramways. Mr. H. E. STILGOE, borough engineer.

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Mowlem & Co. . . . .	14,608	16	4
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Pauling & Co., Limited . . . . .	13,499	1	4
J. Dickson . . . . .	13,162	14	7
W. Griffiths . . . . .	12,738	3	9
Dick, Kerr & Co. . . . .	12,719	19	7
W. Wadey . . . . .	12,499	8	0
W. L. Meredith . . . . .	12,470	15	10
A. Brunton & Son . . . . .	11,796	13	7
H. Hill . . . . .	11,794	6	0
E. Nicholls . . . . .	11,594	17	1
J. J. BRIGGS, Blackburn (accepted) . . . . .	9,729	14	1
Engineer's estimate . . . . .	12,075	0	0

## HARROW.

For making-up Amersham, Springfield, St. Kilda's and Oakley Roads. Mr. T. CHARLES, surveyor.

## Amersham Road.

T. Free & Sons . . . . .	£478	14	0
Parsons & Taylor . . . . .	458	13	8
H. DRURY, Wealdstone (accepted) . . . . .	425	14	9
Surveyor's estimate . . . . .	480	8	10

## Springfield Road.

Parsons & Taylor . . . . .	715	14	7
T. Free & Sons . . . . .	630	1	0
H. DRURY (accepted) . . . . .	582	0	5
Surveyor's estimate . . . . .	667	6	11

## HARROW—continued.

## St. Kilda's Road.

Parsons & Taylor . . . . .	£486	13	8
T. Free & Sons . . . . .	463	13	4
H. DRURY (accepted) . . . . .	442	4	11
Surveyor's estimate . . . . .	496	11	3

## Oakley Road.

Parsons & Taylor . . . . .	431	9	1
T. Free & Sons . . . . .	344	11	11
H. DRURY (accepted) . . . . .	288	10	3
Surveyor's estimate . . . . .	367	6	6

## HASTINGS.

For additions to the public convenience, White Rock, Hastings, for the Corporation. Mr. PHILIP H. PALMER, borough engineer.

J. GEARY, Bohemia Road (accepted) . . . . . £290 0 0

For alterations and additions to an engine and boiler-house in Waterworks Road. Mr. PHILIP H. PALMER, borough engineer.

H. DITCH, High Street (accepted) . . . . . £653 0 0

## ISLE OF WIGHT.

For construction of a gasholder tank in brickwork at the Gasworks, Cowes. Mr. CORBETT WOODALL, engineer, Palace Chambers, Bridge Street, Westminster, S.W.

J. AIRD & SON, London (accepted) . . . . . £1,660 0 0

## KENSAL GREEN.

For erection of school for 1,270 children, laundry and cooking centre and caretaker's house, for Willesden School Board. Mr. G. E. T. LAURENCE, architect, 181 Queen Victoria Street, E.C. Quantities prepared by Mr. ALAN PAULL, 6 Quality Court, Chancery Lane, W.C.

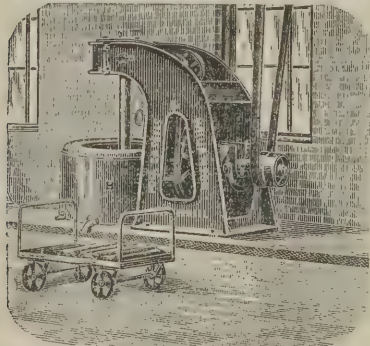
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Cowley & Drake . . . . .	18,250	0	0	665	0	0
W. Scrivener & Co. . . . .	18,236	0	0	725	0	0
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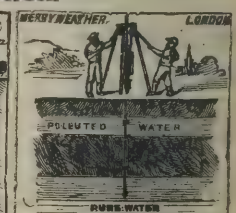
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For formation of a new entrance gateway, &c. Mr. J. PARKINSON, architect, 67 Church Street, Lancaster.

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A. Vipond, joiner.  
Calvert & Heald, plumber.  
Total, £60 8s. 6d.

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THOMAS BROTHERS, Llandilo (accepted) . . . . . £600 0 0

For erection of a residence for Mr. R. Shipley Lewis. Mr. DAVID JENKINS, architect.

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G. Mainwaring . . . . . 1,250 0 0  
David Evans . . . . . 1,200 0 0  
THOMAS BROTHERS, Llandilo (accepted) . . . . . 1,200 0 0  
Henry Price (coals and wood not included) . . . . . 1,150 0 0

For erection of a post office at Rhosmaen Street. Mr. DAVID JENKINS, architect.

G. Mainwaring . . . . . £1,010 0 0  
Lewis Davies . . . . . 1,002 0 0  
J. & D. Jones . . . . . 935 0 0  
Thomas Brothers . . . . . 825 0 0  
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W. Griffiths . . . . . 1,013 0 9  
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*Glebe Road.*

Williamson & Sons, Limited . . . . . 899 10 1  
W. Griffiths . . . . . 891 16 3  
T. ADAMS (accepted) . . . . . 874 12 5

*Elder Avenue.*

Williamson & Sons, Limited . . . . . 736 12 11  
W. Griffiths . . . . . 717 5 2  
T. ADAMS (accepted) . . . . . 710 4 7

For erection of a block of residential mansions in North Street Belgravia. Mr. E. J. SADGROVE, architect, 22 Surrey Street, Strand, London, W.C. Quantities by Mr. W. H. ELSMORE, Castlenau, Barnes, S.W.

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McCormick & Sons . . . . .	1,256 12 5	25 12 0
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G. Neal . . . . .	1,224 6 8	28 16 4
Cowley & Drake . . . . .	1,206 0 0	25 12 0
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E. Triggs . . . . .	1,333 0 0
Stimpson & Co. . . . .	1,330 0 0
R. A. Yerbury & Sons . . . . .	1,310 0 0
Cowley & Drake * . . . .	1,265 0 0

For removing three iron buildings and offices from Page's Walk and re-erecting them in Deodar Road.

James Mitson . . . . .	£1,388 9 4
T. Cruwys . . . . .	980 0 0
Humphreys, Limited . . . . .	937 0 0
W. Harbrow . . . . .	867 0 0
CROGGON & CO., LIMITED (accepted) . . . . .	775 0 0

\* Recommended for acceptance.

**LONG BUCKBY.**

For excavating for and building brick gasholder tank, for the Long Buckby Gas and Coke Company, Limited.

C. HAYNES, Long Buckby (accepted) . . . . .	£202 15 0
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**LOSTWITHIEL.**

For erection of four private dwelling-houses at Lostwithiel, for Messrs. Liddicoat. Mr. WILLIAM J. JENKINS, architect, Bodmin.

BASSETT BROS., Lostwithiel (accepted) . . . . .	£2,695 0 0
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**MARKET RASEN.**

For erection of a Wesleyan chapel and schools at Osgodby, near Market Rasen. Mr. FRED. W. DIXON, architect, Trevelyan Buildings, Manchester.

J. M. THOMPSON & SONS, Louth (accepted) . . . . .	£655 0 0
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**MEXBOROUGH.**

For making-up streets in Hall Gate and Cross Gate. Mr. G. F. CARTER, surveyor.

**Hall Gate.**

W. Hobson . . . . .	£417 13 6
C. A. Walker . . . . .	403 8 2
G. Eyre . . . . .	380 0 0
F. EYRE, Sheffield (accepted) . . . . .	343 11 10

**Cross Gate.**

W. Hobson . . . . .	316 0 11
C. A. Walker . . . . .	301 6 8
G. Eyre . . . . .	281 0 0
F. EYRE (accepted) . . . . .	267 6 0

**MORLEY.**

For erection of a pair of semi-detached villas in Park Street, Mr. T. A. BUTTERY, architect, Queen Street, Morley.

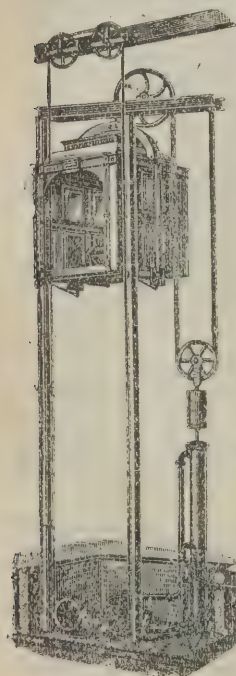
**Accepted tenders.**

J. & J. Sugden, mason.  
N. Holroyd, joiner.  
W. Sissons, plumber.  
E. Wilson, plasterer.  
J. Atkinson & Son, slater.

**NEW BROMPTON.**

For erection of villa in Balmoral Road, New Brompton, for Mr. F. Pierson. Mr. E. J. HAMMOND, architect, New Brompton.

J. H. Park, New Brompton . . . . .	£507 0 0
J. L. Truman, Chatham . . . . .	460 0 0
H. Harris, Gillingham . . . . .	395 0 0
F. A. Hammond, New Brompton . . . . .	375 10 0
C. E. SKINNER, Chatham (accepted) . . . . .	335 0 0

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with doors, fittings, &c., and can be placed in lift with handle  
removed. Particulars and Estimates on application to Sole  
Manufacturers, J. REAP & CO., Engineers, Ironfounders, and  
Pattern Makers, 16 Coinbrook Street, Southwark, S.E.



**NEWPORT.**

For erection of a footbridge from William Street to Courtybella Terrace. Mr. R. H. HAYNES, borough engineer.			
Thames Ironworks and Shipbuilding Co.	£683	13	6
Isca Foundry Co.	626	2	6
J. S. ELLIS & Co., Chepstow ( <i>accepted</i> )	562	16	10
Borough engineer's estimate	570	0	0

**NORWICH.**

For sewerage and making-up Quebec Road, Norwich. Mr. ARTHUR E. COLLINS, city engineer, architect and surveyor.			
W. J. Botterill	£965	0	0
T. H. Blyth	877	0	0
Downing & Son	733	0	0
W. A. Read	675	0	0
C. Rackham	650	0	0
A. C. W. & C. Hobman, Bermondsey*	616	0	0

\* Recommended for acceptance.

**PORT SUNLIGHT.**

For erection of a block of three cottages, for Messrs. Lever Bros. Messrs. WILSON & TALBOT, architects, Liverpool. ARTHUR HULSE, Chester ( <i>accepted</i> ).			
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**SCOTLAND.**

For extension to Cullen and Cullen House Waterworks. Mr. GEORGE ROSS, burgh surveyor.			
J. Grant	£816	11	0
Campbell Bros.	765	12	0
J. Barclay	751	11	0
W. BEVERIDGE, Cullen ( <i>accepted</i> )	748	7	0
G. Mair	295	0	0
J. Bremner	240	0	0
For construction of two miles of additional sewers and other works in connection therewith at Gullane. Messrs. THOMSON & WRIGHT, engineers, 22 Rutland Place, Edinburgh.			
A. Waddell & Son	£1,687	4	11
A. Fraser	1,014	17	2
J. Morris & Sons	876	2	7
J. Martin	847	19	2
R. Wallace	828	10	0
L. KELLY, Edinburgh ( <i>accepted</i> )	784	10	7

**SCOTLAND—continued.**

For erection of waiting-rooms, pay offices and entrance gateways at Dunoon Pier. Mr. W. R. COPLAND, engineer, 145 West Regent Street, Glasgow.			
J. Baxter	£3,579	2	5
M. Henderson	3,254	10	3
J. Black	3,218	0	3
T. Young	3,164	6	5
Miller & Co.	3,043	10	0
Guthrie & Co.	2,941	0	0
E. C. Morgan & Sons	2,927	12	10
W. Adam	2,848	4	10
Lawson & Co.	2,796	7	9
J. DRUMMOND, Kilm, Dunoon ( <i>accepted</i> )	2,963	13	4

**SKEGNESS.**

For erection of a bungalow on Victoria Promenade. Mr. JAMES ROWELL, architect, Boston.			
J. Crawshaw	£553	0	0
Hill & Son and Pinder & Son	490	0	0
S. Sherwin	481	0	0
G. Dunkley	472	10	0
C. Jessop	465	0	0
J. Comer	437	0	0
H. W. PARKER, Boston ( <i>accepted</i> )	430	10	0

**SKELMANTHORPE.**

For erection of an engine-house and weaving-shed. Messrs. JOHN KIRK & SONS, architects, Huddersfield.			
<i>Accepted tenders.</i>			
G. Hinchliff & Son, Clayton West, mason.			
Lawson, Skelmanthorpe, joiner.			
Jessop & Son, Shipley, plasterer and painter.			
C. Armitage, Skelmanthorpe, plumber.			
T. B. Tunnacliffe, Huddersfield, slater.			

**ST. ANNE'S-ON-SEA.**

For providing and laying about 693 yards of Hassall's patent pipes, with manholes, &c. Mr. HENRY BANCROFT, civil engineer, 88 Mosley Street, Manchester.			
J. Schofield & Sons	£965	11	0
J. Farrell	885	2	6
E. Tempest	717	4	2
J. DALE, Northwich ( <i>accepted</i> )	698	1	8

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T. Smart	£1,620	0	0
W. Walkerdine	1,500	0	0
W. Binns	1,299	14	8
H. Arnold & Sons	1,266	0	0
J. H. Vickers, Limited	1,195	0	0
J. GREENWOOD, Wood Street, Mansfield (accepted)	1,150	0	0

## TOTTENHAM.

For making-up roads.

## Accepted tenders.

A. T. Catley, Ruskin Road, £245 ; Allison Road, £719.
T. Adams, Crescent Road, £338 ; Eagle Avenue, £241.
G. J. Anderson, Tiverton Road, £1,145.

## WALSALL.

For erection of two houses, Westbourne Road. Messrs. HICKTON &amp; FARMER, architects.

Summerhill	£850	0	0
Mallin	820	0	0
Lees	810	0	0
Harris	797	0	0
Hammond	780	0	0
Teece	770	0	0

For erection of new warehouse, Park Street. Messrs. HICKTON &amp; FARMER, architects.

Hammond	£1,090	0	0
Mallin	1,030	0	0
Kendrick	1,027	0	0
Guest	1,025	0	0
Wootton	1,015	0	0
Wistance	999	0	0
Lynex	989	0	0
Tildesley	949	0	0
M. HUGHES (accepted)	947	0	0

## WELLINGTON.

For carrying-out works of drainage at Snedshill.

W. & J. Machin	£126	16	0
J. Picken	116	0	0
J. Brown	114	0	0
MILLINGTON & Co. (accepted)	110	10	0

## WIMBLEDON.

For erection of five cottages in Hubert Road. Mr. Wm.

COOPER, architect, 21 Havelock Road, Hastings.	£2,284	0	0
General Builders, Limited	2,206	0	0
H. Ray	2,196	0	0
T. L. Fearon	2,087	0	0
Lord & Son	2,080	0	0
Dockerill & Son	2,049	0	0
C. Fryer	1,941	0	0
G. Burrage	1,850	0	0
J. Burges	1,793	0	0
J. Julian & Co.	1,762	10	0
W. Greenfield	1,760	0	0
S. Boothman	1,630	0	0
F. Doabell & Co.	1,590	0	0
H. Brown			

## VARIETIES.

A SCAFFOLD accident occurred at the Ayresome Ironworks, Middlesborough, on the 4th inst. Eight men were thrown to the ground a distance of nearly 30 feet. Four are somewhat seriously injured.

GRINTON CHURCH, Swaledale, has been restored at a cost amounting to very nearly 3,000l.

A NEW Congregational church is to be erected at Poulton-le-Fylde to supersede a building erected in 1809.

THE office of Mr. H. W. Chattaway, Trinity Churchyard, Coventry, was greatly damaged by fire in the early morning of the 4th inst.

DURING the progress of boring for water on the Great Northern Railway premises at Sleaford, a spring was struck yielding 14,400 gallons per hour.

THE Emperor of Russia has presented a photograph of the Imperial family to each of the sixteen girls who, on his laying the foundation-stone of the new Paris bridge, presented him with a silver vase containing orchids.

THE Pupil Teachers' School, Cardiff, was opened by Mr. T. E. Ellis, M.P., on the 3rd inst. The buildings are adjacent to the Higher Grade Schools, and have been erected by Messrs. W. Thomas & Co. from designs prepared by the architects, Messrs. J. P. Jones, Richards & Budgen.

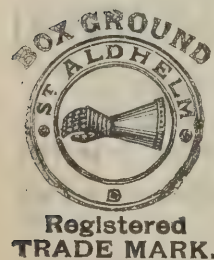
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ACTIVE preparations are being made at the Windsor Station of the Great Western Railway for the erection of the "Queen's Room" of the new terminus, which is to be finished before June, in readiness for the use of Her Majesty when proceeding to and returning from London during the Jubilee commemoration.

THE Bury Town Council have ratified the resolution retaining the services of Mr. Cartwright, borough engineer, who has applied for a position at Sheffield. They agreed to pay 750*l.* for his services in constructing the reservoir and sewage works, granted him a limited private practice and consented to his retaining his present position for two years at least at 600*l.* per annum, and then to be consulting engineer for three years at 250*l.* per annum.

THE trustees of the Primitive Methodist Chapel, New Brompton, Kent, have approved of sketch plans for new chapel and Sunday schools to be built upon the site where existing iron church stands (Gillingham Road), and have instructed their architect (Mr. E. J. Hammond, New Brompton) to proceed with the plans and specification forthwith.

AT a meeting of the Edinburgh Architectural Society, held on the 3rd inst. in Dowell's Rooms—Mr. W. N. Cumming, vice-president, in the chair—a lecture entitled "Pre-Conquest Stone-carving in Northumbria" was delivered by Mr. D. J. Vallance, curator of the Edinburgh Museum of Science and Art, and illustrated by limelight views. There was a good attendance.

IN the course of some excavations which were being made in Waller Street, Luton, the workmen came across two bricked cavities, extending about five feet beneath the pavement. The floor of one is laid with dark-blue tiles, and the arched roof is covered with red tiles and bricks. On the floor were found a quantity of bones and cows' horns, as though the spot had been a place for the disposal of refuse. It is computed that the tiles, cement and bricks are at least 1,000 years old, and the cavity is believed to be a hypocaust, or an oven, which was in use at the time of the Roman occupation.

16,500*l.* is the amount of damages awarded in the London Under-Sheriff's Court in respect to the compulsory acquirement of the freehold of Nos. 80 and 81 Strand, for the purpose of the Hôtel Cecil's approaches and of the Strand improvement scheme.

TWO altars, which have recently been erected in the handsome new church of St. Bridget, Bevington Hill, were

inaugurated on Sunday morning the 7th inst. The high altar, which is dedicated to St. Bridget, consists of a plain alabaster table resting on steps of St. Anne's marble. From the table rises to a considerable height a handsomely wrought reredos, in which are inserted sculptured panels showing scenes from the life of St. Bridget. In the centre is placed a massive tabernacle of Caen stone, and at either side are niches intended for the reception of statues of Saints Patrick and Columbkille. The lady altar, though not so large, is also a pretty piece of workmanship.

THE parish church of Irvine was reopened on the 7th inst. for public worship. The whole of the seats in the area and four of the older sections of the gallery have been renewed and the church has been otherwise modernised. The porches which projected into the interior have been cleared away, the stairs leading to the galleries have been partitioned off, and are now only indicated by sets of three-light windows filled with tinted cathedral glass, and the pews to right and left of the organ have been moved out some distance from the wall, placing the congregation in that part of the church more within range of the pulpit. The parish church of Irvine was built in the year 1774.

THE extensive additions to the Johnstone Combination Hospital, which have been carried out to the plans of Mr. J. L. Cowan, architect, Wellington Street, Glasgow, were opened for public inspection on Saturday, the 6th inst. The cost of extension so far as completed, with auxiliary plant, machinery, &c., will reach about 4,000*l.*, while it will take about another 1,000*l.* to complete improvements yet unfinished. The new block added embraces three wards, and a wing of the present hospital has been greatly enlarged. The whole work has been carried out with all modern improvements adapted for the thorough equipment of an infectious hospital. The drainage has been dealt with in a thorough fashion by filtration, and a laundry has been added, and also a discharge block for patients. In eight days the wards will be ready for occupation, and the work carried out now will provide ample hospital accommodation, it is expected, for the districts of Johnstone, Kilbarchan, Houston, Linwood, Kilmalcolm, Lochwinnoch and other parts for many years to come. An additional acre of ground has been enclosed, and the grounds are being tastefully laid off. The contractors were:—Messrs. Keanie & Co.; Purdon & Cuthbertson; Marshall, Kilbarchan; M'Queanie, Glasgow; Cormack & Sons, Glasgow; M'Connell, Johnstone; Tullis & Co., Clydebank.

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## ILLUSTRATIONS.

ELY CATHEDRAL.—NORTH AISLE, LOOKING WEST.

THE APSE AT CHRIST CHURCH, CHELTENHAM.

THE CHANCEL PAINTINGS AT SS. PHILIP AND JAMES,  
UPPER HATHERLEY, NEAR CHELTENHAM.

ALTAR SCREEN, ST. SAVIOUR'S, SOUTHWARK.

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## TRADE NOTES.

THE well known and established business of Messrs. W. Gradwell & Co., timber and stone merchants, of Barrow-in-Furness, is being brought out as a limited company. Six hundred and forty 6 per cent. cumulative preference shares of 10s. each are offered to the public. The certificate of Messrs. W. B. Peat & Co., chartered accountants, of Barrow-in-Furness, shows that a very satisfactory profit has been made during the last seven years. Mr. W. Gradwell has agreed to act as managing director for the next five years.

THE new schools, Barry Dock, are being warmed and ventilated by means of Shorland's patent Manchester grates, the same being supplied by Messrs. E. H. Shorland & Brother, of Manchester.

## ELECTRIC NOTES.

MESSRS. JOHN DEWAR & SONS, LIMITED, of whisky renown, have now direct communication by telephone between their London office in Lime Street and their Perth office in Glasgow Road.

WE hear with regret of the death of Mr. John Faulkner, who died in his seventy-fourth year on the 7th inst. at his residence in Strangeways. He had been connected with electric science for upwards of sixty years. He attended the lectures at the Victoria Gallery, Manchester, under James William Sturgeon. He was one of the first to introduce a perfect system of conductors for the protection of buildings from lightning. His "electric kite" was applied in early days to high steeples and tall chimneys. One of his earliest applications of electricity was made in connection with signals and bells for coal mines.

In 1875 he invented improved electric magnetic telegraph sounders and bells. One of these sounders was adopted by Professor Bell in his earliest telephonic experiments, and was first exhibited at the Centennial Exhibition at Philadelphia in 1876.

## BUILDING AND BUILDERS.

THE Hon. Walter Rothschild will lay the foundation-stone of the South Hackney Synagogue and classrooms, which are being erected from the designs of Mr. Delissa Joseph, on the 14th inst.

THE Leeds Church Extension Society have secured a site at a cost of £450 for a proposed new church on the Victoria Park Estate, midway between the churches of Bramley and Kirkstall.

THE new theatre at Deptford will be one of the largest in the Metropolis, and the plans have been prepared by Mr. W. G. R. Sprague, the architect of several of the latest suburban and provincial theatres. The work of clearing the site has commenced, and the theatre is expected to be ready by next October. The cost of the building and site will be 45,000s.

THE foundation-stone of the new masonic temple being erected at the junction of West Stewart Street and Argyll Street, Greenock, at a cost of 4,000s., for the use of the members of the Greenock Lodge St. John's, was laid on Saturday last.

## BUILDING TRADES EXHIBITION.

## MEETING OF CONSULTATIVE COUNCIL.

A MEETING of the consultative council of the above exhibition was held at the offices, 43 Essex Street, Strand, W.C., on Friday, the 5th inst., Professor Banister Fletcher, J.P., F.R.I.B.A., presiding. There were present Messrs. Ellis Marsland, P. N. Hasluck, F. T. W. Goldsmith, A.R.I.B.A., Chas. Barry, F.S.A., F.R.I.B.A., E. W. Thornton, A.R.I.B.A., A. H. Ryan Tenison, A.R.I.B.A., Gilbert Wood, E. J. Kibblewhite, H. Riches, W. G. Penty, F.R.I.B.A. (York), W. Seckham Witherington, F.R.I.B.A., John P. Seddon, F.R.I.B.A., A. J. Gale, F.R.I.B.A., Lewis Angell, C.E., F.R.I.B.A., Edwin O. Sachs, A.R.I.B.A., G. M. Callender, H. Phillips Fletcher, A.R.I.B.A. (hon. secretary), H. Greville Montgomery (manager).

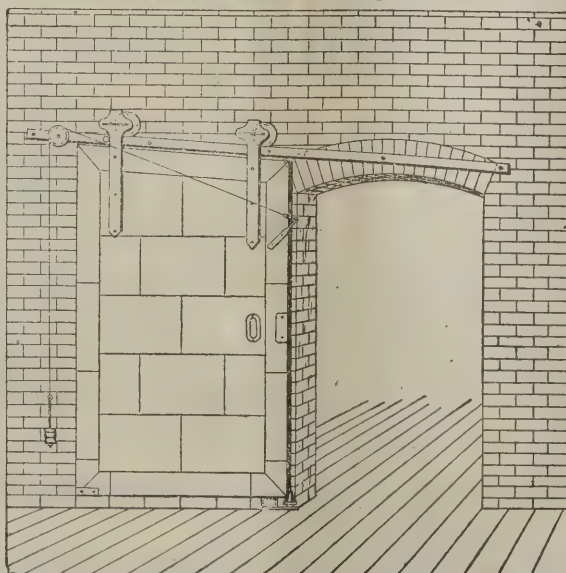
Letters of apology for non-attendance were read from Messrs. John Belcher, F.R.I.B.A., R. Wilkie Edis, F.R.I.B.A.

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The minutes of the previous meeting were read and confirmed, and a report was read as to the prizes promised in connection with the handicraft competitions.

It was agreed to ask architects and others for the loan of drawings and models of buildings, and it was decided to hold conferences during the exhibition in the different sections of the building trades.

It was suggested that various associations connected with the trades be invited formally to the exhibition during the time it is in progress.

The designs for the poster on view at the offices, for which a premium of 10*l.* was offered, created a lively amount of interest to those present, and an informal plébiscite of the best design was taken.

Various other business was gone into, and it was agreed to hold the next meeting of the council at the Royal Agricultural Hall just previous to the opening of the exhibition.

### CONTRACTORS' ACCOUNTS.

A CORRESPONDENT of the *Canadian Architect and Builder* offers the following suggestions on the preparation of estimates and the keeping of accounts:—

A well-digested method in making out estimates is the first element of success, and to arrive at this method considerable brain effort must be expended and some clerical labour employed. A proper list of everything required about a building must be prepared—preferably in alphabetical order—with prices of the material given, and, where possible, price of labour in setting or finishing in part or whole. To this must be added cost of delivery in the works, insurance and a fair percentage for contingencies. The orderly estimator will first take a survey of the ground on which the building is to be erected; he will consider the means of getting his materials on the ground. Then he will find out by actual measurement the amount of excavation necessary and the distance he has to remove such earth as must be carted away. The amount of stone and brickwork, the number of yards of concrete or cement floor required, and all the drain tile will be counted up; each kind and quantity charged in the estimate under its own heading. So with everything about the building, timber, nails,

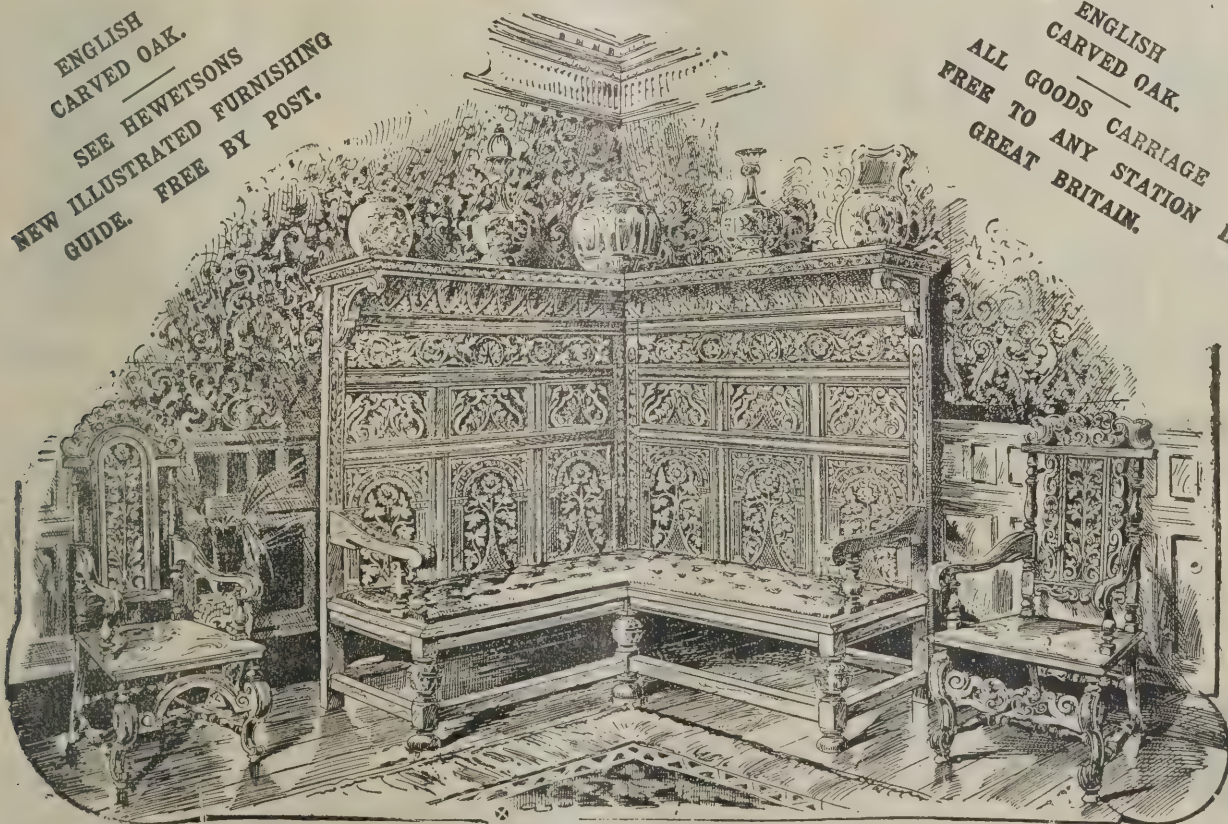
paint, glass, plastering, hardware and the thousand and one other things necessary to complete the contract; everything charged in its proper place accompanied by such remarks as may be deemed pertinent. And, at this point, let me remark that seventy-five per cent. of the troubles that befall the country contractor at least—and this applies also in large measure to contractors everywhere—are due to ignorance or disorderly estimating.

Two things the young contractor should avoid are hasty and disconnected estimates and the acceptance of work on another man's figures, unless that man is an expert and paid for preparing the figures. The unwary contractor who has no confidence in his own figures becomes an easy prey to the unscrupulous owner, who does not care a snap who loses money so long as he gets his work done at a low figure. A contractor who allows his desire to get the "job," or whose necessities impel him to take the work for whatever he can get for it, stands on the brink of ruin, and is sure to be crowded to destruction by the time—or before—the works are finished. Be sure your figures are right; knowing this, nail them to your mast, as it were, and stick to them to the end, unless you find you have omitted something, rendering your tender too low; then ask to be allowed to add the deficiency, and if not permitted, withdraw from the contest. It is not often, however, that the orderly estimator overlooks an item of material or an hour's labour.

The work having been awarded, immediately set to work to provide materials, so that as soon as operations commence there need be no cessation for lack of stuff until the completion of a building. Make a full and complete set of bills of material, taking the quantities from the estimate, and be sure you get what you order, both in quality and in quantity. If you use any stone, arrange to pay for it as measured in the wall—100 feet to the cord. Of course, dimension stone will be paid for by the foot, or as may be agreed upon. Look carefully after your brick during delivery, and see that you do not get more than your proper allowance of "bats" and "soft bricks." House your lime as soon as it is on the ground, and be sure you get the quantity you are billed with. Keep an eye on everything you have placed on the ground. Overhaul your lumber bills and have the number of joists, studs, rafters and all dimension stuff tally with your order and with your bills. Do this without delay, so that discrepancies may be adjusted while the matter is fresh. Make arrangements with your painter to have all shop work primed as soon as it leaves the

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workman's hands. The plasterer and plumber should be engaged to start their respective labours when required, in order to have the work continue without a break. All these things being arranged in an orderly manner, the next thing will be to commence work.

(To be continued.)

### THE COUNTY COUNCIL WORKS DEPARTMENT.

AT the inquiry of the special committee of the London County Council on the 5th inst., Mr. H. Holloway, president of the Master Builders' Association, gave evidence. He said he was a member of the firm of Holloway Brothers, building contractors. There was no such thing as a ring of contractors in London against the Council. The contractors, however, objected to some of the conditions of contract, and unless those conditions were modified, he did not think the Council would get the first-class contractors to contract for its work. They objected to the words of the wages clause compelling the contractor to pay the full current rate of wages "obtained by the trade unions of the London district." He did not object to the "current rate of wages" being inserted. The contractors also objected to being compelled to disclose their books to the officials of the Council. He thought inspection of the time-sheets and wages-books would be sufficient; examination of the contractors' other books was unnecessary and offensive. He objected to the system of open tenders, preferring that of select tendering. Contractors would not care to be put into competition with the Works Department of the Council. If the Council had an honest desire to get tenders from responsible contractors they should, as near as possible, adopt the form of contract which had been agreed to between the Institute of Architects and the Institute of Builders. He considered that the work of responsible contractors was of quite as good quality as that done by the Works Department. He could see no advantage to the workman obtained from the Works Department which he did not obtain from respectable contractors.

The Chairman: Then if the Council has made conditions which no contractors will accept, a Works Department becomes a necessity?—My point is, that it is only these conditions which are keeping contractors out, and that they are not essential to good work being done for the Council. I think these conditions should be abrogated.

By Sir G. Lushington: In putting the words "rate of wages obtained by trade unions in the London district" in the contracts the Council was really making itself an engine for enforcing the policy of trade unions, and was placing itself in antagonism to contractors.

By Dr. Longstaff: The system of open tendering was a fad of public bodies. It was diminishing at the present time, because these bodies were getting wise from experience and were adopting a system of select tendering. The trade union system was good for young men but hard and cruel to older men. He honestly believed that the objectionable conditions of the tenders for the superstructure of Bexley Heath Asylum were inserted to prevent responsible contractors from tendering. It was his deliberate opinion that the labour clauses in the contracts were passed for the direct purpose of preventing contractors tendering for the Council's work.

By Mr. Beachcroft: In the 60,000*l.* worth of work his firm had done for the Council, they had certainly made a profit of more than 1½ per cent. It was impossible for any committee of a public body to successfully compete with his firm.

By Mr. Davies: He was not against municipal work, but architectural work could not be done so well by a municipality as by a building contractor.

By Mr. Fletcher: It was unfair to the workmen of London for the Council to attempt to do its work all over London with 2,000 men employed at the centre. It might give rise to the creation of a privileged class of workmen.

By Dr. Collins: Alterations had been made by the Council in the conditions of contract at the express request of the master builders. The Council in its terms of contract had all along done everything to protect the workmen and not the contractors.

By Mr. Dickinson: He should think that in London there were quite 100 "respectable" contractors who might be put upon a list, and from that list the Council should from time to time choose firms to contract for its work.

At the conclusion of the examination of the witness the committee adjourned.

Mr. J. Mowlem Burt, of the firm of Messrs. Mowlem & Co., contractors, gave evidence on Wednesday. He said his firm had done a great deal of work for the Council. He had no objection to the rates of wages being set out in the schedule to the Council's contracts, but he thought that in any variations in wages during the execution of a contract, the sum paid under

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the contract should be proportionately enhanced or reduced. He suggested that the wages clause should read simply that the wages paid should be those agreed upon between the masters and the men. He objected to the words of the contracts, "in practice obtained by the trade unions." He did not think trade unions should be the arbiters of the wages. Both young men and men who were past their best work suffered greatly under the present system, because naturally the contractors could not pay them full wages. That prevented them from being employed on works under the Council. He also objected to the penalty clauses of the Council's contracts, since they gave the impression that the Council regarded all contractors as men who were not to be trusted. His firm had never been harshly dealt with by the Council. The clause in the contracts compelling the contractor to submit his books for inspection if so desired was very vexatious. He thought it would be sufficient for the Council to inspect the wages and time-sheets. His firm had not ceased to tender, but they could not accept contracts under the present conditions. In the tenders they had sent in they had struck out the objectionable clauses. His firm would not object to tender in competition with the Works Department—at least, until they found it was useless. By that he meant that a time might come when they found the Works Department made a very low offer, and then came to the Council for more money. The inspection clauses absolutely prevented them doing work under contracts which contained those clauses. He desired the employers to have a voice in the wages to be paid. His firm, being general contractors, hardly saw the same objection to the arbitration clause that builders in the strict sense of the term would see. They were generally willing for an engineer to be the sole arbitrator, but they should certainly object to the architect being the sole arbitrator. There was a distinct feeling in the building trade that the Council, in insisting on these objectionable clauses desired to prevent contractors from tendering. He thought the system of select tendering as adopted by the London School Board a good one. He did not believe that architectural work could be carried out by a corporate body as cheaply as by contractors. He should doubt whether the visits of an average County Councillor to the works would be of the same advantage as his own visits would be.

Mr. Rowland Plumbe, who has acted as architect for the erection of some of the Council's artisans' dwellings in connection with the Shelton and Boundary Street schemes, said that

the work executed by the Works Department was as good as that executed by ordinary contractors. He was unable to see any difference in the amount of work done by the men for contractors and that done for the department. The supervision of the work was as effective in the case of the department as in work carried out by contractors. He thought it would be best for the Council to put out to contract the highly-technical building work. Sewer work, he thought, might well be carried out by the Council, for in that class of work contractors usually made large provision for risk.

The proceedings were again adjourned.

### THE DANGERS OF SEWER GAS AND THE LIABILITIES OF SANITARY AUTHORITIES.

At the time that the decision was given in the case tried at the Birmingham assizes, August 1896 (executors of T. H. Smith v. King's Norton Rural District Council), we commented upon the facts disclosed and the importance of the decision to sanitary authorities. It may be as well to refresh our readers' memory by a short *résumé*.

The late Mr. Smith, it was alleged, died from an illness which was attributed to sewer gas, which entered his house through the ventilating shaft from a sewer. The District Council denied that any damage was caused by their negligence, and declared that the condition of the house drains was rather the cause of Mr. Smith's illness and death. That the illness was in some way connected with defective drainage there could be no doubt. The house was erected in 1885. From the drains near the site a shaft was carried up a tree. At the desire of the architect the position of the shaft was changed, and it was fixed within the chimney, the alteration being the work of the builder of the house. The shaft was leaky, and the connection with the drains was inefficiently executed. It was given in evidence that fumes found their way into the library, where Mr. Smith spent much time. Nobody in the house appeared to have any knowledge of the existence of the shaft, and when the scrutiny was made the evil had done its work, for other members of the family suffered, but not fatally.

Mr. Justice Collins, before whom the case was tried, said the question for the jury was whether Mr. Smith's death was caused by the escape of gas from the sewer ventilator, or by

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The *Lancet*, January 12, 1867.

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the condition of the house drains. After a long consideration the jury were unanimous that death was caused by an escape from the sewer ventilator, and the damage was assessed at 3,500*l*. This brings the danger arising from sewer gas forcibly before us, and the necessity of destroying it instead of dispersing it through the atmosphere, and also the great liability the sanitary authorities incur who neglect to provide proper means for the destruction of sewer gas.

The present system of taking ventilating shafts outside houses is altogether wrong, as unless they are run up to a great height above the houses they aggravate the dangers they are supposed to obviate, and if brought up alongside a chimneystack the gas will descend through the flues, and consequently disseminate the deadly poison even more directly through the house than would be the result through a defective drain. In short, the only method that will insure safety is by destroying absolutely the gas, and this can only be effected by burning it, as is done in the sewer gas destroyer lamps. There have been in use for some years different systems which have proved successful to a great measure, but have not been perfect, amongst the defects being the liability of the lights going out on the occasions of flooding when the sewers are running full bore, and the risk of explosion at these times. In the system invented by Mr. J. E. Webb (and which is in use at the Strand (London) Board of Works, Shoreditch, Tottenham, Hereford, Southampton, Wolverhampton, Tettenhall, Leicester, Leamington, Malvern, Paris, &c.) all objections in previous attempts are entirely done away with, which will be proved by the following extracts we make from the report on sewer ventilation by the city surveyor of Hereford to the sewers committee:—

*Webb's Sewer-gas Destructor.*—This consists of an ordinary street gas-lamp, having a copper pipe inside the cast-iron column.

The gas-burners and lantern-head are so arranged as to do the threefold work of lighting, extracting and destroying, or rather converting the sewer-air into a harmless compound.

One great merit I attach to this lamp is that if the products of combustion from the sewer be from any cause temporarily arrested, and the light becomes extinguished, there is no risk from explosion, as the by-pass light is supplied with air from the outside atmosphere by a separate pipe, which would automatically relight the three burners on the obstruction being removed or by the sewage falling to its normal level.

Although we have had severe gales and phenomenal floods during the past week, in no case has the light failed, while of

the Holman's type two were extinguished once, and a third two mornings in succession.

The average rate of extraction I found to be 2,291 cubic feet per hour, which is largely in excess of the quantity claimed for it by the inventor.

The nearest air inlet is in Kerry Square, while it is also clearing the sewer in Widemarsh Street, as far as Blackfriars Street on the one hand and the Mansion House on the other—a total length of 1,200 yards of sewer.

The air leaving the outlet at the top of the lamp was perfectly free from offensive smell on every occasion examined.

The illuminating power of the gas appears to be considerably increased by the use of sewer air instead of ordinary atmosphere.

The lamp could not be put to a more severe test in Hereford, owing to its close proximity to the Imperial Brewery (from which offensive liquids of a high temperature are frequently discharged into the sewer), and the Worcester hide and skin yard also delivers most offensive matter into the sewers within 80 yards of the lamp. Many cases of zymotic disease have occurred in this district, and frequent complaints of sewer gas were formerly received from the residents in the neighbourhood, but since the erection of the lamp I have not heard a single complaint; on the contrary, those in the immediate vicinity are pleased with the improved light, as well as the absence of smells. The high rate of temperature maintained (500 degs. Fahr.) is such that no germs can by any possibility pass through the lamp into the atmosphere alive. The only smell on approaching as close to the outlet as the heat will permit is such as is felt near the ceiling of a room where a number of gas jets are alight.

The first cost of this lamp and connection to the sewer is 20*l*. 3*s*. 8*d*., or about 15*l*. in excess of an ordinary lamp column and lantern head. The annual cost is the same as an ordinary gas lamp, while the light is much more brilliant than that of a lamp consuming the same quantity of gas.

The conclusion I have arrived at is that Webb's lamp is, under all conditions, the best, both as regards annual cost, simplicity of construction and the higher temperature to which the sewer air is subjected before escaping into the atmosphere.

Since the above report was made the ninth order has been received from the city of Hereford.

Taking into consideration the great risks involved by the neglect to insure the effective destruction of sewer gas, it becomes a duty for all in charge of the sanitary matters of towns to become acquainted with the system by which Mr.



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### THE DWELLING-HOUSE.

ON Thursday, February 4, Dr. G. Vivian Poore, F.R.C.P., delivered a lecture at the London Institution on the "Dwelling-house," illustrated by numerous lantern-slides. After pointing out the defects commonly seen in the better class of London houses—extreme height in proportion to area, dark underground basement, absence of back-door for delivery of goods or removal of refuse, ill-ventilated staircase and close "areas" shutting in the gullies leading to the sewer—the lecturer insisted that, although such defects were inevitable in London, they should never be imitated in the country. Great height not only increased the risks from fire, but increased the labour of service, because moving vertically involved twenty times the labour of moving horizontally. The risks from infectious disease were greatly increased by these high houses, which were getting daily more common. Modern methods of sanitation gave a fatal facility for overcrowding, which was certain eventually, if not checked, to do more harm than the sanitation had done good.

In country places, where it was possible to give adequate area to a house, it was most important to insure the thorough ventilation of the staircase and passages, and if this were neglected these internal communications only served for the drifting to and fro of foul air and not for the supply of fresh air. In dwelling-houses as in hospitals, all sanitary offices should be shut off by a ventilated lobby from the main structure, and the lecturer showed plans by which the staircase might be made to fulfil this purpose. The question of aspect, the advantages and disadvantages of a cellar beneath a house and the great importance of a wholesome larder were points which received attention.

The lecturer next considered plans by which the sanitation of an isolated house might be made independent of the local authorities, and he showed plans of "filtration gutters" by which domestic slop-water might be easily purified.

Overcrowding was the greatest of all sanitary ills, and was often fostered by sewage schemes. A plan was shown of an estate of 9 acres lying between two newly-sewered suburban roads, which had, as was usual in such cases, been bought by a so-called building society, and in which 177 houses with a

population of over 1,200 was contemplated. These societies were a cause of sanitary ruin, æsthetic ruin and financial ruin; they encouraged artisans to begin life with a mortgage round their necks, and occasionally landed them in the clutches of a professional usurer.

Some of the model by-laws of the Local Government Board were not suited for country places, and regulations as to air-space round dwellings which might be beneficial in towns became mischievous suggestions when printed and circulated in the country. Again, the London Building Act placed no adequate check upon enormous structures, and "open spaces" (bought at great cost) were definitely made an excuse for the abolition of private curtilage to houses. These large buildings were common in the centre of London, and it was curious to note that the "Strand Registration District," which is the pulpit from which we have preached sanitation to the whole world, and which is exceptionally well provided with open spaces, was, next to the city of Liverpool, the most unhealthy registration district in the country. So-called "lungs" in which the blood only circulates occasionally on a Sunday are no compensation for a lack of space and light and air in the dwelling.

The cost of the dwelling-house was steadily increasing. Taking a concrete example in Marylebone, it was shown how the rates had risen 87 per cent. in 23 years, and how the whole of the obligatory charges—rent, rates, taxes and water—amounted to over 2½ per annum per square yard of occupied land. Would this upward tendency of the rates ever cease?

Increase of cost of the dwelling inevitably led to overcrowding, and every addition to the rates increased the cost of the dwelling. Looking at the physical and moral harm which resulted from overcrowding, every increased tax on the house ought to be very seriously considered. Schemes of ostentation and so-called philanthropy which fell heavily on the householder in the form of rates did harm rather than good. Some outlet ought to be left for private generosity. Very little was done to check overcrowding. On the contrary, the jerry-builder was fostered at the expense of the ratepayers. Modern sanitation was largely based on a mischievous, lop-sided socialism which was doing incredible harm. No improvement could take place unless it were found possible to encourage the sanitary well-doer. If the man who built a wholesome, isolated house, and completed his sanitation on his own premises, was merely "rated up" and practically fined for doing so, no improvement was possible. The lecture concluded with sundry suggestions for the equitable adjustment of sanitary rates.

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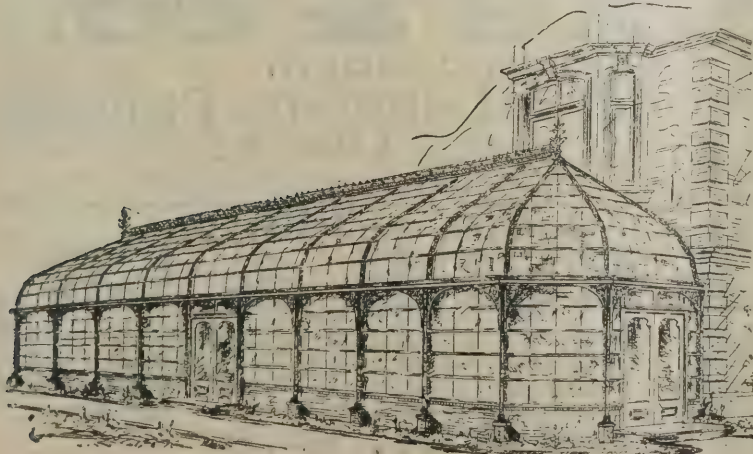
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**YORKSHIRE COLLEGE ENGINEERING SOCIETY.**

At a meeting of the members of this Society, held on the 1st inst., Mr. Benjamin Holgate, F.G.S., delivered an interesting lecture on the subject of "Clays used for Making Bricks and Pottery." The president of the Society (Mr. Henry McLaren) occupied the chair. The object of the lecture, as Mr. Holgate explained, was a very practical one. It would doubtless be that in time to come many of the students might find themselves following their profession in distant lands. He wished them, therefore, to be able to judge as to the suitability of any particular clay for the manufacture of bricks, and the criteria to be set before them would, he hoped, assist them to form an accurate conclusion. Mr. Holgate detailed the various kinds of clays which might be observed in the colour and nature of the class of buildings erected in different localities. For instance, commencing in Dorsetshire, and travelling thence through London to Yorkshire, they would note that the materials used gradually changed. In Dorset all the buildings were of brick, and that was so through London and as far as Huntingdon. In East Yorkshire, as at Brough, they would find almost the same kind of cottage as in the Fen district—very old buildings, with very thick walls compounded of mud, lime and gravel. In the great Vale of York, however, they would notice that all the villages were ruddy with their red-tiled roofs. In West Yorkshire, as they approached the hilly country, they would find, as in Leeds, many of the houses were built of bricks well blackened over, but before that they often saw the bricks "sweating," and showing a deposit of white salt. Further west, where the rocks were near the surface, the houses were built of freestone, and up to recently were also covered with thin flagstones of the same material. In Oxford and Cambridge the buildings were of oolitic limestone, which soon decayed, and had a venerable appearance. In the slate country houses were naturally built of slate. At the present time the great majority of buildings were built of bricks moulded either standard size, or in any form that might be desired. Mr. Holgate dealt also with china, tertiary, gault, drift, carboniferous and ganister clays, and the treatment of carboniferous, also touching on fire and ordinary bricks. He gave a scientific definition of the substance of clay, and a practical commentary thereon. He mentioned that at Poole, in Dorsetshire, there was a bed of 500 different kinds of clay, and remarked that it was from that place that the makers of clay smoking-pipes in Leeds obtained their material. The brick-making value of clay depended on

its-fluxing qualities. In conclusion, Mr. Holgate said he hoped that, by carefully studying the subject from the points he had given them, any of the students present, when they came across a suitable clay, even in a country they had not seen before, might be able to say, "Here is a clay from which bricks can be made."

An entertaining and instructive discussion followed.

**THE COST OF BOARD SCHOOL BUILDINGS.**

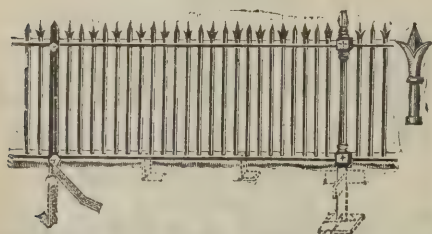
A SPECIAL sub-committee of the Works Department of the London School Board, appointed to inquire into the cost of the schools erected by the Board, for the purpose of ascertaining whether any reduction of expense could be made, have presented their report. It appears that the cost of building ran up considerably between 1885 and 1895, the cost per head on main school buildings, including halls and drawing classrooms, being from 10*l.* 13*s.* to 15*l.* 15*s.* 9*d.* in the latter year, as compared with 7*l.* 0*s.* 1*d.* to 9*l.* 1*s.* 11*d.* in the former. In a report made to the sub-committee, the architect of the Board suggests that the standard of building which was appreciably raised in 1888, as the result of the recommendations of a special committee, is almost beyond the necessities of the case. The object to be gained is to find a satisfactory mean between the two extremes of inferior building and of luxuriously expensive workmanship. The question of sanitation has of late years come prominently to the front, and the exactions of the local sanitary authorities have tended to enhance considerably the cost of public buildings, while the new London Building Act of 1894 involves additional expense. Having called attention to other matters involving additional cost in school construction, the architect suggests that, with a view to reducing expense, the general standard of ten years ago should be reverted to, "which would only mean the abandonment of the little luxuries added from time to time." In another part of the sub-committee's report the general advance in the cost of building between 1885 and now is assessed at from 7½ to 10 per cent. The great advance in London during the past year is said to be due to the state of the labour market, the results of the various trade disputes being evident and undeniable. The risks which contractors run in this direction have caused a general advance in rates to meet contingencies. After considering the views expressed by their officers, the sub-committee recommend the Board to revert to the old specification in force

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in 1885-86 for all future schools and enlargements, subject to such modifications as the architect may think it necessary to make in order to bring the specification up to the present requirements of the Board and the Education Department. There are also various recommendations with reference to the materials used and the method of using them, the object being to reduce the cost of school buildings.

### TRAMWAYS IN BERLIN.

AT the meeting of the Board of Works for the Holborn District the following report by Mr. Lewis H. Isaacs, the surveyor, was read:—

Gentlemen,—Consequent on the presentation of a numerous signed memorial from the occupiers of premises in Theobalds Road urging the Board to lay down a noiseless carriageway pavement in that thoroughfare in lieu of the existing granite setts, and a promise having been made on the part of the Board that the matter should receive immediate and favourable consideration, I deemed it my duty to institute inquiries how the wishes of the memorialists could best be complied with, regard being had to the rights of the North Metropolitan Tramways Company to run their cars over the surface of that road.

I ascertained that the matter had not only been considered, but the problem had been solved by the municipal and tramway authorities in the city of Berlin, and I proceeded on my journey to that city on Saturday, the 16th ult.

The distance being considerable, and the weather exceedingly severe, I determined to break the journey outwards by stopping at Brussels and Cologne, and on my return to visit Hamburg, in all of which cities I was informed that tramway works both novel and important in character had recently been executed, and I may here state that I was well repaid for the extra time and trouble consequently involved.

I found, however, that the mode of working rather than the construction of the tramways in these three cities were the matters calling for observation and report on my part, for the employment of noiseless pavement has not made much progress as yet in any of them. Brussels, indeed, owing to its surface levels, is practically debarred from the use of asphalt as a paving material, for not only is it a hilly city, but those hills are both long and steep.

It may be stated briefly that the employment of horses for

the haulage of tram-cars is rapidly disappearing in the cities I have just visited, and electricity is the motor now generally adopted. I am informed that it is cheaper than traction by horses, and the municipal authorities encourage its use because it is so much more cleanly so far as the surface of the streets is concerned. In illustration of what I am here stating in regard to the action of the municipal authorities in this matter, I may mention that as the concession to the larger of the two tramway services in Berlin is about to lapse, it has been intimated to the directors of that company that the concession will not be renewed unless horse traction is done away with and another motor substituted.

Steam as a motor has been tried, but has failed to give satisfaction, and in no single instance did I find petroleum, gas or compressed air employed. The noise of steam, which is such a terror to horses, and the vapour given off by petroleum are both avoided. I find also that the overhead system of supplying electricity is apparently the one which finds most favour, though I must confess that the appearance of the streets and roads is not improved by its adoption.

Of the four cities I have named, Berlin is pre-eminently the one most suited for intra-mural communication by means of tramways. Its surface, like that of the entire State of Brandenburg, is almost a dead level, and the inhabitants of the city have not been slow to avail themselves of the natural advantages thus afforded for pleasant and cheap conveyance through the streets of the capital and its suburbs.

They have also in the plodding but thorough manner of the German race, addressed themselves to the solution of the problem how to combine the advantages of an agreeable and cheap means of locomotion with a sanitary and noiseless pavement, and from what I saw in Berlin I think they may be congratulated upon succeeding in so doing. Since I was last there some five or six years ago, the city has grown very much, and the number of its inhabitants now stands as high as 1,600,000.

By the courtesy of Mr. Louth, the representative of the Neuchâtel Asphalte Company in Berlin, I have been favoured with the following statistics:—

"The city of Berlin in round figures has a carriage-way area of about 4,500,000 metres, of which 1,500,000 metres are paved with asphalt and 65,000 square metres with wood. Taking the average street to be 10 metres wide (carriage-way), Berlin would have 450 kilometres of street way, of which 150 kilometres would be paved with asphalt."

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Berlin Tramway Company, they have about 400 kilometres of tramway, and as it is mostly double line, you may say 200 kilometres of street way with trams are laid therein.

On the day after my arrival in Berlin I availed myself of an introduction which I possessed to Herr Dr. Hobrecht, the chief engineer to the municipality, and by him I was presented to Herr Baurath Gottheiner, chief of his staff, to whom is allocated the entire direction and control of the whole of the tramways within the municipal area. I learned from the last-named gentleman that the system which was being tried when I last visited the city of minimising the wear and tear of the paving material next the tram rails, viz., the placing on each side of the rail pieces of stone about 4 inches wide and of a depth equal to that of the rail itself, similar in fact to the edge curb used in London footways had been tried but without success; that these pieces of stone were being gradually removed and an altogether new system introduced.

This new system was mainly if not entirely dependent upon the absolute rigidity of the tram rails. No movement or vibration in them is permissible, and to effect that desideratum a rail is used of which I have made a sectional drawing.

From this it will be perceived that the depth of metal from the top of the rail to the underside of the bottom flange is 6 inches, that the width of the latter is  $4\frac{1}{2}$  inches, and the width at top, including the groove in which the flange of the wheel runs, is  $4\frac{1}{2}$  inches.

This rail is known as the "Phoenix." It is rolled at Osna-brück in Germany, and has been adopted in England. It is, in fact, the rail now laid down in the Theobalds Road, with one or two variations, but these variations are most important.

The rail used in England is 7 inches deep instead of 6 inches as in Germany, to suit the size of the granite sets in which it is embedded.

This extra depth is an advantage as tending to increase the solidity of the rail. In Berlin, however, the fish-plates for each length of rail are bolted together six times, whilst in London for the same length only four bolts are used. This to a large extent accounts for the extra rigidity of the Berlin rail as compared with the London one.

The method of placing the rails in conjunction with asphalt pavement is as follows:—The bottom flange of the rail rests upon a layer of mastic asphalt  $\frac{3}{4}$  of an inch thick, and the same material (mastic) 2 inches wide is placed next the upper flange and on each side thereof, the theory being that the mastic acts as a cushion or buffer, and receives the vibration (if any)

which may be occasioned by the passage of the tram cars or the ordinary wheeled traffic proceeding over the surface of the road.

I have shown in section the tram rails so laid in asphalt according to the system which now prevails in Berlin, and I have also prepared a drawing showing the manner in which the fish-plates are bolted together in the tramways recently constructed in that city.

The result of this method of dealing with the subject after two years' experience is most excellent. There is no disintegration of the asphalt next the edges of the rails, with the consequent destruction of the compressed asphalt forming the paving of the remainder of the roadway. But, as the Berlin engineers impressed upon me, everything depends upon the rigidity of the rails. Unless that can be obtained, the whole system fails; but I see no reason why that which has been accomplished in Berlin should not be accomplished in London.

Allowance must, of course, be made for the difference in volume of the street traffic of Berlin and that of London. It is almost unnecessary to say that the traffic of the former city, though by no means small, does not even approximate to that of the latter, either as regards the number of the vehicles or the weights carried therein. The driving pace is more sharp in Berlin than in London.

Private as well as hackney carriages are driven in Berlin at a pace which in London would render those concerned amenable to a charge of furious driving to the common danger of both vehicular and pedestrian traffic.

Reverting to the requisition or memorial of the inhabitants of Theobalds Road, and assuming for the moment that it is practicable to lay tramway rails in asphalt without consequential destruction of the paving material, we have now to address ourselves to the consideration of the question, How is it possible under existing conditions to effect the change in the Holborn district, say, for a commencement, in Theobalds Road?

The conditions under which tramways are laid down in Berlin and London are widely different. In Berlin the municipal authority is supreme.

It can and does control the original construction and the subsequent maintenance of the tram rails, and the paving in juxtaposition therewith, absolutely and without appeal from any of its decisions in regard thereto. Needless to say a very different state of things prevails here.

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I have reason to believe, however, that the North Metropolitan Tramways Company, to whom the line in Theobalds Road belongs, would not be indisposed to meet in an equitable spirit any approach on the part of this Board to effect a change in the paving of that road which would lead the frontagers no longer to look upon the tramway as the cause of a nuisance which is fast becoming unbearable.

A most desirable alteration of the existing conditions as to the maintenance of the street-paving could also be effected.

Instead of having, as now, two authorities over the maintenance of one roadway, terms might be arranged under which the sole charge of the road surface, excepting of course the tramway rails, should be vested in this Board. Then would disappear the anomaly now existing that the road authority is dependent upon the co-operation or otherwise of a trading company, whether the paving of the roadway in which a tramway is laid is to be maintained in a proper condition for ordinary vehicular traffic or otherwise.

I have received a letter from the chief engineer to the municipality of Berlin, of which the following is a translation:—Municipal Buildings, Berlin: January 28, 1897.

With reference to the interview which you had with Mr. Gottheiner, architectural councillor, we beg to confirm that since 1880 tram-lines have been paved very extensively here and in many of our main arteries of traffic, such as, for instance, Leipziger-Strasse, König-Strasse and Friedrich-Strasse, with asphalt pavement, and we have not so far had any cause to think of abandoning this system. Up to a very few years ago the building-in of the rails into the asphalt pavement was effected by facing the rails on either side by granite sleepers, 15 to 16 centimetres wide by 15 to 17 centimetres high, and bringing the compressed asphalt up to this edging of stone. The tramway company—who, according to the existing agreements, are bound to maintain this pavement within and between the rail tracks, as well as to a width of 70 centimetres on either side beyond the metals at their own expense—requested us three years ago to dispense in future with the granite bordering along the rails, and to have the asphalt covering brought up immediately against the rails. As, in view of the great extent of asphalt paved roads, the maintenance of the old arrangement proved very expensive, and as in consequence of the introduction of a more substantial and firmer tramway superstructure, this ar-

range ment was no longer required. In the case of siding-points and tramway crossings only the bordering with stone sleepers would be adhered to in future, because in these parts of the structure it was not feasible to insure the same amount of stability as in the case of ordinary rails, but, on the other hand, the company proposed to increase the dimensions of the stone bordering in these cases from 19 to 20 centimetres in width and from 17 to 18 in height.

We agreed to this proposal with the proviso that in future until further notice we should dispense with the use of stone borderings wherever an iron superstructure system, with a rail 15.5 centimetres high, and laid on the system of alternate or non-coincident rail-joints is used. We have, moreover, permitted the tramway company, should they think it desirable, to join the asphalt pavement to the rail by a narrow strip of mastic instead of compressed asphalt.

We beg to remark, in conclusion, that according to the experience hitherto gained, dispensing with the stone edging and carrying the asphalt immediately up to the rail itself has not given rise to any inconvenience or complaint.

Lewis H. Isaacs, Esq., Chief Engineer,  
Holborn Town Hall, London, W.C.

I cannot close this report without expressing my sincere thanks to the chief engineer of the municipality of Berlin and to the head of his staff, as also to the engineer of the elder and larger of the two tramway services in that city, "Die grosse Berliner pferde Eisenbahn," for their courtesy and kindness in placing at my disposal all the models and drawings in their possession, to illustrate the many points upon which I sought information.

So far from deeming it a trouble they took pains to assure me they considered themselves flattered by a visit from an English architect and engineer, with the object of being advised and assisted by them in a matter of such great public importance.

#### INSTITUTION OF MECHANICAL ENGINEERS.

THE annual meeting of this Society was held on the 4th inst. in the hall of the Institution of Civil Engineers. Mr. E. Windsor Richards, president, was chairman. The President was re-elected, and the names of Mr. Edw. P. Martin, of Dowlais, and

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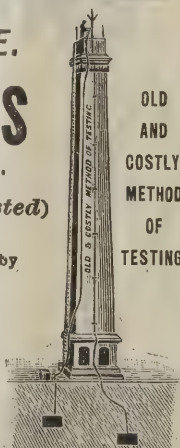
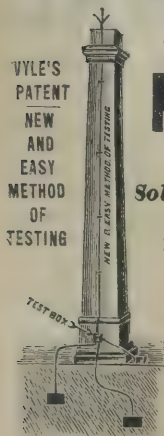
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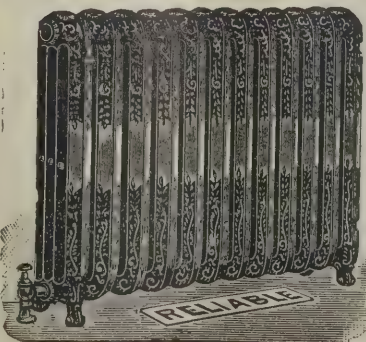
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Mr. J. Hartley Wickstead, of Leeds, were added to the list of vice-presidents. The annual report of the Council disclosed the vigorous prosperity of the Institution. The total of members (2,360) is 89 in excess of the previous year, and during 1896 there have been added to the register 183 names, against the diminution by deaths of 27, and 67 resignations. During the past year baronetries have been conferred by Her Majesty upon Sir William Coddington, M.P., and Sir William T. Lewis (members); and the Council have nominated Professor Unwin, F.R.S., an honorary life member of the Institution, in appreciation of his eminent position as a representative of scientific engineering. The accounts showed receipts during the year of 7,388*l.*; the balance of receipts over expenditure, actual and estimated, leaving a sum of 2,173*l.* in hand. The capital of the Institute, allowing 600*l.* for accounts not yet rendered, amounts to 46,000*l.* Of this, 24,000*l.* remains invested, mostly in railway debentures, while 16,000*l.* has already been expended upon the Institute's house, now in process of erection at Storey's Gate. The foundations have been put in, and the superstructure will be proceeded with as soon as the requirements of the Office of Works and of the London County Council have been settled.

The report by Professor Roberts-Austen to the Institute's research committee, on alloys, was read. It dealt for the most part with the copper-zinc series known as brasses, which possess so much industrial importance, and afterwards it dealt with certain relations between the fusibility and strength of alloys involving considerations as to the constitution of alloys generally. An account was further given of the experimental investigations which had been undertaken with a view to measure the molecular mobility of solid and molten metals known as diffusion. Certain improved results in the recording pyrometer, rendering it more sensitive, were lucidly described. The value of the experiments on the nature and properties of alloys which were originated by the Institution in 1890 has received widespread recognition, and it may be fairly claimed that they have stimulated similar work in France in a remarkable way, as also in Germany. Professor Roberts-Austen's report dealt with many intricate subjects in a masterly way, and settled many questions that were previously greatly involved. That the mechanical properties of metals and alloys are connected with their atomic volumes was definitely answered in the affirmative. The diffusion of metals in metals occupied many passages of value, the experiments having led to the recognition of the remarkable

fact that the diffusion of metals can be readily measured, not merely in molten but also in solid metals. An appreciative discussion was opened by Sir William Anderson, and actively continued by some of the leading members.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

1915. Hiram Waddington, for "Improvements in water-closet seats."

2047. Wilhelm Beielstein, for "Flushing apparatus, with movable syphon for water-closets."

2089. Reginald Haddan, for "Improvements in tool-holders for metal planing and cutting machines."

2097. Charles Burley and Charles Burley, Jun., for "New or improved tools or appliances for facilitating the machining of the lugs, bottoms, brackets and the like of bicycles."

2143. Thomas Frederick Lees, for "A new and improved holed firebrick for heating furnaces."

2184. James Alexander Drummond, for "An improved method of and means for securing plate and sheet glass to walls, ceilings, bricks and other surfaces."

2195. Alfred Suant and George Washington Robertson, for "Improvements in apparatus employed in the manufacture of paving bricks or tiles."

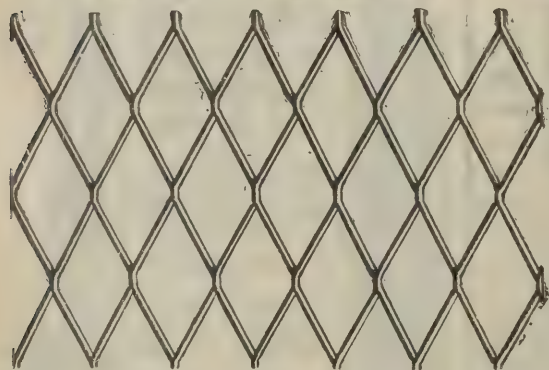
2302. William Hewitt, for "Improvements in apparatus for the manufacture of tiles."

2400. William Johnstone Jeffrey and John George Mowbray, for "Improvements in the backs of tiles, bricks, briquettes and the like made from clays or other materials."

2402. William Dewhurst Cliff, for "Improvements in glazed bricks and manufacture of the same."

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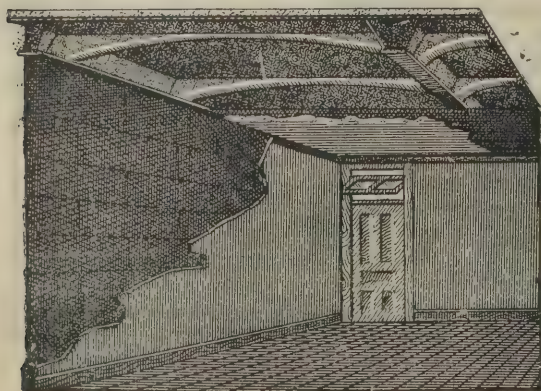
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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

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*For Advertisement Scale, see page xiii.*

## CONTRACTS OPEN.

ALFRETON.—For erection of business premises in High Street. Mr. Gilbert, High Street, Alfreton.

ANDOVER.—Feb. 27.—For alterations to the town hall. Mr. Thos. E. Longman, town clerk, Andover.

ANTRIM.—Feb. 25.—For erection of a lavatory and closet at the male infirm ward, and making structural alterations for the purpose of enlarging the male infirmary of workhouse. Mr. J. Clark, Union Office, Antrim.

ARMAGH.—Feb. 27.—For erection of a band stand on the Mall. Mr. H. C. Parkinson, architect, Armagh.

BARNET.—Feb. 24.—For erection of foreman's cottage, fire-engine house, stable, boundary walls, gates, &c. Mr. H. W. Poole, 40 High Street, Barnet.

BATH.—Feb. 20.—For erection of a corn merchant's shop and stores. Mr. Henry Hookway, solicitor, 15 Old Bond Street, Bath.

BELFAST.—Feb. 19.—For erection of school buildings and caretaker's house, Ravenhill Road. Messrs. Young & Mackenzie, architects, Donegall Square E., Belfast.

BELFAST.—Feb. 25.—For erection of school buildings in Glandore Avenue. Mr. N. Fitzsimons, architect, 82 Royal Avenue, Belfast.

BIDEFORD.—Feb. 26.—For erection of four houses at East-the-Water. Mr. R. T. Hookway, architect and surveyor, Bridgeland Street, Bideford.

BLACKBURN.—For erection of schools for boys, girls and infants at St. Ann's, France Street. Mr. Oswald Hill, architect, Albert Square, Manchester.

BOURNEMOUTH.—Feb. 23.—For erection of premises for the Rainbow Dyeworks Company, Boscombe. Messrs. Jennings & Goater, architects, G.P.O. Chambers, Bournemouth.

BRADFORD.—Feb. 25.—For erection of showrooms and offices in Otley Road. Messrs. Empsall & Clarkson, architects and surveyors, 7 Exchange, Bradford.

BRADFORD.—Feb. 27.—For erection of a nurses' home. Messrs. Milnes & France, architects, Bradford.

BRADFORD.—Feb. 23.—For erection of clothing establishment in Kirkgate. Messrs. Milnes & France, architects, Bradford.

BRECONSHIRE.—Feb. 27.—For erection of a parish church, Brynmawr. Messrs. Nicholson & Hartree, architects, Hereford.

BRENTWOOD.—Feb. 20.—For renewing the roof and various works of improvement at the Congregational Church. Mr. Wm. Richardson, High Street, Brentwood.

BRISTOL.—Feb. 22.—For erection of a new school at Fairfield Road, Montpelier. Mr. W. L. Bernard, 3 St. Stephen's Chambers, Baldwin Street, Bristol.

BRISTOL.—March 2.—For erection of a passenger station at St. Anne's Park, Brislington. Mr. G. K. Mills, secretary, Paddington Station, London.

BUXTON.—For erection of residence, &c. Messrs. Wm. Sugden & Son, Leek and Hanley.

BURNLEY.—March 6.—For erection of an infectious diseases hospital at Kibble Bank. Mr. F. S. Button, Blannel Street, Burnley.

CARDIFF.—Feb. 24.—For erection of two houses and shops at Cardiff Road, Cadoxton. Messrs. Gethin & Wallis, architects, Windsor Chambers, Westgate Street, Cardiff.

CARDIFF.—Feb. 24.—For setting back of a portion of the front boundary wall of the Union Workhouse, the taking down and removal of three casual wards and the public urinal, &c. Mr. Harpur, M.I.C.E., Town Hall, Cardiff.

CANTERBURY.—March 1.—For erection of a public library and institute. Mr. A. H. Campbell, architect, city surveyor, 28 St. Margaret's Street, Canterbury.

CELBIDGE (IRELAND).—Feb. 19.—For erection of labourers' cottages, one at Rathcoole, two at Tootenhill. Mr. Samuel Manning, executive sanitary officer.

COCKERMOUTH.—Feb. 20.—For erection and completion of gate lodge and museum in Fitz Park. Mr. Thos. Hodgson, Station Road.

COMBS.—Feb. 19.—For erection of six cottages on the Needham Road. Mr. Henry Geo. Bishop, architect, Market Place, Stowmarket.

COVENTRY.—March 6.—For extensions at the City Hospital, Stoney Stanton Road. Messrs. G. & I. Steane, architects, Little Park Street, Coventry.

CULMINGTON.—March 1.—For the restoration of church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

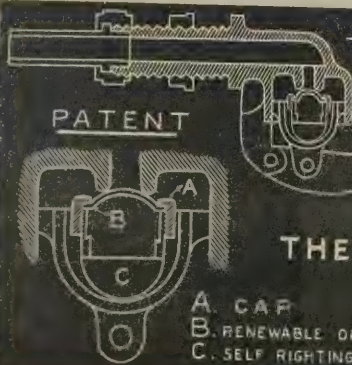
CUMBERLAND.—Feb. 22.—For bricklaying and slating for brick building to be erected at Broughton Hall, near Brigham. Mr. Thomas Penrice, Crosby.

CHORLTON-ON-MEDLOCK.—For erection of bakery premises, stables, &c., in Mornington Street. Messrs. W. F. Mason, Limited, engineers, Longsight, Manchester.

DANBY.—For alterations and additions to the Danby End Wesleyan Chapel. Mr. J. W. Taylor, architect, Newcastle-on-Tyne.

DEWSBURY.—Feb. 23.—For erection of a shed in Greaves Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

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**DEWSBURY.**—Feb. 22.—For enlargement of the retort-house at the Corporation gasworks. Mr. H. Dearden, borough surveyor, Town Hall.

**DARTMOUTH.**—Feb. 27.—For alterations and repairs at the lighthouse, Kingswear. Mr. E. H. Back, architect, Dartmouth.

**DEWSBURY.**—Feb. 24.—For erection of hoist and covered way at warehouse, Wellington Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

**DONEGAL.**—Feb. 25.—For building a retaining wall (dry stone) along the seashore, near Port Station, for the Donegal Railway Company. Mr. Edward Radcliff, engineer, Donegal Station.

**DROYLSDEN.**—For alterations to the Droylsden Castle undenominational schools. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

**DUNDEE.**—Feb. 25.—For erection of a shed 300 feet long by 120 feet broad on the western extension of the eastern wharf, for the Dundee Harbour Trustees. Mr. Geo. C. Buchanan, harbour engineer, Works Office, Harbour Chambers, Dundee.

**FALMOUTH.**—Feb. 22.—For the restoration of Falmouth parish church. Mr. Edmund Sedding, architect, Plymouth.

**FOLKESTONE.**—Feb. 27.—For erection of a mortuary in the cemetery. Mr. H. B. Bradley, clerk to the Joint Committee, 52 Sandgate Road, Folkestone.

**GATESHEAD.**—March 1.—For erection of shops and houses, High Street. Mr. J. G. Crone, architect, 50 Grainger Street, Newcastle.

**GLASGOW.**—March 1.—For enlargement of the killing-rooms, byres and piggeries at Moore Street. Mr. A. B. McDonald, city engineer, City Chambers, 64 Cochrane Street.

**HANWELL.**—Feb. 26.—For erection of three, six or twelve pairs of semi-detached villas in the Shakespeare Road, Drayton Park, W. Mr. W. A. Fisher, surveyor, 16 Finsbury Circus, E.C.

**HARROGATE.**—For erection of boarding-house (Lion Villa), West Park. Mr. Arthur A. Gibson, architect, Yorkshire Bank Chambers, Harrogate.

**HEREFORD.**—March 3.—For erecting a hall and other buildings for the parish of St. Peter. Messrs. Nicholson & Hartree, architects, Hereford.

**HORTON.**—March 1.—For the foundations of the seventh county lunatic asylum, to be erected on the Horton Estate,

Surrey, for the asylums committee of the London County Council. Mr. G. T. Hine, architect, 35 Parliament Street, S.W.

**HUDSWELL.**—Feb. 25.—For rebuilding the south and west walls of the close of land known as the school allotment, at Hudswell, near Richmond. Mr. C. G. Croft, solicitor, Richmond, Yorkshire.

**IRELAND.**—Feb. 24.—For erection of a dispensary house and medical officer's residence, for the Guardians of Athy Union. Mr. T. P. Orford, clerk, Board-room, Workhouse, Athy.

**IRELAND.**—Feb. 27.—For the renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

**IRELAND.**—March 1.—For erection of a station building at Clontarf, co. Dublin, and for a gatekeeper's cottage at Ternascobe, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

**IRELAND.**—March 1.—For erection of schoolhouse at Castlederg. Rev. James Connolly, P.P., Urney Strabane.

**IRELAND.**—For repairs and cement plaster works at Powerscourt Rectory, Enniskerry. Mr. Cecil Orr, architect, Enniskerry.

**IRELAND.**—March 5.—For erection of a dispensary and doctor's residence and a skunk to enclose site. Mr. Joseph Harton, clerk, workhouse, Mullingar.

**IRELAND.**—March 3.—For erection of dispensary and doctor's residence, with offices, &c. Mr. Perry, county surveyor, Galway.

**IRELAND.**—Feb. 23.—For erection of a villa at Omagh. Mr. E. J. Toye, architect, Strand, Derry.

**KEIGHLEY.**—March 3.—For erection of a pavilion at the hospital, Morton Banks. Messrs. John Judson & Moore, architects, York Chambers, Keighley.

**KENDAL.**—Feb. 23.—For pulling-down and rebuilding a portion of the Old Brewery. Mr. John Stalker, architect.

**KENDAL.**—Feb. 20.—For extensions to Netherfield Works. Mr. Robert Walker, architect, &c., Windermere.

**LANGTHORPE.**—Feb. 22.—For erection of four cottages. Mr. Seth Shaw, clerk to Parish Council.

**LEEDS.**—For alterations and additions to premises at Sheepscar. Mr. J. J. Mosley, 6 Wormald Row.

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LIMERICK.—Feb. 20.—For additions and alterations in convent. Mr. William E. Corbett, 28 Glentworth Street, Limerick.

LONDONDERRY.—March 1.—For additions to, repair of, and alterations to the County Court House. Mr. A. C. Adair, architect, Londonderry.

LYDIARD MILICENT.—March 6.—For erection of an isolation hospital at Purton Stone Lane. Mr. R. J. Beswick, Fleet Street, Swindon.

MANCHESTER.—Feb. 22.—For construction of new dressing-closets and other work at the Leaf Street Baths. The City Surveyor, Town Hall, Manchester.

MIDDLESBOROUGH.—Feb. 22.—For erection of a new lodge at the eastern entrance to the new cemetery. Mr. Frank Baker, borough engineer, Municipal Buildings.

MOGDEN.—Feb. 26.—For erection of an isolation hospital and other buildings in connection therewith. Mr. W. J. Ancell, architect, 3 Staple Inn, London.

MORLEY.—March 1.—For erection of mill premises. Mr. T. A. Buttery, architect, Queen Street, Morley.

NEWPORT.—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

NUNNINGTON.—March 6.—For widening, &c., of a stone bridge. Mr. Walker Stead, county surveyor, Northallerton.

OXENHOPE.—Feb. 25.—For erection of a house. Messrs. John Judson & Moore, architects, York Chambers, Keighley.

PETERBOROUGH.—Feb. 25.—For erection of a house on Thorpe Road. Mr. James Ruddle, architect, Boroughbury, Peterborough.

PETERBOROUGH.—For erection of five houses on Padholme Road. Mr. M. Hall, architect, Huntly Grove.

PLUMSTEAD.—Feb. 24.—For alteration to the boiler-house at the Woolwich Union Workhouse, and the removal of the present boilers and the setting (only) of the steam Cornish boilers. Mr. J. O. Cook, 1 Eleanor Road, Woolwich.

POOLE.—Feb. 24.—For erection of two public conveniences. Mr. John Elford, borough surveyor, King Street, Poole.

RAINHILL.—Feb. 19.—For additions and alterations to wards 10 and 11, main building, county asylum. Mr. Jas. Gornall, acting clerk, Rainhill.

RISHWORTH.—Feb. 27.—For erection of an engine-house and engine-bed. Mr. Richard Horsfall, architect, 15 George Street, Halifax.

ROCHDALE.—For repairs and additions to property in Toad Lane. Mr. T. Townend, jun., architect, Fleet Street, Rochdale.

ROCHDALE.—Feb. 22.—For plumbing, slating and plastering four houses in Idle Road. Mr. Dyer, Bower Street.

ROCHDALE.—Feb. 27.—For erection of three houses. Mr. H. S. Nicholl, 1A Mount Street, Rochdale.

ROCHDALE.—Feb. 27.—For erection of three houses in Albert Royds Street, Rochdale. Messrs. Bamford & Brocklebank, surveyors, 58A York Street, Rochdale.

SALISBURY.—Feb. 24.—For erection of shed near the workhouse. Mr. D. W. Morrice, district surveyor, Homington.

SALTASH.—March 8.—For erection of fourteen private dwelling-houses. Mr. Paine, Saltash.

SCOTLAND.—March 6.—For erection of a school at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

SHIELBRIDGE (N.B.).—Feb. 25.—For erection of stable offices, cottages and laundry buildings at Shielbridge, on the estate of Ardnamurchan. Messrs. A. Maitland & Sons, architects, Tain.

SHROPSHIRE.—March 1.—For restoration of Culmington Church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

SKINNINGROVE.—Feb. 24.—For erection of classrooms, &c. Mr. T. Egglestone, Bridge House, Skinningrove.

SOMERSET.—Feb. 24.—For alterations and additions to Severn Cliffe, Clevedon. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

SOUTHEND-ON-SEA.—March 3.—For construction of a winter garden on the pier. Messrs. Thompson & Greenhalgh, architects, Bank Chambers, Southend.

STANWELL.—March 1.—For erection of a dining-hall at workhouse. Mr. John Anthony Engall, clerk, Staines.

ST. BEES.—March 1.—For alterations, extensions and other works at the Main Street Schools. Mr. James Howes, architect, Workington.

ST. HELENS.—Feb. 24.—For erection of two new blocks, enlargement of administrative block, boundary wall, sewage-tanks, &c., at the borough sanatorium. Mr. Geo. J. C. Broom, borough engineer.

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**TAUNTON.**—March 1.—For erection of public closets and urinals in Castle Green. Mr. James H. Smith, borough surveyor, Municipal Buildings, Corporation Street.

**WALES.**—Feb. 22.—For erection of new schools, parish room and master's residence at Brynsiencyn. Mr. Richard Davies, architect, Bangor.

**WHITECHAPEL.**—Feb. 23.—For reconstruction of w.c.'s in Block A at the infirmary, Vallance Road. Mr. Bruce J. Capell, architect, 70 Whitechapel Road.

## TENDERS.

### AYR.

For the construction of about 6½ miles of sewers and other works in the portion of the burgh formerly drainage districts Nos. 3, 4, 5 and 6, for the Commissioners. Mr. JOHN EAGLESHAM, engineer, Town Chambers.

W. G. Flett . . . . .	£10,000 0 0
Shanks & McEwan . . . . .	9,531 13 7
A. Waddell & Son . . . . .	8,341 12 2
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J. Osborne . . . . .	5,200 16 3
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T. Crawford & Son . . . . .	4,832 11 3
W. H. Blackburn . . . . .	4,701 19 11
C. McAndrew . . . . .	4,541 18 7
H. HASTIE, Crierf (accepted) . . . . .	4,257 8 0

### ABERDEEN.

For the construction of pipe sewers, with ventilating manholes, &c., in Holburn Street and Hilton Street. Mr. WILLIAM DYACK, burgh surveyor.

*Accepted tenders.*  
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J. Bain, 48 Union Row . . . . . £85 5 9

*Milton Street.*

J. Warrack, 36 Gerrard Street . . . . . 23 10 2

### BANGOR.

For the construction of steps at the corner of the pontoon.

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JONES & WILLIAMS, Bangor (accepted) . . . . . £498 0 0.

### BARNESLEY.

For paving, flagging, metalling, sewerage, draining and completing of Park Avenue, part of Park Grove, part of Farrar Street, and part of Britannia Street. Mr. J. HENRY TAYLOR, borough surveyor.

*Accepted tenders.*

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G. F. Browne, Barnesley . . . . . £99 19 0

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G. F. Browne, Barnesley . . . . . 934 10 0.

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G. Haigh . . . . . 269 0 0

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H. Heathfield, Beckenham . . . . . 226 0 0

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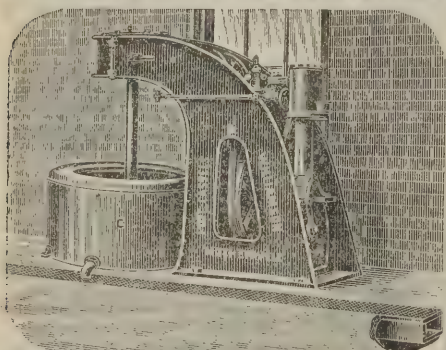
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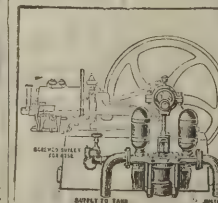
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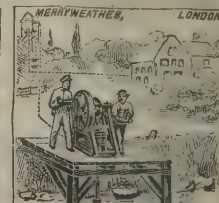
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HERBERT & SONS (accepted) 10½d. per foot run.

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For erection of factory for Messrs. Kembell, Bishop & Co. Messrs. WIGG, OLIVER & HUDSON, architects, 7 Bedford Row, W.C., and 80 Leman Street, E. Quantities by Messrs. GOODMAN & SIMPSON.

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M. Patrick & Son	2,630	0	0
W. Shurmur	2,493	0	0
ATHERTON & DOLMAN (accepted)	2,370	0	0

**BURNLEY.**

For reconstruction of Massey Street footbridge. J. FORSTER & Co., St. Helens, Lancs. (accepted).

**CARSHALTON.**

For erection of an isolation hospital.

W. Wallis	£18,995	0	0
Rice & Son	18,690	0	0
Peters & Son	18,600	0	0
Josslyns & Son	18,336	0	0
E. Goulder	17,834	0	0
Smith & Sons	17,777	0	0
J. B. Potter	17,750	0	0
Longley & Co.	17,449	0	0
Lorden & Son	17,000	0	0
D. Waller	16,990	0	0
J. Burgess	16,200	0	0
A. Bullock	15,970	0	0
E. J. Burnand	15,965	0	0
S. Page	15,934	0	0
D. Stewart & Sons, Wallington *	15,878	0	0

\* Accepted subject to the Local Government Board's approval of the additional loan required.

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For street works. Mr. EGBERT RUSHTON, surveyor. Neptune Street.

Hamor Lockwood	£522	15	3
Ford	364	0	0
J. H. Vickers	348	13	2
Ion & Lewis	335	5	6
T. Wilkinson	334	1	9
A. Brunton & Sons	324	2	2
L. N. DAVISON, Grimsby (accepted)	295	8	9
Surveyor's estimate	306	18	8

**Suggitt's Lane.**

Hamor Lockwood	1,343	2	6
J. H. Vickers	927	5	0
Ford	884	4	7
A. Brunton & Sons	883	1	6
Ion & Lewis	832	16	9
T. Wilkinson	876	10	0
L. N. DAVISON (accepted)	807	17	4
Surveyor's estimate	809	7	8

**CROYDON.**

For erection of residence, Normanton Road, South Croydon. Mr. J. BARTLETT, architect.

A. Parnacott, Westminster	£1,195	0	0
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**DUMFRIES.**

For equipping the laundry, &c., and fitting lifts at the new Langholme Hospital. Messrs. AINSLIE & WOOD, architects, London. Mr. T. KIRKLAND, engineer.

HARPER TWELVETREES, LIMITED, London (accepted)	£362	0	0
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For construction of 287 lineal yards of 9-inch, 8-inch and 6-inch pipe sewer, with manholes, &c., at Broomside. Mr. GEORGE GREGSON, surveyor.

S. Richardson	£102	4	9
G. T. Manners	93	0	0
Sparrow & Brown	90	6	0
J. G. Bradley	89	15	0
H. Nicholson	88	10	0
R. Oliver	88	0	0
J. Manners Coundon	87	12	6
J. Heslop	86	0	0
F. C. Dixon	83	0	0
J. CARRICK (accepted)	79	4	4

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C. Lean	398	7	4
H. Woodhouse	398	0	0
M. W. Davis	395	0	0
R. G. Read	393	0	0
E. HULME (accepted design)	390	17	6
J. S. Wise	381	2	0
C. C. Wardrop	360	0	0
C. Cornes	345	0	0
W. Brettell	—		

## KNARESBOROUGH.

For street works, for the Rural District Council. Mr. R. ANAKIN, surveyor, 44 Station Parade, Harrogate.

Starbeck.

H. Leedham	£570	0	0
A. Estelby	525	0	0
C. Birkill	520	16	0
W. Annakin	466	12	0
J. Pierson	452	13	0
F. U. SIMPSON, Burton Leonard (accepted)	446	15	9

Park Street and New Park, Bilton.

J. Pierson	242	12	0
C. Birkill	233	15	0
W. Annakin	222	8	0
H. Leedham	210	0	0
F. U. SIMPSON (accepted)	190	0	0

## LEEDS.

For erection of a Hoffman kiln and other buildings.

W. HOLDSWORTH, New Wortley, Leeds (accepted) £300 0 0

For construction of covered reservoir, &c., for the Corporation. Mr. THOMAS HEWSON, city engineer, Leeds.

H. ARNOLD & SON, Doncaster (accepted) £23,900 0 0

## LIVERPOOL.

For constructing a tank-house at Bevington Hill, for the City Council.

I. DILWORTH (accepted) £715 0 0

For providing three cast-iron and one wrought-iron tanks at Bevington Hill reservoir, for the City Council.

T. TATTERSHALL & SONS (accepted) £855 0 0

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For erection of new showroom, 464 Brixton Road. Mr. W. M. BRUTTON, architect.

W. Rowe	£1,498	0	0
Haydon	1,481	0	0
Triggs	1,450	0	0
Courtney & Fairburn	1,425	0	0
Tyerman	1,416	0	0
Godson & Sons	1,400	0	0
Peacock Bros.	1,325	0	0
Edwards & Medway	1,320	0	0

For erection of greenhouse and potting shed, for the Westminster Board of Guardians.

T. J. HAWKINS, Ashford (accepted) £44 0 0

For alterations to shop and premises, 169 King Street, Hammersmith. Mr. J. HUME, architect.

Clifton	£320	0	0
Bendon	278	0	0
Pope & Co.	265	0	0
J. LEEDER & Co., Chiswick (accepted)	245	0	0

For alterations at rear of 314 Old Kent Road, S.E. Mr. J. BARTLETT, architect.

H. Hollingsworth, Peckham	£176	0	0
P. Moses, Bermondsey	162	12	0

## NEW CROSS.

For alterations, additions and repairs to the Lord Derby public-house, Woodpecker Road. Mr. W. STEWART, architect, 4 and 5 Aldgate, E.C.

Harris & Wardrop	£2,559	0	0
Cox	2,498	0	0
Burman & Son	2,307	0	0
W. Gladding	2,275	0	0
H. L. Holloway	2,043	0	0
W. HARBROW, South Bermondsey (accepted)	2,035	7	0

For construction of an underground convenience in High Holborn. Mr. GEORGE WALLACE, engineer and surveyor.

Thomas & Edge	£4,202	0	0
Neave & Son	3,957	0	0
W. Thompson	3,919	0	0
C. W. KILLINGBACK & Co., Camden Town (accepted)	3,697	0	0
Engineer's estimate	3,605	0	0

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Mr. JOHN J. SWALLWELL, architect, Steam Packet  
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W. Price . . . . .	399	0	0
J. T. Morris . . . . .	395	0	0
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G. Griffiths . . . . .	380	0	0
A. LAWSON & CO. (accepted) . . . . .	377	0	0

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For additions and alterations to be made at the laundry  
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L. Bearne . . . . .	£525	0	0
Parker Bros. . . . .	511	15	6
F. A. A. STACEY, Newton Abbot (accepted) . . . . .	499	0	0

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For sewerage and making-up Quebec Road, Norwich. Mr.  
A. E. COLLINS, city engineer.

W. J. Botterill . . . . .	£965	0	0
T. H. Blyth . . . . .	877	0	0
Downing & Son . . . . .	733	0	0
W. A. Read . . . . .	675	0	0
G. Rackham . . . . .	650	0	0
A. C. W. Hobman & Co., Bermondsey* . . . . .	616	0	0

\* Recommended for acceptance.

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For construction, laying-down and completion of waterworks  
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District Council.

J. & W. SCOTT, Penrith (accepted) . . . . .	£440	14	6
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**PLYMOUTH.**

For erection of school building with class-room, Queen's Road,  
Lipson, for Mr. Alfred Thos. Roseveare, B.A. Mr. J.  
HARVEY, architect, 9 Courtenay Street, Plymouth.

GOOD & Co., Plymouth (accepted) . . . . .	£286	0	0
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**PUDSEY.**

For erection of a block of seven houses on the Glebe Land  
Estate, Pudsey. Messrs. C. S. NELSON & R. W. SAVAGE,  
architects, Sun Buildings, 15 Park Row, Leeds.

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Asquith & Kitchen, joiner.  
J. Scarth, plumber and glazier.  
Hill & Holroyd, plasterer.  
L. Thompson, Stanningley, slater.  
Muslett & Haley, painter.  
Total, £2,986 8s.

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For re-erection of Bylands, for Mr. J. M. Ashforth, Redbourn,  
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Thompson & Beveridge, London . . . . .	£2,035	0	0
C. Ancell, Lambeth . . . . .	1,950	0	0
C. Miskin, St. Albans . . . . .	1,837	0	0
F. Hall, Herts . . . . .	1,625	0	0
MARRIAGE & Co., Croydon (accepted) . . . . .	1,510	0	0
S. C. Smith, Hemel Hempstead . . . . .	1,470	0	0

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For alterations and additions to shop and premises, Nos. 116  
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For supply of a new bell cage and floor, and for the quartering of the six bells of Winscombe Church.

T. BLACKBORNE, Friary Works, Salisbury (*accepted*) . . . £190 0 0

**YARDLEY.**

For fire stations, for Yardley District Council.

T. J. HAWKINS, Ashford (*accepted*) . . . £134 0 0

For laying-down about 4,800 yards of 9-inch, 12-inch and 15-inch pipe sewers, with the necessary manholes, automatic flushing syphons, &c., and erection of an ambulance depôt. Mr. A. E. CURRALL, surveyor, 460 Stratford Road, Sparkhill, near Birmingham, and The Square, Solihull.

*Sewerage Works.*

H. Weldon . . . . .	£5,299	18	1
S. Turner . . . . .	4,482	13	0
G. Law . . . . .	4,313	17	0
J. White, jun. . . . .	4,140	0	0
J. Biggs . . . . .	3,904	5	1
J. Mackay . . . . .	3,713	18	0
Jones & Fitzmaurice . . . . .	3,664	18	8
CURRALL & LEWIS, Birmingham ( <i>accepted</i> ) . . . . .	3,550	12	2
Surveyor's estimate . . . . .	4,000	11	2

*Ambulance Depôt.*

S. Turner . . . . .	1,130	0	0
J. Freeman . . . . .	820	0	0
T. & W. Thompson . . . . .	800	0	0
H. GREGORY ( <i>accepted</i> ) . . . . .	760	0	0
Surveyor's estimate . . . . .	750	0	0

IN order to provide room for the erection of new Sunday school premises the Regent Square Presbyterian Church has purchased, at a cost of 5,500*l.*, the freehold of five houses which adjoin the church.

*Received too late for Classification.*

**CROYDON.**

For alterations and additions at the Board schools, Mitcham Road, Croydon, including new class-room and cloak-room, infants' department, new water-closets, offices and play-sheds, and bath-room to master's house, for the Croydon School Board. Mr. ROBERT RIDGE, architect, 12 Katharine Street, Croydon.

E. J. Saunders, Croydon . . . . .	£1,250	0	0
Umlandt & Nichol, Croydon . . . . .	1,215	0	0
W. Smith & Son, Croydon . . . . .	1,190	0	0
E. Goulder, Croydon . . . . .	1,188	0	0
S. Hart, Croydon . . . . .	1,176	0	0
D. W. Barker, Croydon . . . . .	1,175	0	0
A. Bullock, Croydon . . . . .	1,160	0	0
H. Bacon, Croydon . . . . .	1,120	0	0
D. Waller, Croydon . . . . .	1,100	0	0
E. P. Bulled & Co., Croydon* . . . . .	1,067	0	0

\* Recommended for acceptance.

**BUILDING AND BUILDERS.**

THE Moseley Presbyterian congregation are about to erect a new church and lecture hall on a site at the corner of Chantry Road, at a cost of 6,000*l.*

A NEW church is to be erected at Burley, Leeds, at a cost of about 6,000*l.*

THE foundation-stone of a new synagogue for South Hackney, which is to be erected in Devonshire Road, Mare Street, at a cost of 7,300*l.*, was laid on Sunday by the Hon. Walter Rothschild.

A NEW hospital is to be erected in Blair Street, Coatbridge. It is to be called the Alexander Hospital. The plans, which have been passed, were prepared by Mr. A. M'Gregor Mitchell, architect and burgh engineer, Coatbridge, and show a handsome set of buildings in the Old Scotch Baronial style of architecture. The cost will be about 8,500*l.*, and there will be thirteen beds for patients meeting with accidents in the districts of Old and New Monkland and Shotts. The buildings will cover 1½ acre of ground near Gartsherrie and Drumpellier Station, N.B.R., and will include nurses', doctor's, convalescent, &c., rooms.

# IMPORTANT TO ARCHITECTS

**Wm. WALLACE & CO.** have special facilities for carrying out Architects'

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MIDDLESEX HOSPITAL (Convalescent Home),  
LONDON FEVER HOSPITAL (Nurses' Home),  
BANSTEAD ASYLUM (L.C.C.),  
ROYAL ASCOT GOLF CLUB,  
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,  
DULWICH COLLEGE,  
HOXTON HOUSE ASYLUM,  
NATIONAL CLUB,  
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## ELECTRIC NOTES.

MR. F. J. WARDEN-STEVENS, A.M.I.E.E., has made a careful examination of the electric-light installation at the Bishopsgate Institute, for the purpose of advising as to a means of reducing the annual cost, which is considered excessive. He has fully investigated the matter, and submitted an exhaustive report to the Governors. This was read at a recent meeting, the surveyor, Mr. D. R. Dale, being present. Several comments were made and general approval expressed, the chairman stating that it was an admirable report, and that the matter had been very thoroughly gone into.

THE Local Government Board have sanctioned the borrowing by the West Ham Town Council of 50,000*l.* for their electric-lighting scheme.

THE lighting of the St. James's end of Pall Mall by electricity is a complete success, and Marlborough House, hitherto a very dark corner, receives the full benefit of the new illuminant.

IN Manchester men are busily engaged erecting in Albert Square four large iron standards from which the electric light will shine, and if the experiment proves successful eight more standards will be put up in the Square. Ultimately, no doubt, gas as a street illuminator will be completely dispensed with.

THE electric-lighting committee of the Edinburgh Town Council, at a meeting held on the 16th inst., considered a motion by the convener, Councillor Mackenzie, on the subject of the charge to be made for electric lighting in the city. The committee agreed to recommend that the charge for the light, as from May 15, should be 4*d.* per unit, a reduction of 1*d.*; that the charge for each public lamp should be 16*l.* per annum instead of 18*l.*, and that the charge for motor power should be 2½*d.*

## TRADE NOTES.

THE Isolation Hospital, Ilford, is being warmed and ventilated by means of Shorland's patent Manchester grates, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. EASTON, ANDERSON & GOOLDEN, LIMITED, Whitehall Place, S.W., and Erith, Kent, are about to erect five lifts in the new Duke Street block of Messrs. Spencer, Turner & Boldero's new warehouses in Lisson Grove.

FOR the ventilation of the Girls' Intermediate School, Abergavenny, Mr. E. A. Johnston, architect, Messrs. Cousland

& Mackay's ornamental Design S "Climax" patent direct-acting louvre ventilator has been used, and supplied from their works at Glasgow.

MESSRS. JOHN KNOWLES & CO. draw our attention to the fact that the "Vitrifine" stoneware drain-pipes which the firm supplies are tested by internal hydraulic pressure up to 30 lbs. per square inch, which is equal to 70 feet head of water.

AT Mossley Hill Church, Liverpool, a large Cambridge quarter clock, showing the time upon two external dials, and striking the hours upon a bell of two tons and quarters upon four smaller bells, was set going by Miss Robinson, the donor, on Monday evening last at 6 o'clock. The clock was made and fixed by Messrs. W. Potts & Sons, of Leeds and Newcastle, from specifications prepared by Mr. R. Bushell, Liverpool. The clock has Lord Grimthorpe's gravity escapement and maintaining power compensation pendulum beating 1½ second, with 500-lb. pendulum bob and all the latest improvements inserted.

## VARIETIES.

A NEW Wesleyan church has been begun at Exmouth to hold 700, and to cost over 6,000*l.*

A NEW Baptist church has been opened at East Greenwich. The building is to take the place of a temporary structure which has been used since 1892.

A NEW church erected at Box by the Free Methodists has been opened by Lady Poynder.

A NEW Congregational church, providing accommodation for 400 persons, has just been opened at South Wigston, Leicester. The cost has been 1,600*l.*

THE great north transept window in Doncaster parish church, which was destroyed by a gas explosion some time ago, has been filled with new stained-glass illustrative of the "Te Deum."

THE People's Palace of Varieties, Aberdeen, in which a fatal fire occurred in September last, is to be at once rebuilt, and Mr. John Rust, architect, has been commissioned to accept tenders for the building amounting in all to 10,000*l.* The hall will be erected on the site of the old building in Bridge Place.

THE next meeting of the Institution of Civil Engineers will be held on Tuesday next, the 23rd inst., at 8 P.M., when a paper will be read with a view to discussion on "The Main Drainage of London," by Messrs. J. E. Worth and W. Santo Crimp, M.Inst.C.E.

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## PARQUET FLOORINGS

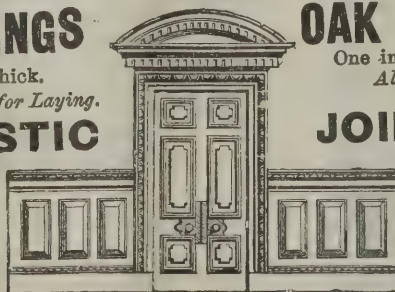
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Stone, and Deal Floors. (See section.)



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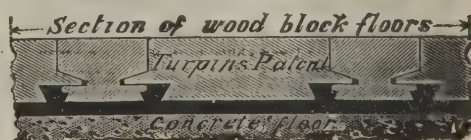
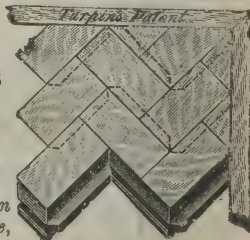
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Also in Pitch Pine, Teak, Deal, &c.

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TURPIN'S  
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LOCKING  
SYSTEM  
for Laying  
Block Floors on  
Concrete, Stone,  
and Deal Floors



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**TURPIN'S**  
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ESTABLISHED 28 YEARS.



A COMMODIOUS school building erected in Upper Lloyd Street, Manchester, by the Moss Side School Board was opened on the 12th inst. The cost of the new building, with accessories and the needful preparation for future extension, has been about 8,500*l.*, and the completed scheme will only add about 1,000*l.* to that sum.

THE Metropolitan Machine Company have just opened a handsome new riding school in the City in the rear of their well-known Bishopsgate works and showrooms. This great acquisition to the cycle-learning facilities of the Metropolis will make the "Juno" firm more popular than ever in the ever-growing cycling world.

THE directors of John Oakey & Sons, Limited, propose a final dividend upon the ordinary shares of 5 per cent. for the half year ending December 31 last, together with a bonus of 2½ per cent., making 12½ per cent. for the year; to pass 8,500*l.* to reserve, making that fund 26,234*l.* 16*s.* 10*d.*; and to carry 198*l.* 14*s.* 7*d.* forward to next account.

WITH reference to the artesian well at the Sleaford Station of the Great Northern Railway, noticed in our last week's issue, we now learn that this well, which has been bored by Messrs. Le Grand & Sutcliffe, of London, is 150 feet deep and overflows at 6 feet 6 inches above the ground. The flow of 14,400 gallons per hour was taken at 3 feet above surface, but the actual overflow at surface level is no less than half a million gallons per diem.

THE Leigh Council having decided to separate the offices of clerk and surveyor, over ninety applications have been received for the surveyorship, which is worth 300*l.* per annum, increasing to 350*l.* in three years and to 400*l.* in six years. The applications include well-known Manchester, Liverpool and Bolton gentlemen and surveyors from other Lancashire towns, the Isle of Wight and South of England being also represented.

THE county of Carlow having, in the opinion of the authorities, no further use for a gaol, it was on the 19th inst. put up for public sale by order of the grand jury. The premises comprise debtors' prison, convict prison containing thirty-four cells, female prison of thirty cells, house of correction, treadmill, pump and "fine-cut granite gate entrance." After an animated competition Mr. Molloy, a local merchant, was declared the purchaser at 1,200*l.* It was rumoured that the purchase has been made in trust for some Roman Catholic purpose, probably an industrial school.

A MEETING of the Association of Parochial Engineers was held on the 9th inst., Mr. A. Saxon Snell, F.R.I.B.A., occupying the chair. Mr. T. W. Smith read a paper on the above-named subject, giving in the first place a brief account of the old system for the disposal of refuse, and pointing out the dangers which the public health encountered. He then dealt very exhaustively with the merits and demerits of the refuse destructors of modern days. He also described the method of working the destructors, and pointed out that a good revenue was to be obtained from the sale of the "clinkers." The paper was followed by a discussion, in which Mr. House, of St. Luke's Vestry, and Mr. Spom, of Kensington Vestry, joined.

THE new Customs outlook station in Glasgow Harbour has been completed, and is now in working order. The station-house, which is situated on Mavisbank Quay, immediately to the east of Stobcross Ferry, is a prominent feature on the south of the harbour, and its design is so uncommon as to attract the attention of the thousands of people whose business takes them up and down the harbour. It stands about 40 feet from the face of the quay, and a piled foundation had therefore to be provided for the front and end walls. The building is two storeys in height, and overhead is a look-out room, 20 feet by 12 feet, with numerous windows, from which the officers on duty command the whole river up and down. On the ground floor are the kitchen, the examining officers' office, the surveyor's office, the storeroom and the lavatory; and on the first floor the boatmen's dormitory, the preventative officers' office, the preventative officers' dormitory, the chief preventative officer's office and the cloak and lamp-rooms. The exterior walls are of first quality fine-pressed red bricks, with red sandstone base-course, projecting corners and window and door sills, lintels and rybats.

AT a meeting of the improvement committee of the Gloucester City Council plans of a new theatre and opera-house, which a London syndicate are about to erect on the site opposite the municipal schools in Brunswick Road, were submitted and passed. The plans, which have been prepared by Mr. John P. Briggs, of Effingham House, Arundel Street, Strand, disclose a handsome and imposing building of brick and terra-cotta. Seating accommodation will be provided for 1,500, and from each seat there will be a clear and uninterrupted view of the stage. The latest lines have been followed in regard to comfort, exits, electric lighting and ventilation, and without doubt the theatre, when completed, will compare favourably with any house in the provinces.



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& 188 PICCADILLY, W.

*Superb selection of Bronzes &  
Louis XIV, XV, & XVI. Fittings etc.*



## ILLUSTRATIONS.

ELY CATHEDRAL.—THE REREDOS.

DESIGN FOR REBUILDING NORTH BRIDGE STREET,  
EDINBURGH.

## NEW CATALOGUES.

MESSRS. EDISON & SWAN have sent us one of their new illustrated price-lists of electric fittings, holders, switches, &c., of which they keep a large stock at their central warehouses, Ediswan Buildings, 56 and 37 Queen Street, London, E.C.; the West End dépôt, 53 Parliament Street, Westminster, S.W.; and the various provincial dépôts. The book is well printed on excellent paper, profusely illustrated, and forms a useful compendium of knowledge as to the various appliances for and accessories to electric lighting.

## ASPINALL'S ENAMEL.

ASPINALL'S ENAMEL, LIMITED, are usually considered solely as manufacturers of enamel, put up in tins and tinlets, but it is an egregious error to suppose that the firm confine their attention to this branch of business, extensive as it is. They have enamel suitable for every description of decorative work, both inside and outside, and we recommend everyone who wants an article with an easy flow, and something which is not difficult to work with the brush, to apply for samples of their "O" quality. With paints and varnishes, quality has been, and always will be, the main thing considered by Aspinall's Enamel, Limited. With a tin bearing the label of New Cross Brand, one is sure of a paint of the highest grade. All their varnishes are guaranteed "genuine gum varnishes," and the increased turnover in this particular article testifies to the appreciation of their *clientèle*. Perhaps the most remarkable of their recent successes is "Wapicti," a washable distemper combining the properties of a strong disinfectant and antiseptic agent. Wapicti dries with a dull flat surface, similar in effect to fresco painting, and it can be had in such a charming variety of

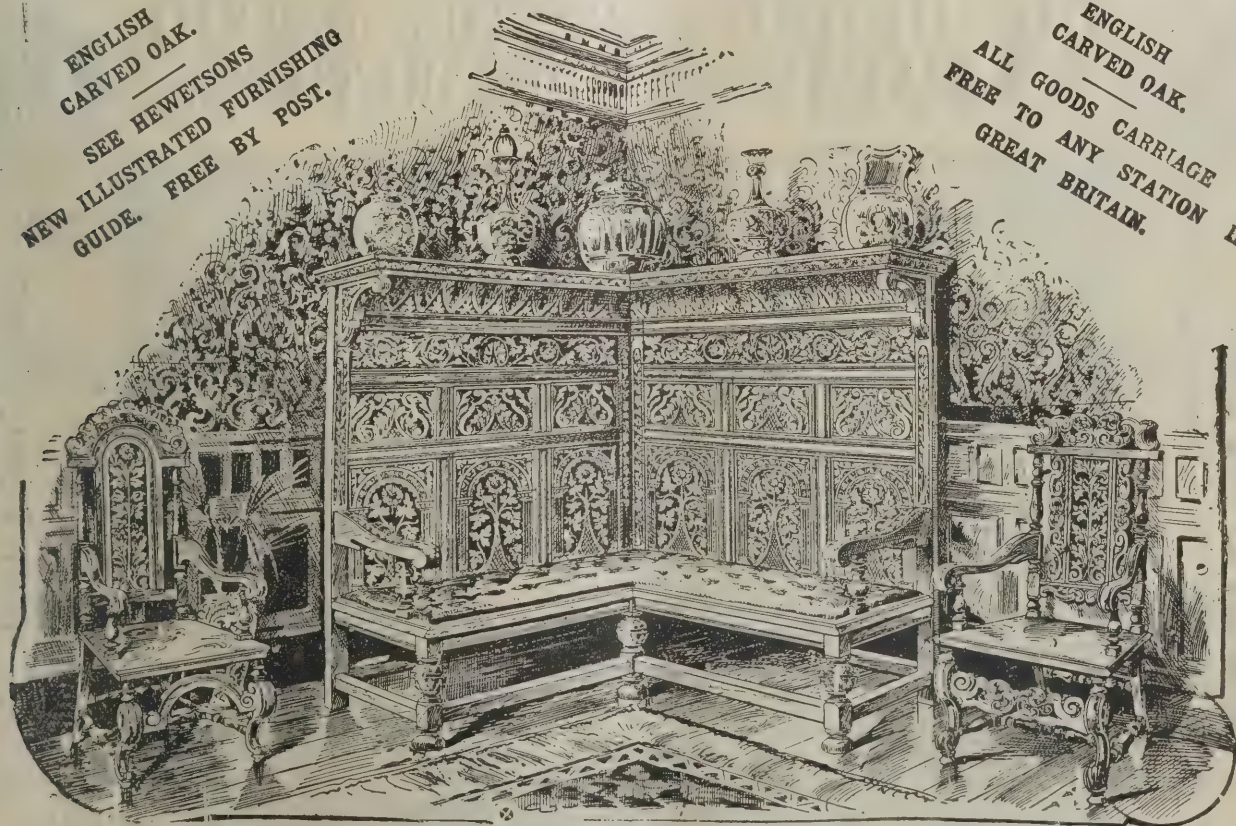
colours as to enable ambitious decorators to attempt Pompeian effects, or, harking still further back, Assyrian combinations of rich and brilliant hue. Wapicti is invaluable for interior decoration of living rooms, kitchens, passages, sculleries, wash-houses, &c. We cannot be too careful in the decoration of the walls of dormitories, hospitals, barracks, &c., and one pays far too little attention to the question of a healthy or unhealthy wall-paint or paper. There is nothing obnoxious in Wapicti—in fact, its disinfectant qualities alone recommend it, and its delicate tints and its artistic effects render it the desideratum of the decorating trade. Wapicti may be applied over oil paint without clear-colling, or oil paint may be laid over it.

THE PATENT VICTORIA STONE COMPANY,  
LIMITED.

THE ninth annual meeting was held on Saturday last at the Great Eastern Hotel, Bishopsgate Street, Mr. J. J. Griffiths, the chairman, presiding. In his address the chairman said the volume of business transacted during the year exceeded by 20,000% the amount done in any previous year. The profit earned was 9,779%, against 7,176% in the previous year, an increase of 2,611%. They were now making great advances in the way of architectural work, which was becoming an important feature of the company's operations. The beautiful specimens of carved architectural stone shown in the room opened up a new field for profits, and as the material was capable of holding its own in any position, in any climate, and for any length of time, he thought it could not fail to add to the company's business in future. The directors had acquired the sole agency of the National Opalite and Glazed Brick and Tile Syndicate in two of the principal counties in the Midlands, and had made arrangements to buy five acres of land at Groby for the purpose of erecting cottages for their workpeople. Many of their workmen were unable to get house-room within four or five miles of their work, and the directors proposed to build suitable cottages, and to offer easy terms to their workmen to purchase cottages or plots of land for building. The directors, he added in conclusion, had decided to call up the balance of the capital—20,000%—and to offer the new shares to the existing proprietors at par. Mr. James Glaisher having seconded the motion, Major Lewis H.

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ARM-CHAIR, £4 15s.No. 320.—CARVED OAK HALL COSY CORNER,  
6 ft. 6 in. high, £24 10s.No. 321.—The "KNIGHT" CARVED OAK  
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Isaacs strongly objected to the issue of the new shares at par. The second and third issues, he pointed out, had been made at a premium of 17., and if the same course was adopted now they would obtain 4,000% towards the acquisition of land for building purposes. He moved an amendment to the effect that the new shares should be issued at 17. premium. The amendment was rejected, only three hands being held up in its favour, and the motion for the adoption of the report was carried unanimously. On the motion of the chairman, seconded by Major Isaacs, a dividend at the rate of 10 per cent., free of income tax, was declared. Mr. James Glaisher and Mr. W. T. Douglass were re-elected directors, and Mr. James Aynsley was reappointed auditor. The proceedings closed with a cordial vote of thanks to the chairman and directors.

### THE COUNTY COUNCIL BUILDINGS, LONDON.

At the instance of Major-General J. Shaw Stewart, R.E., the following resolution was unanimously adopted by the Paddington Vestry at its meeting on the 16th inst.:—"That, in the opinion of this vestry, the scheme proposed by the London County Council, and at present before Parliament, for erecting new Council buildings for London, is a highly extravagant project; and, should it be considered necessary to have new buildings, this vestry strongly urges upon the Council the expediency, before deciding upon any site, of ascertaining by public advertisement and by every other possible means what suitable sites within the metropolis are available, and the terms upon which they can be secured." Mr. Frank Dethridge, the vestry clerk, was directed to send a copy of this resolution to the Paddington borough members and to the vestries and district boards of the metropolis, with a request to the former to oppose the Bill now before the House of Commons, and with an invitation to the latter to pass a similar resolution to that adopted by the Paddington Vestry.

MESSRS. GRAHAM & BANKS' tender of 303% for decorating the new supper-room at the Royal Palace Hotel, Kensington, has been accepted by the directors, and the work is to be done under the architects, Messrs. Henry S. Legg & Son, of Christ's Hospital.

### NOTTINGHAM MASTER BUILDERS' ASSOCIATION.

THE members of the Nottingham Master Builders' Association held their annual dinner at the Albert Hotel, Derby Road, on the 13th inst. There were about seventy in the company, and the proceedings were characterised by much enthusiasm and success. Supporting the chairman were Mr. James Wright (the vice-chairman), Alderman C. Bennett, Councillor John Wright, Messrs. G. Fish, J. Sulley, H. Vickers, J. W. Woodsend, J. H. Williamson, W. Edgar, F. Hodson, Chambers (the vice-president Leicester Association). Others present included Messrs. H. Green, A. H. Niblett, J. H. Vickers, Simpson, Whittaker, W. Watson, W. Wootton, Whitehouse, Fish, F. Atkin (retiring secretary), W. J. Barton (secretary), A. G. Bell, J. Cowper, S. Cook, T. Cuthbert, T. Day, F. Evans, Garton, Burton, H. C. Gilbert, Gabbitass, H. Haines, A. Hinsley, Hobson, J. Hutchinson, E. Kent, J. Lewin, G. T. Lovett, Whitworth, W. Maule, F. Messom, Norris, Pillatt, Poyzer, Priestley, Price, Rudd, W. Savage, F. Shaw and W. Hall.

### MUNICIPAL OFFICERS' ASSOCIATION.

THE annual dinner of the Municipal Officers' Association promises to be a great success, not only in point of numbers, but of its thoroughly representative character; municipal officers coming from all parts of the country. The Right Hon. the Lord Mayor of London, the president of the Association, will be well supported. Amongst those who have promised to attend we notice the Right Hon. Lord Balfour of Burleigh, Chief Secretary of State for Scotland, Sir John Blundell Maple, M.P., J. L. Wanklyn, M.P., Mr. C. J. Stewart, Clerk to London County Council, Sir John Monckton, Town Clerk of London, Mr. H. H. Crawford, the City Solicitor, the town clerks of Birmingham, Crewe, Devonport, Douglas (Isle of Man), Huddersfield, Lancaster, Bootle and Nelson, and amongst the London vestry clerks Mr. M. H. Hale (hon. solicitor to the Association), Holborn, Mr. C. William Tagg, Camberwell, Mr. W. M. Mead, Bromley St. Leonard, Mr. G. W. Preston, St. Luke's, Mr. F. Dethridge, Paddington, Mr. A. P. Johnson, Southwark, also Mr. J. H. Rutherglen, Mr. O. S. Brown, surveyor of Camberwell, Dr. Stevens, medical officer of health, Camberwell, Mr. G. A. R. Fitzgerald (standing Parliamentary counsel), Mr. G. Attenborough, accountant to School Board for London, Mr. F. Sumner, surveyor of Bermondsey, Mr. R. H.

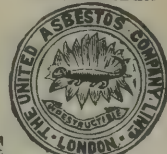
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Lord, accountant, Camberwell, Professor Corfield, St. George's, Hanover Square, Mr. J. Rush Dixon, Shoreditch, Alderman Beachcroft, L.C.C., Mr. E. Collins, clerk, and the medical officer of health, and the surveyor of Chiswick, Mr. G. Weston, the surveyor of Paddington, &c.

The demand for tickets (5s. each) is very great, and officers should make early application to the Honorary Secretary, Mr. C. J. F. Carnell, 33 Paulet Road, Camberwell, S.E.

### THE CONDITION OF DUBLIN.

At the meeting of the Dublin Sanitary Association on the 11th inst., Dr. Duffey, president of the Royal College of Physicians, said the state of the public health in Dublin since the beginning of the present year had, to say the least of it, been very unsatisfactory. He did not wish to be an alarmist, and he agreed with the superintendent medical officer of health in the opinion he expressed that there was no necessity for a scare. But at the same time he thought it would be injurious to minimise the gravity of the present situation, or to seek by any plausible explanation to discount the excessive mortality which existed. They were now in the midst not only of one epidemic, the epidemics at present were now at least four—preventable diseases, to say nothing of the enteric fever, which unfortunately was always more or less present amongst them. During the week ended January 30 last he found that the death rate in this city was 50·2 per thousand persons living. The zymotic death rate was 9·2 per thousand. He might mention that in London the death rate this week was a little over 20 per thousand, and the average zymotic death rate was, he believed, about 2 per thousand. They could see the great difference between these figures. They had been officially informed that the present high death rate existed from preventable disease, and was chiefly due to its being spread widely through the infantile population, and that—he was now quoting—"because since 1892 there had been few deaths," he presumed "cases" was meant, "from measles, scarlet fever, or whooping cough, and therefore few children under four years had been protected against these diseases by previous attacks." Surely it was also small comfort to be told by the same authority that at no distant date the epidemics would have died out. Were they to understand that that would take place because there would be no persons left to be

attacked, or that there would be no more pabulum for the disease to feed upon? Instead of letting them die out should they not make some attempt to stamp them out? What warranty had they for the rather vague assertion that these diseases would in all probability not again arise in epidemic form? The want of adequate hospital accommodation for infectious diseases such as those in the present instance amongst them, the absence of means of isolation for the families amongst whose members infectious diseases might occur, and the deficiency of provision for convalescent hospitals for such cases were, they well knew, very potent factors for the spreading of these diseases. Past experience showed that it was chiefly by stimulating official perfunctoriness and bureaucratic indifference that they were able to get the legislative powers that existed—small as they were—put into force for the preservation of the health of the people. It was by constantly drawing attention to those matters requiring sanitary reform and educating the people in the elementary rules of public health that the Dublin Sanitary Association was doing its important work which deserved general support. Referring to the proposed convalescent hospital at the Pigeon House, he said he was rather surprised to have seen it stated that he gave an opinion that was diametrically opposed to that of the Council of their Association. The only remark he remembered having made on the matter was in a private conversation with a medical man in talking of the healthiness of the site, which was a different thing from the establishment of a convalescent hospital there for patients recovering from scarlet fever. He remembered saying that after some experience of the Pigeon House Fort thirty years ago or more, when he was a surgeon in the Army Medical Department some men of his regiment and their families were there, and as far as he knew it was a healthy quarter. He did not wish in any way to put his opinion against the opinion of the Council of the Association.

Dr. Grimshaw, Registrar-General, spoke of the present high death rate in Dublin, especially of the deaths caused by measles. In 1892 this disease caused 472 deaths, and if every five years they were to have such an epidemic, the matter was very serious. The fact of the matter was that the sanitary condition of the city was not what it ought to be. They had still streets of wretched tenement houses crowded together in various places, and they had inadequate accommodation for the treatment of infectious diseases. Excessive drinking and dirt had got more to do with the high mortality than any other two elements. But to say that it was only the children who

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were dying was the worst statement that could be put forward. The children were the very people who should be taken care of. They would ultimately be the citizens if they were allowed to live, but, unfortunately, they were not in Dublin, and their population was practically at a standstill. It was a very serious matter. The only place in the world that beat Dublin in the matter of death rate was Bombay. According to the last return the rate in Bombay was 102 per thousand, but there was no place else in the whole world that he could find in the records that came to his office that came near the death rate which they had reached in the city of Dublin. Last week it was 49·8 per thousand within the city. It was something appalling, and something which had occurred very seldom here before, and was a cause for alarm, and very serious alarm indeed. It was preposterous to try to minimise the high death rate by saying it was only the children that were dying.

### WORKMEN'S DWELLINGS IN MANCHESTER.

THE sanitary committee of Manchester have for some time been considering proposals for utilising for the purpose of tenement dwellings and cottages for working men a number of building sites now in possession of the Corporation. The city surveyor in his report says:—"The total number of persons to be housed is 2,584. The sites known as the 'Oldham Road area' and 'Pollard Street area' are to have buildings so constructed as to contain in the aggregate not fewer than 2,034 persons. The Oldham Road area is divided into two building sites of nearly the same size. Tenement dwellings of five storeys have been erected upon the east portion of the site between Spittal Street and Bengal Street. These dwellings contain 235 double rooms and 48 single rooms and accommodate 848 persons. The remainder of the site between Spittal Street and Cornwall Street is available for the erection of additional buildings. The Pollard Street area is covered by tenement dwellings very similar to those that have been erected on the Oldham Road area. These dwellings consist of 130 double rooms and 5 single rooms, and accommodate 448 persons; this leaves a balance of 738 persons still to be provided for on the Oldham Road area. Three hundred persons are to be housed on the Chester Street area and 250 persons on the Pott Street area, making a total of 1,288 persons still to be housed." In order to obtain accommodation for this number of persons without having recourse

to high buildings similar to those already erected, the city surveyor has examined the other sites belonging to the committee which may be utilised for the erection of labourers' dwellings. A plan is given which shows the position of five building sites situated in Oldham Road, Chester Street, Pott Street, Harrison Street and Pryme Street. The railway stations, tram routes, and the distances of the sites from Albert Square are indicated on this plan. With regard to the Oldham Road area, the plan adopted provides for buildings to front Oldham Road four storeys in height, and to consist of thirteen shops and dwelling-houses, with frontages varying from 19 feet 3 inches to 29 feet 6 inches. The first, second and third storeys would consist of five-roomed dwellings connected with the shops. The buildings on the remaining portion of the site would consist of two rows of two-storey tenement buildings, fronting to a new 12-yards street, and one row of five-roomed cottage dwellings, fronting to George Leigh Street, which is 18 yards wide. The clear space between the buildings at the rear would vary from 58 feet to 55 feet in width. The four rows of buildings would afford accommodation for 377 persons. The estimated cost of erecting these buildings is 17,901*l.*, equal to 36*l.* 15*s.* 3*d.* per person. The estimated cost of sewerage and paving the new streets, exclusive of the cost of widening the existing streets, is 900*l.*, to which must be added the estimated value of the site, viz. 7,981*l.*, or a total of 26,782*l.* On the Chester Street area it is proposed to erect four blocks of buildings, with frontages to Chester Street, Marsland Street and Hulme Street. The buildings would be two storeys in height, and each dwelling would consist of two two-roomed and two three-roomed tenements. These buildings would afford accommodation for 306 persons. The estimated cost of these four blocks is 11,873*l.*, equal to 38*l.* 16*s.* per person, and the estimated cost of new streets, exclusive of street improvements, is 350*l.* The estimated value of the site, which has an area of 4,554 yards, is 2,277*l.*, or a total of 14,500*l.* An alternative scheme is submitted. On the Pott Street area it is proposed to erect two blocks of four-storey tenement dwellings, of a similar character to those already described for the Chester Street area. The buildings would accommodate a total of 400 persons. It is proposed to widen Pott Street, Sandford Street, Caroline Street and Wharf Street, making the width of these streets in each case 14 yards. The estimated cost of the buildings is 15,357*l.*, equal to 38*l.* 7*s.* 10*d.* per person, and the estimated cost of new streets, exclusive of street improvements, is 164*l.*



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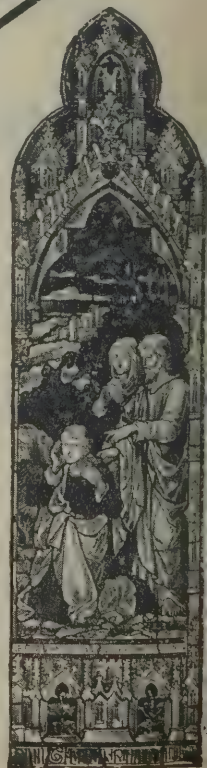
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The estimated value of the site, which has an area of 3,914 yards, is 1,957*l.*, or a total of 17,478*l.* The committee recommend the Council to approve of and authorise (subject to the sanction of the Local Government Board) the erection of a model lodging house in Harrison Street, in general accordance with the sketch plans prepared by the city surveyor. Certain proposals contained in the report of the city surveyor with respect to Pryme Street were withdrawn. The number of persons to be accommodated by the schemes recommended for adoption is 1,346.

### LONDON WATER SUPPLY.

In a letter to the *Times* Sir Frederick Bramwell, C.E., writes:—

I presume it will not be long before Parliament will, again be considering this matter, with the object of once more determining whether or not the undertakings of the water companies now supplying London should be compulsorily acquired by the London County Council, in conjunction, it may be, with certain outside authorities as regards portions of the undertakings.

I was under the impression that hitherto the County Council had always put forward the desirability of the whole water supply being in the hands of one authority, but it would seem they have now altered their views upon this point, and are prepared to agree to county councils many and to authorities many.

According to my view, if the inhabitants of the Metropolis were wise, they would leave the undertakings in the hands of the companies who for years past have given a supply to those inhabitants the excellence of which is proved by the health of the people, as testified in the weekly returns of the death-rate of London and of some thirty or more of the principal towns in England.

There are eight companies engaged, each of them supplying a population sufficiently numerous as to well warrant an independent organisation for the control of its district; but it might possibly be found on inquiry that an improvement could be made by combining the eight companies into two undertakings, one for the north and the other for the south side of the Thames. If such a change were made it might also be well, in order to satisfy public opinion, to add certain persons holding public position (the fewer the better) as *ex-officio* members of the boards. But if the sentiment that the water-supply should be in the hands of some public body, and not in those of private

companies, be so strong that Parliament feels the companies must be displaced, then, in the deepest interests of the ratepayers of London, I do trust that Parliament will not for one moment allow the companies to be acquired by the London County Council, and I urge this for the following reasons:—

It cannot be the desire of any honest person that the holders of stock in the present London water companies should be deprived of their property without fair and full compensation for that in which they originally invested, or into which they have entered by subsequent purchase, in both cases on the faith of Parliamentary bargains.

Assuming the change to be made from the companies to some newly-constituted water board, it may be taken that such a board would seek to utilise to the utmost that which it had purchased, namely, the undertakings and sources of supply of the present companies; but the London County Council is committed to a policy of a change of supply—that is to say, if the London County Council became the purchasers of the companies the ratepayers of London will have to pay not only that which they ought to pay to compensate the proprietors, but at least as much more—which there is no need to pay—for the provision of new sources of supply.

A most competent Royal Commission, composed of representative men in engineering, chemistry, geology and medicine, and presided over by Lord Balfour of Burleigh, came to the unanimous conclusion, after hearing all parties, that the existing London water-supply is a perfectly wholesome one, and, as I have said, the weekly returns of the death-rate show that this is so.

The London County Council set up their opinion in opposition to that of the Commission and to the records of the death-rate. But I presume one may say without offence that the London County Council are not infallible, and it seems to me it would be most regrettable if the water-supply of London were to be acquired by this body with the object, not of using the sources of supply, but of discarding them, thereby once more, be it stated, involving the ratepayers in an enormously increased annual charge for water.

Take a striking instance of what would happen. The Commission approved of a plan brought forward by Mr. Walter Hunter and the late Mr. Fraser, on which plan Mr. Hawksley and I reported, by which, in the neighbourhood of Staines, large reservoirs were to be provided, the provision to be made as and when wanted, to impound the excess waters of the Thames and to deliver them to the water companies at times

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when the flow of the Thames was comparatively small. Last year Parliament sanctioned the first instalment of this scheme, promoted jointly by three of the water companies, and the work is just about to be begun.

The Commission recognised that the average daily flow of the Thames was some 1,300 million gallons, and that, therefore, after providing for the requirements of the navigation there was an enormous volume of water which now went away uselessly to the sea, while, by means of reservoirs, it might be impounded and be beneficially used.

In the Parliamentary committee which inquired into this Bill the counsel of the London County Council said that the passing of the Bill "will make the abandonment of the Thames as a source of supply—a policy which, rightly or wrongly, has been decided on by the County Council, and which will ultimately commend itself to everybody in London—much more difficult."

If therefore this year Parliament puts the London County Council into the position of being the owners of the London water-supply, they should logically put a stop to these works.

I may, perhaps, be told that the London supply has not been satisfactory from the point of quantity, and reference may be made to the difficulty experienced in 1895, during the many weeks of continuous frost, and in respect of the East London Company by reason of the shortness of the water-supply in the drought of 1895.

It may, perhaps, surprise those of your readers who pin their faith to municipal control of supply when I mention that in the city of Manchester, in the autumn of the "Jubilee" year, the supply was so short that baths had to be prohibited; that in Bradford the corporation, as appears from a report of the waterworks committee in October 1887, "have been under the necessity of placing the town on short supply during portions of the years 1876, 1877, 1878, 1879, 1880, 1883, 1884 and again this year," and that during the weeks of frost in 1895, to which I have alluded, the inhabitants of Sheffield suffered quite as badly as any of the inhabitants of London, and found out that frost was no respecter of persons.

As regards the stoppage of supply by frost, in some few cases this did arise from freezing of the smaller mains, but in most cases the stoppage of supply by frost arose from the imperfect laying and care of the service-pipes into the houses—which pipes are the property of the consumers. In my own house I took care of these pipes, and I never had a day's stoppage of supply throughout the whole period.

As regards the East London case. It is difficult to speak of this with calmness, having regard to the way in which this company was treated. In the year 1893 they applied for an Act containing powers to increase their storage capacity, when it pleased the Parliament of that day, at the instance of the London County Council, to throw out the Bill upon the second reading, and not even to send it forward to a committee to ascertain the necessity for this increase. This decision was arrived at by a majority of twenty-four, including as most fit persons to determine on a London Water Bill, fifty-six Irish, twenty-three Scotch and eight Welsh members. Two years afterwards happened that which it had been the very object of the works then applied for to prevent—a short water-supply; that which was called in the newspapers a "water famine." But those who adopt such an expression should read the report of the Local Government Board inspector who held an inquiry in December 1895 into this matter. They will find that during the so-called "water famine" there was an average supply of 30 gallons per head per diem, that there was never pumped into the district a quantity less than 26 gallons per head per diem. As perhaps your general readers may not appreciate this statement as to whether 26 gallons per head per diem is a sufficient supply or not, I may point to the instance of the Manchester new supply from Thirlmere. Manchester is bound on demand to afford water to certain other towns so long as there remains for Manchester 25 gallons per head per diem.

In conclusion, may I repeat that I earnestly advise the rate-payers of London to leave the water supply in the hands of private companies? If on some sentimental ground, such as "that a public need should be satisfied by public means," they will not consent to this being done, then let it be put into the hands of a new body which will utilise the existing undertakings and sources of supply; but, in the interests of the already overburdened, unhappy householders, do not give it to a body who are pledged to discard the present sources of supply and to find new ones—a fearful cost.

#### RESPONSIBILITY FOR DRAINAGE.

Two important cases connected with questions of drainage have been heard in the Queen's Bench Division. The plaintiff in *Holland v. Lazarus* carried on the business of a lodging-house keeper at 18A Dyssell Street, Dalston Lane, and the defendant is the owner of Nos. 20, 22, 24 and 26 Dyssell Street, adjoining the plaintiff's premises. The plaintiff claimed

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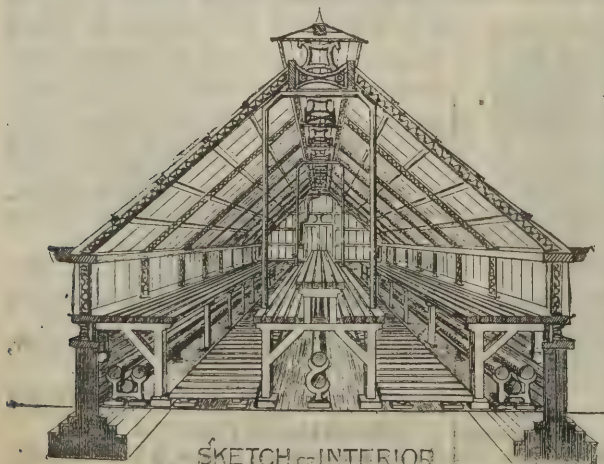
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damages for a nuisance created by sewage matter percolating through the soil into his premises and an injunction. The claim for an injunction was subsequently withdrawn and also a counterclaim by the defendant. It appeared that a drain from the defendant's four houses, constructed under the order of the vestry in 1884, ran under the plaintiff's lodging-house. It was alleged that, owing to the defective construction of this drain, the lodging-house was, in the earlier months of 1896, rendered partly uninhabitable by the percolation of sewage and noxious gases, and that this resulted in serious loss of lodgers to the plaintiff. The defence was that the nuisance was caused by the plaintiff or his predecessor in title having a 3-inch rain-pipe improperly connected with the drain by means of a 6-inch pipe. Evidence was given that there was absolutely no fastening in the connections and that the smells and leakage resulted, at any rate in great part, from this fact, though it was alleged that leakages had also occurred from other portions of the defendant's pipe.

Counsel for the plaintiff submitted that the plaintiff, or his predecessor, by connecting his rain-pipe with the defendant's drain had turned it into a sewer, and that it was therefore repairable by the vestry.

Mr. Macaskie, in reply, contended that the pipe in question was a drain within the definition of section 250 of 18 & 19 Vic., c. 120, being a "drain for draining" a group or block of houses by a combined operation under the order of a "vestry or district board."

Mr. Justice Bruce was at first inclined to hold that the pipe was a "drain," but subsequently held that, though it had been a "drain" for defendant's four houses, the junction of the rain-pipe in the plaintiff's house had made it a sewer. He cited *The Queen v. the Vestry of St. Matthew, Bethnal Green*, as an authority for his decision. He also held that the plaintiff could not recover for nuisance, on the ground that whatever nuisance there was arose from the imperfect joining of the plaintiff's own pipe on his own premises. But he held that a certain amount of leakage from the defendant's pipe, as it passed under the plaintiff's house, had been proved, and that, on the authority of *Humphries v. Cousins*, the defendant was technically liable for a trespass. Mr. Robinson submitted that, the leakage being from a sewer which was repairable by the vestry, the defendant could not be liable for the escape of his sewage from that sewer, but his Lordship gave judgment for the plaintiff with one farthing damages for the trespass, but directed that he should pay all costs save such as should appear to the taxing-master

attributable to the trespass, and he gave the plaintiff costs on the counterclaim.

In *Holland v. Pearce* the plaintiff claimed damages for misrepresentation by the defendant in connection with the letting of No. 1 Colham Villas, Yiewsley, West Drayton, to the effect that the drainage was in perfect sanitary condition and that the water-supply was pure. The defendants denied the alleged representation, and said that, if it had been made, it was true to the best of the knowledge and belief of the defendant William Pearce. Further the defendant Thomas Pearce said that the statement of claim disclosed no cause of action against himself.

Mr. McCall, Q.C., for plaintiff, said that the question was whether the representations were in fact made, for, if so, there could be little doubt that they were made falsely or fraudulently, that was, that the defendant made them recklessly, regardless as to whether they were true or false. In June 1893 the plaintiff applied to the defendant William Pearce, with the view of taking a lease of the house in question. During the negotiations the plaintiff put to him the specific query, "Is the house well-drained, and is the water-supply good and pure?" To this the defendant replied in the affirmative, and as the result the plaintiff took the house on June 28, 1893. He went into possession in July, and from that time his family were subject to periodic illnesses. The well was so arranged that the water was highly charged with sewage. The plaintiff called in the sanitary inspector, and it was found that the pipe leading from the sink was entirely untrapped. There was an old pipe leading from the cesspool, and this pipe, having been broken off, acted as a funnel to discharge sewer gas under the floor of the house. There was also an old brick drain that acted in a similar way. It had never been cleaned, and was more than half full of sewage matter. Plaintiff had therefore no alternative but to leave the house, and he was entitled to liberal compensation.

The plaintiff said he negotiated for taking No. 1 Colham Villas in June 1893. He saw the defendant, William Pearce, who said that the drains were all in good order, and the water was pure. Relying on this statement, plaintiff took the house. Witness then gave further evidence as to the illnesses of his family and the expenses to which he had been put.

Mrs. Holland, the plaintiff's wife, corroborated her husband's evidence.

Dr. Ferris gave medical testimony as to the plaintiff's illness, which, he said, was first gastritis and afterwards of a typhoid character.



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Other evidence was then called as to the state of the drains and the water supply. This closed the plaintiff's case.

Mr. Kemp, Q.C., addressed the jury for the defence. He said that the plaintiff's case had not been justified by the evidence. The charge was in reality a criminal one, but he would satisfy them that when the plaintiff took the house there were no representations as to the drains or water-supply at all, although, so far as defendant knew, the water-supply was good and the drains in order. The plaintiff had looked through the premises himself, and never asked any question as to the drains or water. Moreover, during the occupancy of the previous tenant there had been no complaint. Nor was there any reference to a misrepresentation in the correspondence. It was not till after the issue of the writ that this suggestion was made.

Mr. William Pearce, one of the defendants, was called, and said that he made no mention to the plaintiff of either drains or water.

Dr. Hayden, the previous tenant, gave evidence as to the purity of the water.

Some further witnesses having been called for the defendants, the learned counsel and the judge addressed the jury, who, without leaving the box, found a verdict for the defendants.

### CONTRACTORS' ACCOUNTS.

(Concluded from last week.)

THE first actual work will be to excavate for cellar. The contractor must first lay out the size of excavation and start his labouring men to work either under his own supervision or that of a competent foreman. In either case the exact time of each man should be kept in a time-book prepared for the purpose, and each man on the work should also be provided with time slips similar to the one given below, in which a daily record will be kept of the doings of each workman, including date, time, for whom the work was done and the description of work; these slips do not cost much, and I dare say they may be had at the office of the *Canadian Architect and Builder*. Their advantage and usefulness cover much more than their cost, and are a sure preventative to subsequent disputes regarding time and wages. They should be handed in to the contractor or his clerk at least once a week:—

STUB.		WORKMAN'S TIME SLIP.		
No. 10.	No. 10.	.....189 .		
.....189 .	Work done this day by .....			
(Workman's Name.) for		For Whom.	Description of Work.	Time.
Contractor, &c., on John Doe's cellar, excavating and moving stones, 8½ hours		John Doe	Excavating cellar and moving stones	8½ hours
(..... 2¼" .....	(...1½"....)	(..... 2½" .....	(...1" ...)	

The stub may be kept by the workman, while the slip should be kept on file after the time has been properly charged on the one hand and credited on the other.

By adopting a system of this kind, or one similar, the contractor may know every day, if desired, just how the work is getting along financially. In adopting this method of getting at the actual cost of any work it does not follow that another piece of work of a similar kind will cost exactly the same amount. The knowledge gained to-day by actual experience is not sufficient for an estimate to be made six months or a year hence; and accordingly the contractor must be constantly laying about him for new ideas, ever on the alert to take advantage of new methods and ready to make application of these novel plans that are constantly being put forth to facilitate work and reduce cost. It is impossible for the non-progressive contractor, who still adheres to the methods of twenty-five years ago, to compete with men whose organ of order is largely developed, and who are alive to every modern innovation if it gives promise of advancing his interest.

Besides adopting the foregoing method of time-keeping, the contractor should have a slip for his own use, which might be termed "A Memorandum of Estimate and Costs." This memorandum should be for the purpose of noting results and comparing them with first estimate in order to discover lapses or discrepancies. In my own practice, when contracting I found this system of great utility in giving a definite to every transaction connected with the work in hand, which served me well when making estimates on other buildings. I give herewith a form that is generally employed for this purpose:—

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Sole Makers of Finch's Siphonic W.C. & Finch's Urinal for Women, &c.

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OF ALL DESCRIPTIONS.

CONTRACTORS BY APPOINTMENT TO THE SCHOOL BOARD FOR LONDON.



MEMORANDUM OF ESTIMATE—COST FOR MR. J. DOE'S HOUSE. 189...

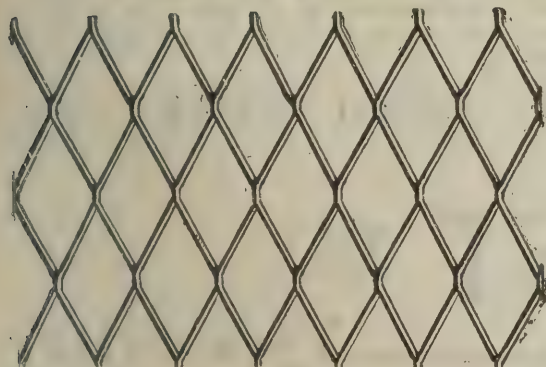
Various Service and Material.	Quantities.	Original Estimate.	Bid.	Cost.	Profit.
Cost Preparing Estimate and Expenses					
Grading and Excavating					
Quarried Stone					
Mason Work					
Dimension Stone					
Brick and Terra-cotta					
Bricklayer					
Grates					
Ranges and Set Stoves					
Heaters					
Heating Pipes, Radiators, &c.					
Registers					
Mantels					
Tiles and Tile Floors					
Outhouses					
Pavements					
Carpenter Work					
Lumber					
Factory Work					
Porches and Verandahs					
Fences					
Hardware					
Painting and Glazing					
Plastering					
Plumbing					
Gas Pipes and Fixtures					
Electric Wiring and Fixtures					
Roofing					
Tin and Galvanised Ironwork					
Iron Fencing and Cresting					
Cellar Floors					
Cement Work					
Teaming and Carting					
Labourers' Work					
Permits and other Legal Matters					
Paperhanging					
Personal Expenses					
Percentage					
Insurance					
Miscellaneous					

Here the contractor may tell at a glance what any piece of work cost him, and he may be able to judge from this what any similar work is likely to cost him, though, as before stated, it will not do to accept blindly as the probable expense of one piece of work because a similar piece previously cost a certain sum. No matter how much alike two pieces of work may be in style, material and surroundings, there will always exist conditions that will make differences of cost. This is a well-known fact among experienced contractors.

The great leak that is so often found in contractors' affairs is generally to be looked for in the labour department. When I say "labour department" I do not confine myself to the labouring man, the man who works with pick and shovel—as a rule he performs his part well and honestly, and his pay is small—I mean the loss is mostly found in the pay-sheet of the high-priced mechanic, chiefly because he has not been handled properly. After the quality of order in a contractor should follow a knowledge of men and an ability to lead them to successful endings. There should be no delay in paying their wages. If any portion of wages due the mechanic is held back from any cause, that mechanic at once becomes a creditor of the contractor, and cannot, from the very nature of things, feel bound to do more for his employer than his own ideas and inclinations will permit. Prompt payment of wages does much towards making prompt and industrious workmen. Be prompt and correct in all your dealings with men in your employ, then you may expect to receive prompt and effective service, for you hold the right to exact it.

In letting sub-contracts, it is usual to pay the sub-contractor in the same ratio as the contractor is paid. This in all cases should be understood, in order to prevent disputes. It is always better for a contractor to sublet the work of heating and plumbing, but in doing so it should be understood that all the work must be done in accordance with the demands of the main specifications and drawings, but if there are no drawings showing the system of piping for the heating and plumbing, with radiators, registers, baths, sinks, taps, vents, &c., a plan should be prepared before the work is let, and this plan should be approved of by the architect or by the owner if there is no architect employed. I must warn the young contractor here concerning the matter of heating and plumbing, and advise that if he has had no experience or a very little experience in these branches, he should take no definite action about them until he has got the opinions of some person or persons who have had a lengthy experience. Indeed, in preparing an

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Meshes from  $\frac{1}{8}$ th in. to 6 in. wide. Strands from 24 B.W.G to  $\frac{3}{16}$ th in. thickness of steel.

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**CATALOGUES AND PRICE LISTS** can be obtained on application. Also copy of a REPORT by an EMINENT FIRM of ENGINEERS on the use of EXPANDED METAL IN CONCRETE.

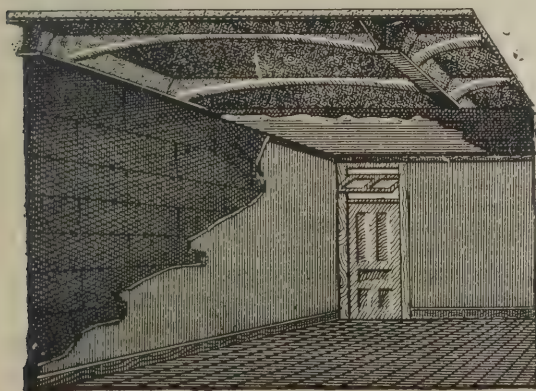
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estimate, when much plumbing is to be done and where a system of heating is to be placed in the building, it is always the wisest plan to submit the drawings and specifications to some experienced person in the business, and have him estimate on the work and say what he will do it for. The figures secured, it is well to add from 5 to 10 per cent. to them to cover the contingent expenses that are sure to arise. If the mason-work, painting and portions of the work are sublet for fixed amounts, do not forget to add a percentage to the amounts to be paid to sub-contractors, for it must be borne in mind that you cannot be responsible for another man's work and see that he performs his proper duties without an expenditure of time, labour and money.

Having received and accepted the most suitable bids for the various works and added them to the figures estimated for the work you intend undertaking yourself, the next thing will be to add an additional 5 or 10 per cent. to the whole amount, which sum should represent profit above all and every expense in connection with the contract. If this amount or a greater one does not result from the work when completed, it cannot be said that it was a profitable contract as business matters go.

I would like to say right here that no sensible contractor ever "jumps" at the cost of a building and takes the work at the figures he gives, neither will he adopt the method of "cubing" in making an estimate that he intends to use when tendering for a piece of work. Cubing may do well enough in experienced hands for making an "approximate" estimate of the cost of a building, but proves a snare and a pitfall if relied upon as being exact.

Besides the blank forms presented in the foregoing, there are many others that are used by contractors in their practice, varying according to the character of work and its locality.

### PROPOSED MUNICIPAL BUILDINGS AT LANCASTER.

A MEETING of the Lancaster Town Council was held in committee on Friday evening, at which it was proposed to purchase the property in Dalton Square belonging to the Misses Coulston, containing 5,500 square yards, for public purposes as a memorial of the Queen's diamond jubilee. The property in question has long been looked upon as a suitable site for public buildings, fronting on to Dalton Square, a splendid open space in the

centre of which is the well-known "oval." The erection of a large public hall on the site was also considered as part of a further scheme of municipal buildings. The need for a new town hall, police court and municipal offices has long been felt and urged upon the Corporation. The matter was eventually adjourned after a long discussion.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

2607. George Percival Milnes, for "Improvements in or relating to starting-gear for vehicles."

2668. Freund & Fink, for "Improved device for disinfecting the seats of closets and the like."

2689. George William Ward, for "Chimney and ventilating-shaft, top down-draught preventer and windguard."

2703. Thomas Drummond, for "Improvements in and relating to chimneys, cowls and ventilators."

2733. William Henry Witham, for "Improvements in apparatus for flushing water-closets, urinals and other like purposes."

2737. John Hamilton Morgan, for "An electric alarm sash-fastener."

2869. William Holt, for "Improvements in and connected with screens for the use of builders, contractors and others."

2878. Amos Hall, for "Improvements in the construction and arrangement of hospitals, applicable also to other buildings."

2942. Martin William Maylard, for "Improvements in water-closets."

2959. Mitchell Holt, for "Improved weightless window-sash and frame."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 73 Chancery Lane, London, W.C.

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BIRMINGHAM: 73 Temple Row,  
LEEDS: 15 Briggate,  
CARDIFF: 77 St. Mary Street.

NEWCASTLE-ON-TYNE: 50 Dean Street.  
DUBLIN: 17 Nassau Street.  
BELFAST: 13 Rosemary Street.  
PARIS: 36 Boulevard des Italiens.  
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HIGHEST AWARDS: EXHIBITIONS 1891-93-94-95.—Awarded the Royal Photographic Society's Medal for Architectural Photography.

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PRICE LIST AND ESTIMATES ON APPLICATION.



# THE Architect and Contract Reporter.

## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xiii.*

## CONTRACTS OPEN.

**ABERDEEN.**—March 2.—For erection of dwelling-houses at Auchmacoy, Pitlurg, Port Erroll, Cruden, Longhaven and Boddam Stations, for the Great North of Scotland Railway Company. Mr. W. Moffatt, secretary, Aberdeen.

**ANDOVER.**—Feb. 27.—For alterations to the town hall. Mr. Thos. E. Longman, town clerk, Andover.

**APPLEDORE.**—March 3.—For building a new wall at the works, for the Appledore Gas Company, Limited. Mr. Edward Lemon, secretary, Appledore.

**ARMAGH.**—Feb. 27.—For erection of a band stand on the Mall. Mr. H. C. Parkinson, architect, Armagh.

**BANGOR.**—March 3.—For alterations and additions to 322, 324, 326 and 328 High Street. Mr. R. Glynne Davies, architect, 220 High Street, Bangor.

**BELPER AND CHESTERFIELD.**—March 12.—For reconstruction of a bridge carrying the highway over Birches Brook. Mr. Robt. C. Cordon, surveyor, Duffield, Derby.

**BIDEFORD.**—Feb. 26.—For erection of four houses at East-the-Water. Mr. R. T. Hookway, architect and surveyor, Bridgeland Street, Bideford.

**BRADFORD.**—Feb. 27.—For erection of a nurses' home. Messrs. Milnes & France, architects, Bradford.

**BRADFORD.**—For alterations and additions to warehouse. Vicar Lane. Mr. F. Moore, architect, 40 Sunbridge Road, Bradford.

**BRECONSHIRE.**—Feb. 27.—For erection of a parish church, Brynmawr. Messrs. Nicholson & Hartree, architects, Hereford.

**BRIGHOUSE.**—March 2.—For the supply and delivery and fixing at the Mill Lane gasworks of two steam-boilers, rotary gas exhauster and engine combined, and a quantity of 12-inch and 9-inch pipes, &c. Mr. James Parkinson, engineer, Public Offices, Brighouse.

**BRISTOL.**—March 2.—For erection of a passenger station at St. Anne's Park, Brislington. Mr. G. K. Mills, secretary, Paddington Station, London.

**BURNLEY.**—March 6.—For erection of an infectious diseases hospital at Kibble Bank. Mr. F. S. Button, Blannel Street, Burnley.

**CAMBERWELL.**—March 1.—For erection of hallkeeper's rooms in Havil Street. Mr. O. S. Brown, surveyor, Vestry Hall, Camberwell.

**CANTERBURY.**—March 1.—For erection of a public library and institute. Mr. A. H. Campbell, architect, city surveyor, 28 St. Margaret's Street, Canterbury.

**CANTERBURY.**—March 3.—For erection of ironing-room, landing-stage, &c. Mr. W. J. Jennings, architect, Canterbury.

**CARRICKFERGUS.**—March 15.—For erection of a Masonic hall. Mr. James Boyd, Town Hall, Carrickfergus.

**CHELMSFORD.**—March 6.—For erection of seven residences. Mr. F. Whitmore, architect and surveyor, 17 Duke Street, Chelmsford.

**CHELMSFORD.**—For erection of a Wesleyan church and schools. Messrs. Gordon, Lowther & Gunton, architects, Finsbury House, E.C.

**CHELMSFORD.**—March 11.—For erection of a laboratory and for other works at the county offices, 78 Duke Street. Mr. J. H. Nicholas, secretary to the committee, County Offices, Chelmsford.

**CLAYTON.**—March 4.—For erection of a pair of villas at Chrisharben Park. Mr. Sam Spencer, architect and surveyor, 344 Great Horton Road, Great Horton.

**COLCHESTER.**—March 8.—For erection of a building in Colchester. Mr. William C. Street, architect, 7 Victoria Street, Westminster.

**COVENTRY.**—March 6.—For extensions at the City Hospital, Stoney Stanton Road. Messrs. G. & I. Steane, architects, Little Park Street, Coventry.

**CROYDON.**—Feb. 27.—For erection of a group of schools in Dering Place. Mr. Robert Ridge, architect, 12 Katharine Street, Croydon.

**CULMINGTON.**—March 1.—For the restoration of church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

**DARTMOUTH.**—Feb. 27.—For alterations and repairs at the lighthouse, Kingswear. Mr. E. H. Back, architect, Dartmouth.

**DARLINGTON.**—For erection of stabling, &c., in Tubwell Row. Mr. C. N. Coates, Stapleton, Darlington.

**DENTON.**—For erection of a residence at Denton. Mr. J. H. Burton, surveyor, 2 Guide Lane, Hooley Hill.

**DEWSBURY.**—March 4.—For erection of seven dwelling-houses on the Northfields Estate. Messrs. John Kirk & Sons, architects, Dewsbury.

**DEWSBURY.**—March 3.—For erection of nine houses and two shops in Cemetery Road and High Street, Westtown. Messrs. John Barton & Son, architects, Halifax Road, Dewsbury.

**DUDLEY.**—For erection and completion of two houses at Holly Hall. Mr. Thomas Robinson, architect, Victoria Chambers, Stourbridge.

**DUKINFIELD.**—For erection of schools for about 900 children. Messrs. John Eaton, Sons & Cantrell, architects, Ashton-under-Lyne.

**DUKINFIELD.**—For erection of a detached villa residence in Old Road. Messrs. Eaton, Sons & Cantrell, architects, Ashton-under-Lyne.

**EBECHESTER.**—For erection of seven houses in flats at Blackhall Mill. Messrs. Badenoch & Bruce, architects, 55 Pilgrim Street, Newcastle-on-Tyne.

**FOLKESTONE.**—Feb. 27.—For erection of a mortuary in the cemetery. Mr. H. B. Bradley, clerk to the Joint Committee, 52 Sandgate Road, Folkestone.

**GAERWEN.**—March 10.—For restoration of Gaerwen Church. Mr. P. Shearson Gregory, architect, Bangor.

**GAINSBOROUGH.**—March 15.—For erection of 10 wards, mortuary, boundary walls, stone and iron stairs, and new conveniences at the workhouse. Messrs. Eyre & Southall, architects, Gainsborough.

**GATESHEAD.**—March 1.—For erection of shops and houses, High Street. Mr. J. G. Crone, architect, 50 Grainger Street, Newcastle.

**GLASGOW.**—March 1.—For enlargement of the killing-rooms, byres and piggeries at Moore Street. Mr. A. B. McDonald, city engineer, City Chambers, 64 Cochrane Street.

**GLOUCESTER.**—March 4.—For erection of three new show-rooms, with a retaining wall and wrought-iron palisading on the George Street front of cattle market; also for erection and completion of walls of proposed bull ring in Market Parade and wrought-iron palisading. Mr. R. Read, city surveyor, Guildhall, Gloucester.

**GOMERSAL.**—March 2.—For alterations and additions to Wesleyan Methodist Sunday schools, West Lane. Mr. J. W. Burrows, architect, Birstal and Morley.

**GRANGE-OVER-SANDS.**—March 8.—For erection of workmen's cottages and extension of retort-house at the Gasworks, Meathorpe Marsh. Mr. Edward Thompson, manager and secretary, at the Gasworks.



HALIFAX.—March 8.—For extensions and additions to the King Cross Constitutional Club. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—March 11.—For erection of a brewery, stabling, &c., at Windmill Hill, Northowram. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HANWELL.—Feb. 26.—For erection of three, six or twelve pairs of semi-detached villas in the Shakespeare Road, Drayton Park, W. Mr. W. A. Fisher, surveyor, 16 Finsbury Circus, E.C.

HEBDEN BRIDGE.—March 6.—For alterations and additions to Croft Mills. Mr. W. Wrigley, architect and surveyor, Crossley Terrace, Hebdon Bridge.

HEREFORD.—March 3.—For erecting a hall and other buildings for the parish of St. Peter. Messrs. Nicholson & Hartree, architects, Hereford.

HORSFORTH.—March 4.—For erection of 21 houses at New Road Side. Mr. J. W. Fawcett, secretary, 10 Albion Street, Leeds.

HORTON.—March 1.—For the foundations of the seventh county lunatic asylum, to be erected on the Horton Estate, Surrey, for the asylums committee of the London County Council. Mr. G. T. Hine, architect, 35 Parliament Street, S.W.

IRELAND.—Feb. 27.—For the renovation of Faughan Reformed Presbyterian Church. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

IRELAND.—March 1.—For erection of a station building at Clontarf, co. Dublin, and for a gatekeeper's cottage at Ternascobe, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

IRELAND.—March 1.—For erection of schoolhouse at Castlederg. Rev. James Connolly, P.P., Urney Strabane.

IRELAND.—March 5.—For erection of a dispensary and doctor's residence and a skunk to enclose site. Mr. Joseph Harton, clerk, workhouse, Mullingar.

IRELAND.—March 3.—For erection of dispensary and doctor's residence, with offices, &c. Mr. Perry, county surveyor, Galway.

IRELAND.—March 4.—For rebuilding and repairing manse at Strangford Presbyterian church. Rev. R. Allen Beatty, LL.B.

KEIGHLEY.—March 3.—For erection of a pavilion at the hospital, Morton Banks. Messrs. John Judson & Moore, Architects, York Chambers, Keighley.

KILLAMARSH.—For erection of retort-house, purifying-house, engine-house, stores, house and offices. Mr. H. Wagstaff, 57 Salter Gate, Chesterfield.

KINGSTON-ON-THAMES.—For male infirmary, nurses' house and porter's lodge, at the workhouse. Mr. William H. Hope, C.E., architect and surveyor, Union Offices, Portsmouth Road, Kingston-on-Thames.

KIRKCALDY.—March 3.—For erection of block of three self-contained villas at St. Brycedale Avenue. Mr. Robert Little, architect, 4 and 6 St. Brycedale Avenue, Kirkcaldy.

LEYTON.—March 2.—For erection of sheds for water-vans and steam-roller at the electric-light station, Cathall Road. Mr. William Dawson, Town Hall, Leyton.

LONDONDERRY.—March 1.—For additions to, repair of, and alterations to the County Court House. Mr. A. C. Adair, architect, Londonderry.

LONDONDERRY.—March 8.—For erection of a shirt factory and laundry in Great James Street. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

LYDIARD MILLICENT.—March 6.—For erection of an isolation hospital at Purton Stone Lane. Mr. R. J. Beswick, Fleet Street, Swindon.

MANCHESTER.—For erection of fifteen houses and one shop in Halliwell Lane. Mr. John H. Pemberton, 23A Brazennose Street, Manchester.

MANCHESTER.—March 4.—For construction of a retaining wall adjoining the river Medlock, near Sackville Street. The City Surveyor, Town Hall, Manchester.

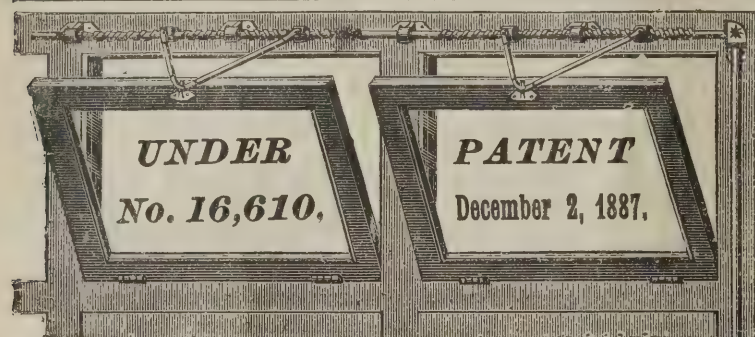
MANCHESTER.—March 9.—For construction of a retaining wall adjoining the river Medlock, at Helmet Street. The City Surveyor, Town Hall, Manchester.

MANSFIELD.—March 17.—For erection of an infirmary for sixty-eight beds, a maternity ward for eight beds and other works at the workhouse. Mr. R. F. Vallance, Mansfield.

MARSDEN.—March 3.—For alterations and additions to the mechanics' infants' school. Messrs. John Kirk & Sons, architects, Huddersfield.

MIDDLESBROUGH.—March 2.—For erection of a large block of buildings in Newport Road. Mr. Walter G. Roberts, architect, 61 Albert Road, Middlesbrough.

MIDDLETON.—March 6.—For extension of firemen's dwellings. Mr. Wm. Wellburn, borough surveyor, Town Hall, Middleton.



THE LARGEST & BEST VARIETY OF FANLIGHTS & SASH OPENERS, &c., to suit all requirements, viz. details of work and price, to work by means of the Vertical Screw Rod and Regulator, or Cord.

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**PANIC EXIT BOLTS,**

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**THE "XIT,"**

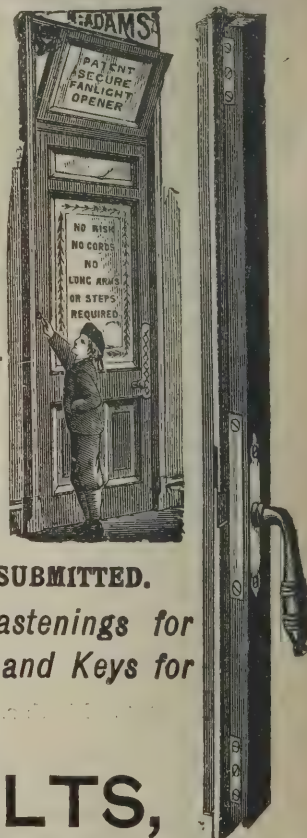
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**MOGDEN.**—Feb. 26.—For erection of an isolation hospital and other buildings in connection therewith. Mr. W. J. Ancell, architect, 3 Staple Inn, London.

**MORLEY.**—March 1.—For erection of mill premises. Mr. T. A. Buttery, architect, Queen Street, Morley.

**NEW BROMPTON.**—March 16.—For erection of a cookery centre at Balmoral Road. Mr. E. T. Atchison, clerk, 8 Waterloo Road, New Brompton.

**NEWPORT.**—March 1.—For erection of pavilion in Newport cattle market. Mr. Benjamin Lawrence, architect, Austin Friars Chambers, Newport, Mon.

**NUNNINGTON.**—March 6.—For widening, &c., of a stone bridge. Mr. Walker Stead, county surveyor, Northallerton.

**OXENHOPE.**—For erection of store and seven houses in Station Road. Mr. John Haggas, architect, North Street, Keighley.

**OXENHOPE.**—For erection of six houses at Goose Green. Mr. John Haggas, architect, North Street, Keighley.

**RISHWORTH.**—Feb. 27.—For erection of an engine-house and engine-bed. Mr. Richard Horsfall, architect, 15 George Street, Halifax.

**ROCHDALE.**—Feb. 27.—For erection of three houses. Mr. H. S. Nicholl, 1A Mount Street, Rochdale.

**ROCHDALE.**—For erection of premises for the Friendship Inn, Spotland Road. Mr. Edgar Wood, architect, 78 Cross Street, Manchester.

**ROCHDALE.**—March 6.—For rebuilding of Ogden Baptist Sunday school. Mr. Ernest Jones Clegg, 160 Huddersfield Road, Newhey, near Rochdale.

**ROCHDALE.**—For alterations and additions to the John Street Tavern, John Street. Mr. George A. Hammond, architect, Rochdale or Heywood.

**ROCHDALE.**—Feb. 27.—For erection of three houses in Howarth Cross Street, Halifax Road. Mr. H. S. Nicholl, 1A Mount Street, Rochdale.

**ROCHDALE.**—March 2.—For erection of four houses in Belfield Road. Messrs. Bamford & Brocklebank, surveyors, 58A Yorkshire Street, Rochdale.

**RUABON.**—March 13.—For erection of villa residence at Llangollen Road, Acrefair. Mr. Jones, architect, Brook Lea, Acrefair, Ruabon.

**SALTASH.**—March 8.—For erection of fourteen private dwelling-houses. Mr. Paine, Saltash.

**SCOTLAND.**—March 4.—For alterations and additions to Lesmahagow parish church. Mr. Alexander N. Paterson, architect, 136 Wellington Street, Glasgow.

**SCOTLAND.**—March 6.—For erection of a school at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

**SEDBERGH.**—For erection of an entrance lodge to Akay. Mr. John Hutton, architect and sanitary engineer, Kendal.

**SHEFFIELD.**—March 3.—For erection of public baths, Sutherland Road. Mr. Charles F. Wike, city surveyor, Town Hall, Sheffield.

**SHROPSHIRE.**—March 1.—For restoration of Culmington Church tower. Rev. D. E. Holland, Culmington Rectory, Bromfield, Shropshire.

**SOUTHEND-ON-SEA.**—March 3.—For construction of a winter garden on the pier. Messrs. Thompson & Greenhalgh, architects, Bank Chambers, Southend.

**SOUTHEND-ON-SEA.**—March 1.—For construction of underground conveniences in High Street. Mr. Harold Harlock, borough surveyor, Southend.

**STANWELL.**—March 1.—For erection of a dining-hall at workhouse. Mr. John Anthony Engall, clerk, Staines.

**ST. BEES.**—March 1.—For alterations, extensions and other works at the Main Street Schools. Mr. James Howes, architect, Workington.

**STOCKPORT.**—For additions to the Methodist Free Church, Poynton. Mr. Fred. W. Dixon, architect, Trevelyan Buildings, Manchester.

**SUTTON BRIDGE.**—March 6.—For erection of a stone bridge at Sutton-under-Whitestonecliff. Mr. Walker Stead, county surveyor, Northallerton.

**TAUNTON.**—March 1.—For erection of public closets and urinals in Castle Green. Mr. James H. Smith, borough surveyor, Municipal Buildings, Corporation Street.

**TOTTENHAM.**—March 2.—For erection of fire station in Minster Road. Mr. P. E. Murphy, Coombes Croft House, 712 High Road, Tottenham.

**ULVERSTON.**—March 18.—For erection of Wesleyan church. Mr. Thomas Birkett, hon. secretary, 20 Market Street, Ulverston.

**WATERLOO.**—March 9.—For completion of the tower and new vestries and chapel at Christ Church, Waterloo, near Liverpool. Messrs. Austin & Paley, architects, Lancaster.

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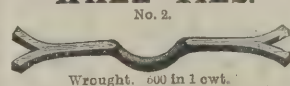
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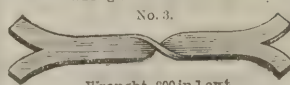
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WESTON-SUPER-MARE.—March 5.—For alterations to the Boulevard Baptist church. Messrs. Price & Wooler, architects, Waterloo Street, Weston-super-Mare.

WIGAN.—March 1.—For alterations to premises, Standishgate and Powell Street. Mr. J. B. Thornley, architect, Powell's Chambers, Wigan.

WORCESTER.—March 11.—For erection of a residence for the chief constable, alterations to the existing premises at the city police station, &c. Mr. Henry Rowe, city architect, Worcester Chambers, Pierpoint Street, Worcester.

YARM.—March 3.—For erection of a Primitive Methodist chapel. Mr. Thomas W. T. Richardson, architect, 57 High Street, Stockton.

YARM.—March 6.—For erection of a constable's house. Mr. Walker Stead, county surveyor, Northallerton.

## TENDERS.

### BANFF.

For extension of the reservoir street-water channels and wells in connection with the Portknockie water extension. Mr. ALEXANDER SMITH, engineer, Cullen House, Cullen.

#### Accepted tenders.

G. Mair, builder . . . . .	£107 0 0
W. Beveridge, plumber . . . . .	37 16 0

#### Other tenders.

J. Barclay . . . . .	189 19 0
R. Anderson . . . . .	187 6 6
J. & J. Campbell . . . . .	37 0 0

### BEDFORD.

For construction of an underground convenience in Tavistock Street.

B. Litchfield & Son . . . . .	£392 0 0
F. Corby . . . . .	371 0 0
E. Pacey . . . . .	366 0 0
J. Corby & Son . . . . .	366 0 0
T. H. Coleman . . . . .	355 0 0
G. E. FATHERS (accepted) . . . . .	346 0 0

### BLACKBURN.

For erection of shop premises in Simmons Street. Messrs. SIMPSON & DUCKWORTH, architects, Richmond Chambers, Blackburn.

R. Ibbotson . . . . .	£802 0 0
T. Taylor . . . . .	795 0 0
T. Parker . . . . .	794 0 0
J. Walmsley . . . . .	790 0 0
Harrison & Son . . . . .	790 0 0
G. Whewell . . . . .	778 0 0
R. Charles . . . . .	772 0 0
Hipson & Son . . . . .	765 0 0
J. Shorrocks . . . . .	755 0 0
Kenyon & Moulding . . . . .	743 0 0
J. Sharples . . . . .	743 0 0
J. Gillibrand . . . . .	739 0 0
J. Parker . . . . .	738 0 0
J. FECITT & SONS, Blackburn (accepted) . . . . .	736 18 0

### BRITON FERRY.

For construction of reservoir, &c. Mr. T. REES, engineer, Newport, Mon. J. ALLAN, Cardiff (accepted) . . . . . £16,437 7 0

### BRIXHAM.

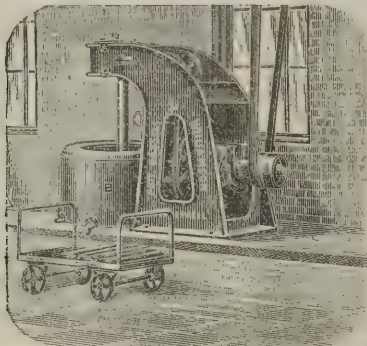
For erection of a caretaker's cottage for the Brixham School Board. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLE BROWN, Paignton.

T. Brown, Chelston . . . . .	£428 0 0
Webber & Maunders, Paignton . . . . .	404 0 0
E. P. Bovey, Torquay . . . . .	385 0 0
E. Pike, Torquay . . . . .	374 0 0
Smaridge & Curtis, Paignton . . . . .	329 0 0
Cooksley, Brixham . . . . .	290 0 0
Silley, Brixham . . . . .	275 0 0
W. Wyatt, Brixham . . . . .	256 0 0
Architects' estimate . . . . .	300 0 0

### BURNLEY.

For Painting of Old Hall Street U.M.F.C. Chapel. W. DAVY (accepted).

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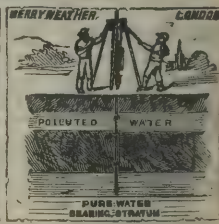
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W. HALL & SONS, London (accepted)	£8,183	10	0
General Builders' Association	8,171	11	0
T. Crossley & Sons	7,798	0	0
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**BUCKINGHAM.**

For Rebuilding of Christ Hospital Almshouses. Mr. C. BELL, architect, Salters' Hall Court, E.C.

Tibbetts	£1,069	0	0
Grist & Co.	988	0	0
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Tompkins	649	0	0

**CADOXTON.**

For erection of hotel. Messrs. A. TREVOR ROBERTS, HILL & Co., land surveyors, 12 Thompson Street, Barry Dock.

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M. E. Stamp	3,878	0	0
A. Seaton	3,816	10	4
Jones & Maddren	3,500	0	0
G. F. Couzens	3,484	10	0
Powell & Mansfield	3,359	0	0
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G. DOBSON (accepted)	2,745	0	0		150	0	0
W. Chambers	2,683	0	0		63	0	0
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**CARLISLE.**

For erection of railway tavern and implement warehouse, Botchergate. Mr. H. HIGGINSON, architect, 3 Lonsdale Street, Carlisle.

W. H. PICKERING, Wreay, Carlisle (accepted). £3,600 10 0

**DEWSBURY.**

For cleaning and whitewashing of the interior and cleaning and painting of the exterior of the infirmary.

PORRITT & BRAY, Dewsbury (accepted). £59 10 0

**DORSET.**

For erection of two pairs of semi-detached cottages at Stratton. Mr. A. L. TILLEY, architect, 16 Cornhill, Dorchester.

A. HARVEY, Charminster (accepted). £899 4 0

**DOVERCOURT.**

For making-up of the Marine, Parade, Dovercourt, and adjacent roads. Mr. H. DITCHAM, surveyor.

G. Double, Ipswich	£3,805	15	0
Glenny, Colchester	3,147	3	9
L. Mackenzie, Clacton-on-Sea	3,034	2	6
J. Moran & Son, Harwich	2,934	3	7

**DURHAM.**

For erection of twelve workmen's houses in Mitchell Street, and for levelling of site and erection of boundary walls, &c. Mr. GEORGE ORD, architect, 16 The Avenue, Durham.

*Accepted tenders.*

J. G. Bradley, bricklayer and mason.  
T. W. Mowbray, carpenter and joiner.  
Heron & Brown, plumber.  
W. T. Blakey, slater.  
T. Nesbitt, plasterer.  
T. H. Dodd, painter.  
Total, £2,372 1s. 3d.

**FALMOUTH.**

For erection of a boys' school at Wellington Terrace. Mr. SWIFT, architect, Lemon Street, Truro.

MOYLE & MITCHELL, Chacewater, near Scorrier, Cornwall (accepted). £1,542 0 0

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T. Pace	1,104	4	11
A. Roper	1,079	2	6
G. Bullock	1,076	8	6
H. Gough	1,023	16	9
G. K. Downing	975	0	6
Bradney & Lloyd	951	4	0
G. J. Muirhead	883	10	1
E. WHITTINGHAM, Newport (accepted)	863	15	6
Tommy Bros.	855	11	11

## HERTFORD.

For laying about 650 yards of 9-inch glazed stoneware pipe sewers, with manholes. Mr. J. H. JEVONS, borough surveyor.

H. Norris	£775	5	8
J. Jackson	623	6	4
EKINS & Co., Hertford (accepted)	610	7	3

## IRELAND.

For erection of labourers' cottages at Celbridge.

J. McCann	£300	0	0
J. LENNON (accepted)	296	0	0

## ISLE OF WIGHT.

For making new road at Carisbrooke. Mr. J. E. HAYNES, surveyor.

M. Drake	£175	0	0
G. H. Coker	139	0	0
J. LOWE (accepted)	109	7	6

For widening a road at Chale. Mr. J. E. HAYNES, surveyor.

J. Linnington & Sons	£167	0	0
G. H. Coker	120	0	0
J. LOWE (accepted)	105	10	0

For widening a road at Porchfield. Mr. J. E. HAYNES, surveyor.

W. Kenney	£21	10	0
G. H. Coker	19	10	0
S. Gulliver	19	9	0
W. Smith	19	4	4
M. DRAKE (accepted)	19	0	0

## KEIGHLEY.

For erection of three shops in East Parade. Messrs. JOHN JUDSON & MOORE, architects, York Chambers, Keighley.

## Accepted tenders.

Sugden, Mitchell & Sunderland, mason.	
Foster & Fortune, joiner.	
W. Thornton, slater.	
Clough, plumber.	
J. King, plasterer.	

## KINGSWEAR.

For additions to Bryndart, Kingswear, for Major C. P. Dean. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, of Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLE BROWN, of Paignton.

H. Webber & Sons	£212	0	0
James Short	210	0	0
E. Pike	200	0	0
R. C. Pillar	198	2	6
E. P. BOVEY (accepted)	198	0	0
Architects' estimate	200	0	0

For a villa residence for Mrs. Walker. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, of Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLE BROWN, of Paignton.

R. T. Pillar	£795	0	0
G. Webber & Maunder	760	0	0
S. Blachford	750	0	0
H. Webber & Sons	716	0	0
E. Pike	706	0	0
Smaridge & Curtis	685	0	0
E. P. BOVEY (accepted)	685	0	0
Architects' estimate	700	0	0

## LANCASTER.

For levelling, paving, &c., of certain streets in the township of Scotforth.

R. Escolne	£282	16	3
J. JOHNSON, Lancaster (accepted)	251	15	7

## LEEDS.

For supply of cast-iron water-mains. Mr. THOS. HEWSON, city engineer.

COCHRANE & Co., Dudley*	£5,818	0	0
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\* Accepted subject to approval of Council.

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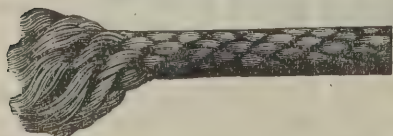
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## LEEDS—continued.

For carting and laying complete about 2,680 yards of 30-inch water-mains between Sheepscar and Harehills reservoir.	
Mr. T. HEWSON, city engineer.	
A. BRUNTON & SON, Hull (accepted).	£903 14 9
For boiler setting, erection of economiser-house and alterations at Headingley pumping station. Mr. THOS. HEWSON, city engineer.	
WADE BROS., Woodhouse, Leeds (accepted).	£827 2 6
For construction of additional sewage settling-tanks at the Knostrop-sewage works. Mr. THOMAS HEWSON, city engineer.	
I. GOULD, Hunslet, Leeds *	£27,991 0 0
* Accepted subject to approval of Council.	

## LIMERICK.

For additions and alterations to the convent of the Society of Marie Reparatrice. Mr. WILLIAM E. CORBETT, C.E., architect, 28 Glentworth Street, Limerick.	
R. Gleeson	£1,630 0 0
J. Ryan & Son	1,386 5 0
P. KENNEDY, Military Road (accepted)	1,284 14 0

## LONDON.

For erection of a bakery at Charlton Place, Islington, for Messrs. Brett & Bennett. Mr. GEO. WAYMOUTH, architect, 23 Moorgate Street, E.C. Quantities by Mr. A. PAULL, 6 Quality Court, W.C.	
F. & H. F. Higgs	£5,900 0 0
Colls & Sons	5,795 0 0
R. D. Lown & Sons	5,690 0 0
Sabey & Son	5,597 0 0
Patman & Fotheringham	5,491 0 0
Johnson & Co.	5,489 0 0
Dove Bros.	5,375 0 0

## LONDON SCHOOL BOARD.

For providing additional heating, Scawfell Street.	
W. G. Cannon & Sons	£148 0 0
J. Fraser & Son	140 0 0
J. C. & J. S. Ellis, Limited	134 10 0
J. F. Clarke & Sons	119 0 0
H. C. Price Lea & Co.	109 0 0
Duffield & Co.*	84 0 0

## LONDON SCHOOL BOARD—continued.

For erecting upper standard rooms, w.c.'s, &c., Ashburnham.	
	A.
Holloway Bros.	£6,132 0 0
G. S. S. Williams & Son	6,053 0 0
W. Shurmur	5,986 0 0
R. A. Yerbury & Sons	5,946 0 0
J. Shillitoe & Son	5,940 0 0
Treasure & Son	5,816 0 0
Perkins & Co.	5,308 0 0
D. Charteris	5,244 0 0
Lathey Bros.	5,281 0 0
W. Downs	5,234 1 6
Stimpson & Co.	5,095 0 0
C. Cox	5,093 0 0
J. & M. Patrick	5,006 0 0
E. Lawrance & Sons*	4,990 0 0
A. Extra for brickwork in cement.	

For erecting higher standard rooms, &amp;c., Sherbrooke Road.

	A.
W. Downs	£4,644 18 0
W. Shurmur	4,553 0 0
T. Boyce	4,578 0 0
Perkins & Co.	4,548 0 0
Treasure & Son	4,501 0 0
Lathey Bros.	4,387 0 0
Dove Bros.	4,338 0 0
C. Cox	4,290 0 0
R. A. Yerbury & Sons	4,277 0 0
E. Lawrance & Sons	4,235 0 0
Stimpson & Co.*	4,124 0 0
A. Extra for brickwork in cement.	

For supply of heavy coal hammers.

	Per dozen.
J. C. & J. S. Ellis, Limited	£1 16 6
R. H. & J. Pearson, Limited	1 16 6
Moseley & Son	1 16 0
Pryke & Palmer	1 9 6
Bird & Co.	1 8 0
J. Woodcock & Sons*	1 7 9

\* Recommended for acceptance.

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## LONDON SCHOOL BOARD—continued.

For rebuilding offices, &amp;c., Penrose Street.

J. Grover & Son	£2,500	0	0
C. Cox	2,474	0	0
J. Garrett & Son	2,380	0	0
E. Lawrence & Sons	2,368	0	0
W. Downs	2,352	0	0
Stimpson & Co.	2,346	0	0
Dove Bros.	2,345	0	0
J. Marsland	2,305	0	0
G. Munday & Sons	2,279	0	0
E. Triggs	2,220	0	0
W. Akers & Co.	2,219	0	0
Lathey Bros.	2,212	0	0
Holliday & Greenwood *	1,997	0	0

\* Recommended for acceptance.

## MARSDEN (YORKS).

For enlarging the Wesleyan chapel, erection of a new organ loft, new Sunday schools, &amp;c. Messrs. JOHN KIRK &amp; SONS, architects, Huddersfield.

## Accepted tenders.

Whitehead, Fielding &amp; Bradbury, mason.

J. Schofield, joiner.

J. Bottomley, plasterer.

F. Goodall, plumber.

J. Bottomley, painter.

Pickles Bros., slater.

R. Taylor &amp; Son, ironfounder.

J. Bottomley, concreter.

## MERTHYR TYDFIL.

For construction of about 480 yards of 12-inch and 9-inch stoneware pipe sewers at Mount Pleasant, and for the supply and erection of about 146 cwt. of wrought-iron tubes, 12 inches diameter. Mr. T. F. HARVEY, engineer.

Gale & Farquharson	£575	4	9
Amos & Harries	546	10	10
G. Hancock	527	4	9
Y. Williams	447	17	11
T. PREECE (accepted)	440	14	11
W. Lewis	409	17	3
Frazer, Cardiff	401	14	7
Page, Cardiff	389	17	2
Parry, Merthyr Tydfil	384	6	0

## NEWTON ABBOT.

For providing and laying cast-iron water-mains, constructing a storage tank, &amp;c. Mr. S. SEGAR, surveyor, Union Street, Newton Abbot.

Shaddock	£2,940	0	0
W. H. Berry	2,530	0	0
Jenkins & Son	2,357	0	0
Gabriel, Bennett & Co.	2,340	0	0
Mason	2,300	0	0
R. R. Facey	2,200	0	0
Fisher	2,178	13	0
Veale & Son	2,170	0	0
Rafarel & Co.	2,125	0	0
Parker Bros.	2,100	0	0
A. Thomas	2,031	13	11
M. Bridgeman	1,961	1	10
Dart	1,858	0	0
HAWKINGS & BEST, Teignmouth (accepted)	1,850	0	0

## NOTTINGHAM.

For enlargement of Quarry Road Board school. Mr. A. H. GOODALL, architect, Nottingham.

Job Carlin	£3,625	0	0
(Unsigned)	3,585	0	0
J. H. Vickers	3,378	0	0
J. Shaw	3,150	0	0
G. A. Pillatt	3,065	0	0
J. Oscroft	3,031	0	0
Appleby & Lambert	2,998	0	0
(Unsigned)	2,997	0	0
J. Musson	2,975	0	0
Dennett & Ingle	2,967	0	0
T. Barlow	2,936	0	0
F. H. Wilkinson	2,901	16	0
W. Pinkett	2,895	0	0
T. Cuthbert	2,830	15	0
J. HUTCHINSON, Nottingham (accepted)	2,800	0	0
(Unsigned)	2,734	0	0

## UXBRIDGE.

For decoration of and alterations at the Providence Congregational Church. Mr. WILLIAM L. EVES, architect, 54 High Street, Uxbridge.

C. F. HEARLEY, Uxbridge (accepted). £272 13 0

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New Depth Gauge for Engineers, 4 inches by 7/8 inch wide, in leather case. The slide and one side marked to read by verniers to 100ths of inches and 1-10th of millimetres. The other side marked for use as a rule, in inches and 64ths and millimetres and halves. 5s. 6d.

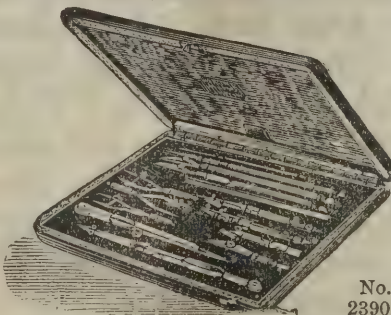
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No. 2389.—8-in. Oak Case, similar to above and containing same Instruments, but with proportional Compass added. 45 15 0

No. 2390.—Morocco Pocket Case, lined with Silk Velvet, containing the following needle point Electrum Instruments:—4 1/2-in. double jointed Compass, with ink and pencil points and lengthening bar, hair dividers, ink and pencil bows, three plain point spring bows, two drawing pens, pricker, ivory protractor and parallel—an exceedingly compact set, suitable for the pocket, of very finest quality. 25 0 0

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STEAM FACTORIES, 9, 10, 11, 16, & 17 FULLWOOD'S RENTS, W.C.



## PAIGNTON.

For villa residence for Mr. William Tozer. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLLE BROWN, Paignton.

G. Webber & Maunder	£508	10	0
Smaridge & Curtis	498	0	0
E. Westlake	490	0	0
H. Webber & Sons	485	0	0
R. HARRIS (accepted)	460	0	0
Architects' estimate	500	0	0

For erecting constitutional club-rooms and business premises, for Mr. Thomas Adams. Mr. WALTER G. COULDREY, architect, Paignton. Quantities by Mr. VINCENT CATTERMOLLE BROWN, Paignton.

E. Westlake, Paignton	£1,798	0	0
E. P. Bovey, Torquay	1,695	0	0
R. Yeo, Torquay	1,580	0	0
H. P. Rabbich, Paignton	1,574	0	0
H. Webber & Sons, Paignton	1,537	0	0
G. Webber & Maunder, Paignton	1,479	11	0
T. Brown, Torquay	1,450	0	0
M. Bridgman, Paignton*	1,434	17	6

\* Accepted with modifications.

For works at Primley House, for Mr. H. C. Belfield. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLLE BROWN, of Paignton.

## Drainage and sanitary work.

R. Harris	£365	0	0
C. & R. E. Drew	307	0	0
E. Pike	300	0	0
G. Webber & Maunder	290	0	0
H. WEBBER & SONS (accepted)	290	0	0
Architects' estimate	300	0	0

## For fixing grates.

H. WEBBER & SONS (accepted)	27	12	0
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## For painting and papering.

S. Tucker	130	0	0
Mitchell & Son	114	0	0
H. WEBBER & SONS (accepted)	94	0	0
J. Thomas & Son	90	10	0

## SWANSEA.

For Gendros school for 350 children, for Cockett School Board. Mr. G. E. T. LAWRENCE, architect, 181 Queen Victoria Street, E.C. Quantities by Messrs. W. H. BARBER & SON, 22 Buckingham Street, Adelphi, W.C.

	Buildings.	Wood-block floors.	Total.
Battray & Jenkins	£3,300 0 0	£255 10 0	£3,555 10 0
T. Watkins & Co.	3,179 3 11	62 7 10	3,241 11 9
T. Waters	2,810 12 8	264 14 6	3,075 7 2
H. Billing	2,880 12 6	174 11 1	3,055 3 7
D. Rees	2,987 0 0	30 0 0	3,017 0 0
D. Jenkins	2,899 0 0	44 0 0	2,943 0 0
Lloyd Bros.	2,750 0 0	20 10 0	2,770 10 0
E. MORGAN*	2,604 0 0	—	2,604 0 0
Gustavus Brs.	2,565 0 0	82 4 0	2,647 4 0
T. Davis	2,599 0 0	24 12 8	2,623 12 8
J. & F. Weaver	2,530 0 0	75 0 0	2,605 0 0

\* Accepted subject to Education Department's approval.

## WALES.

For erection of a school to accommodate 200 children, along with out-offices, boundaries, and playgrounds at Cwmtillery, near Abertillery, Mon.; and for the erection of two classrooms and extensions of cloakrooms to the Nantyglo School, and the renovation of caretaker's cottage. Mr. GEORGE ROSSER, architect, Victoria Buildings, Abercarn.

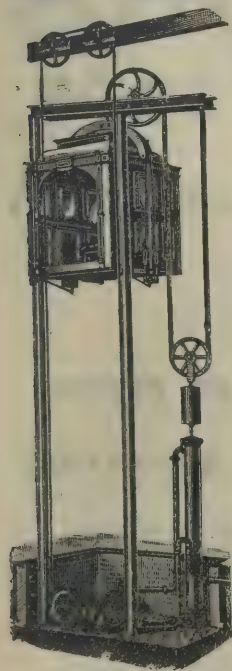
## Cwmtillery School.

Fielding & Evans	£2,407	6	9
Williams & Thomas	2,298	0	0
Gaen Brothers	2,100	0	0
E. Mainwaring	2,049	3	9
D. J. Davies	2,025	0	0
Turner & Sons	1,998	0	0
T. Bagley	1,968	0	0
J. Monks & Co.	1,886	10	0
J. Jenkins	1,800	0	0
C. F. Morgan	1,760	0	0
A. P. WILLIAMS, Abertillery (accepted)	1,670	0	0

## Nantyglo School.

T. S. Foster	1,265	0	0
T. J. Morgan	1,013	0	0
J. Jenkins	855	0	0
D. J. Davies	850	0	0
J. Monks & Co.	846	0	0
J. JENKINS, Brynmawr (accepted)	663	0	0

## ARCHD. SMITH & STEVENS. LIFTS.



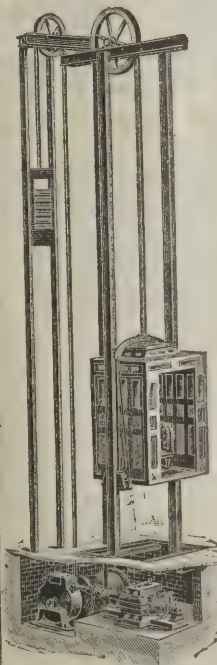
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READING CASES for THE ARCHITECT.  
Price 2s.—Office: 175 Strand, London, W.C.



**WALES—continued.**

For construction of new sewerage works and the extension of the water-mains at Brynmawr. Mr. GEO. H. DANIEL, engineer, Clarence Chambers, Pontypool.  
MONKS & Co., Crumlin (*accepted*).

**WALSALL.**

For sewerage Chapel Street, Blakenall (part of), for a distance of about 68 yards, and for sewerage, making and completing Providence Lane.

*Providence Lane.*

ATKINS, Ryecroft (*accepted*) . . . . . £485 4 0

*Chapel Street.*

ATKINS, Ryecroft (*accepted*) . . . . . 98 17 0

**WELLINGBOROUGH.**

For erection of a council chamber, &c. Messrs. SHARMAN & ARCHER and TALEOT-BROWN & FISHER, architects.

E. Brown & Son . . . . .	£4,392	0	0
T. H. Dorman . . . . .	4,165	0	0
W. Goodman . . . . .	4,148	0	0
Hacksley Bros. . . . .	4,003	0	0
W. Benitt . . . . .	3,990	0	0
W. Stevens . . . . .	3,990	0	0
W. J. HARRISON, Wellingborough ( <i>accepted</i> ) . . . . .	3,800	0	0

**WIDNES.**

For erection of cemetery chapels and registrar's lodge. Mr. JOHN S. SINCLAIR, architect.

C. Burt . . . . .	£7,153	0	0
W. Winnard . . . . .	6,633	0	0
J. Matthews . . . . .	6,330	0	0
E. Gabbutt . . . . .	6,325	0	0
J. Ellison . . . . .	6,140	0	0
G. Woods & Son . . . . .	5,995	0	0
Hughes & Stirling . . . . .	5,760	0	0
G. Parker & Co. . . . .	5,699	0	0
Paterson & Son . . . . .	5,620	0	0
P. Tickle . . . . .	5,499	0	0
G. Rathbone . . . . .	5,210	0	0
T. SADLER, Widnes ( <i>accepted</i> ) . . . . .	5,125	0	0

**ILLUSTRATIONS.**

WINCHESTER CATHEDRAL—THE CHOIR.

WINCHESTER CATHEDRAL—WEST FRONT.

PROPOSED HOUSE AT HINDHEAD FOR DR. A. CONAN DOYLE.

THE DOVER CASTLE, WESTMINSTER BRIDGE ROAD, S.E.

**BUILDING AND BUILDERS.**

THE ceremony of cutting the first sod in connection with a new church at Weston, near Runcorn, took place on the 20th inst. The building is estimated to cost about 4,000*l*.

A MEMORIAL stone of a new mission church at Abercych, in the parish of Manordeify, North Pembrokeshire, was recently laid by Mrs. Saunders Davies, of Pentre. The church will seat 160 worshippers, and the whole expense of its structure will be borne by two ladies.

PLANS have been passed for the conversion to the purposes of a tavern of the house in Mawson's Row—a turning out of Chiswick Mall—in which it is traditionally said Pope lived with his parents from the time they left Binfield until 1717, when his father died and was buried in Chiswick churchyard.

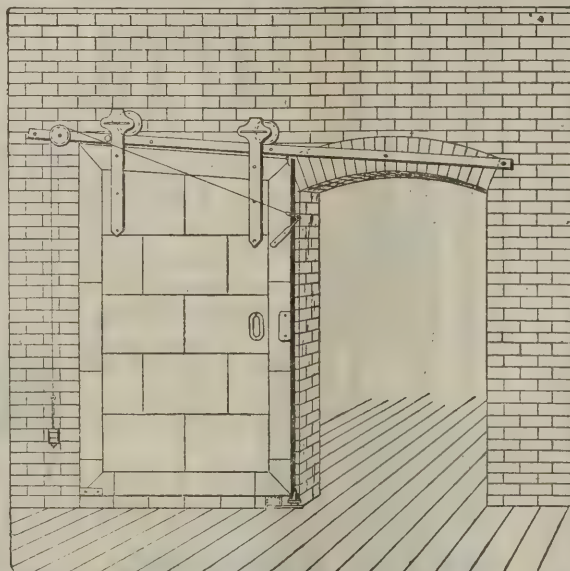
THE foundation-stone of the Prescot new infirmary which the guardians are erecting at a cost of 25,000*l*., including a new laundry building, was laid on the 18th inst. There will be four blocks of buildings, all of local brick, with stone dressings and quoins, and they will be in line with the present erections. Two of the blocks will be three storeys high, one two storeys, and one special block built as a maternity ward. The whole will afford accommodation for 300 beds. The architects are Messrs. J. & W. Gandy, St. Helens; Mr. Fred Brown, St. Helens, the builder, while Mr. W. Molyneux, St. Helens, is erecting the laundry.

ON Tuesday H.R.H. Princess Henry of Battenberg visited Messrs. George Wright & Co.'s, 155 Queen Victoria Street, and selected some mantel-pieces and grates for Osborne Cottage.

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## TRADE NOTES.

THE new Board schools, Shrewsbury, are being warmed and ventilated by Shorland's patent Manchester grates and patent exhaust roof ventilators, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. FREDK. BRABY & CO., Limited, have opened a branch of their business at Ashton Gate Works, Coronation Road, Bristol.

WE have received some specimens of the admirable reproductions of the "Autocopyist," for which it is claimed that it produces up to several hundred superior black copies of anything written or drawn with any ordinary pen on ordinary glazed paper. By sprinkling "transfer powder" over any of the copies they act as fresh originals even after months, thus an unlimited number of copies can be obtained from one writing or drawing. Tracing paper or tracing cloth can be used with very good results. All parts of the Autocopyist keep for years, and are always ready for use. The specimens referred to comprise letters, sketches, and architectural drawings, the original writing or drawing of which was done with an ordinary pen on ordinary paper, therefore the copies are a facsimile.

## VARIETIES.

NEW schools have been erected in connection with the Nutgrove Wesleyan chapel, St. Helens, at a cost of 2,400/.

CARR'S LANE Congregational church, Birmingham, is to have a large sum spent on it for renovations, and the school premises in connection with it are to be enlarged.

WORKMEN are busily engaged in removing the stucco which has so long disfigured the exterior of Gray's Inn Hall, which is to be cleaned and restored to its original condition.

THE new parish church of St. George, Heaviley, Stockport, was consecrated yesterday. The church has been erected at a cost of some 40,000/ by the Christy family.

MR. JAMES STABLES, J.P., has offered to present 5,000/ to the Leeds General Infirmary for the purpose of erecting a new supplementary home for nurses on land recently acquired for that purpose. It is intended to erect a building for the accommodation of fifty nurses.

NEW YORK city has fewer churches in proportion to its population than any other large city in the United States. New York has one church for every 2,837 people, Chicago one for

every 2,199, Brooklyn one for every 2,105, Philadelphia one for every 1,576.

WHEN the Bill proposing to give sanction to the Midland Railway Company to construct a viaduct over St. Pancras Churchyard is brought forward, Mr. H. C. Richards will move an instruction to the committee calling upon the company to refrain from interfering with human remains buried in the churchyard.

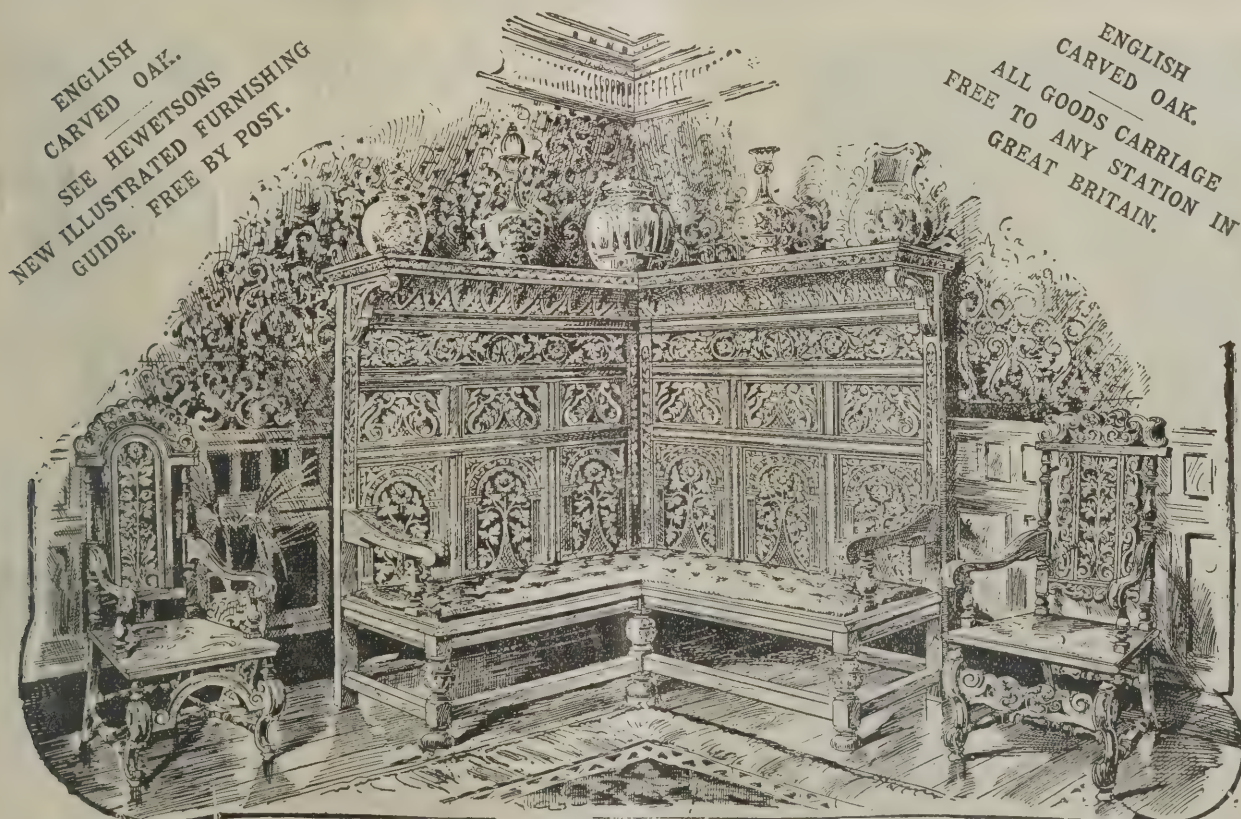
A COPY of Holman Hunt's great picture "The Light of the World," reproduced under the supervision of the artist himself, will be given with the *Quiver* for March. Mr. Hunt has signified his satisfaction at the manner in which the picture has been reproduced.

AT a committee meeting held on February 22 the subscribers to the Stockport Infirmary decided to suitably commemorate the Queen's record reign by enlarging and improving the present building. Messrs. Woodhouse & Willoughby, of Manchester, were selected as the architects to carry out the same.

THE roof and side wall of a small house in Boston Place, Marylebone, fell in recently. The house was occupied by a man named Fletcher and his family, another family named Atwood and others, and some of the inmates were more or less injured by the fall. The accident is attributed to railway operations being carried on in the vicinity.

A PUBLIC competition of designs for the Sutherland Institute, Longton, has just been decided by Mr. W. Gilbee Scott, as assessor, in favour of Messrs. Wood & Hutchings, of Tunstall and Burslem, whose design "Knowledge" was placed first, and their design "Compact" was placed second, thus carrying off the two premiums of 75/ and 25/. The building will provide a public library, and technical schools of science and art, manual training and cookery. On the 7th of last month the foundation-stone was laid by the Prince of Wales, although the plans at that time had not been adopted. The estimated cost is 8,000/.

THE British Indian Association have written to the Bengal Government taking exception to the exclusion of Government buildings, other than those used for military or naval purposes, from municipal jurisdiction, as proposed in the Bill which has been introduced into the Bengal Council. They admit that the measure is reasonable enough as regards State buildings erected and maintained under the supervision of the Public Works Department, though they think that here also there is a sanitary side to the question for which the municipalities can alone be responsible, but what they chiefly object to is the wording of



## A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

No. 319.—The "WORTLEY" CARVED OAK ARM-CHAIR, £4 15s.

No. 320.—CARVED OAK HALL COSY CORNER,  
6 ft. 6 in. high, £24 10s.

No. 321.—The "KNIGHT" CARVED OAK  
ARM-CHAIR, £4 5s.

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the Act, which they complain is such that it may be held to include thanas, registration offices and pounds, schoolhouses, which also serve the purposes of the local post office, and the Government agency for the sale of quinine in pice packets, and other buildings for which no valid cause for exemption is apparent. If, remarks a contemporary, the municipal agency were only an efficient one, nothing would be more reasonable.

WE have lately had submitted to us a sample of Lyte's Woven Metallic Stair-Tread, which we understand is being tried with excellent results at the Army and Navy Stores, Harrod's Stores, Sloane Square Station, and other places. It is composed of lead wires about  $\frac{1}{8}$ -inch diameter, each having a steel-wire core. These are laid parallel to one another, and woven in the opposite direction with plain steel wires about 18 B.W.G. The material is then rolled so as to flatten the lead wires and give an even surface. It can be made in sheets of any size, and can be easily bent at the edge to form the nosing of the stair. The tread certainly seems to be capable of supporting the claims made on its behalf for durability, easy fixing and security against slipping, the lead giving an excellent foothold and the portions of steel wire exposed preventing undue wear. It is also made with brass wire for ship use, and is well adapted for omnibus and tramcar steps. It is being brought out under the auspices of Messrs. Easton, Anderson & Goolden, Limited, of 3 Whitehall Place, S.W.

THE work in connection with the conversion of the Leinster Hall, Dublin, reference to which was made in these columns recently, is now being energetically proceeded with. During the past few days the side balconies have been entirely cleared away, and the front balcony over the entrance from Hawkins Street will be wholly removed in the course of a few days. Portions of the stage still remain, but these are being rapidly removed. The wooden flooring of the hall has been lifted, leaving the bare earth exposed. The present works are being carried out under the direct supervision of the local representative of the syndicate, Mr. J. Edward Whitty. As soon as the preliminary operations of dismantling the interior of the hall have been accomplished, it is understood that tenders for the construction of the new Theatre Royal will be invited, and it is believed that the reconstructed building will be available for the public during the coming Horse Show carnival. The stage will be one of enormous dimensions, stretching from the back as far forward as the door by which parties using the fauteuils in the Leinster Hall obtained entrance to their seats. The theatre will be perfectly isolated on all sides, and danger from fire will

be reduced to the very smallest minimum. Mr. Matcham is the architect, and the new theatre will be erected under his supervision.

### NEW CATALOGUES.

MR. H. MÜNZING, of 199 Upper Thames Street, E.C., has sent us a batch of catalogues and price-lists of his various specialties. Conspicuous among these is the Howard Thermostat, an automatic heat regulator which controls the fire in a furnace or boiler by means of the thermostatic plate, which is fixed in a living or other room. This plate is an equilateral triangle of 8 inches, is a very neat and highly polished plaque, and is placed on the wall of any living room about 6 feet from the floor. On the front of this plaque and near the bottom is a small index, which is used to set the Thermostat to the desired temperature. The index connects with the bell crank on the rear of the plate. Attached to the bell crank is a braided silk cord, which extends down through the partition to a point just below the floor, and over frictionless pulleys to the cylinder dampers. These dampers are made of sheet brass, and measure  $8\frac{1}{2}$  inches long and  $10\frac{1}{2}$  inches in diameter, and have a partition extending through the centre dividing the draught from the check. On each end of the cylinder is an opening 6 inches in diameter; one end is connected by a pipe with the ash-pit section of the furnace or boiler and the other end with the smoke-pipe. The cylinders are slotted, one being fixed, while the other is pivoted so it may be easily rotated. These slotted openings are so arranged that when in certain positions those on one side of the partition will be open, while those on the other side will be closed. The material used in the construction of the Howard Thermostat is of high grade and is guaranteed in every particular. The thermostatic plate furnishes the power by contraction and expansion, and is so sensitive that the finest working machinery is required in its manufacture. It is composed of the most sensitive known material, and works quicker than a mercurial thermometer. The cylinder dampers are made of brass, protected by a covering or jacket of iron, and are so constructed that they cannot get out of order.

MESSRS. JOHN SHAW & CO., Maryhill Ironworks, Glasgow, are sending out a new illustrated price list of flange pipes, hydraulic cylinders, beds and rollers for laundry engineers, beetling beams for dyers and bleachers, columns, jobbing castings, &c., &c.



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**NORTH BRIDGE STREET IMPROVEMENT.**

At a recent meeting of the Lord Provost's committee of Edinburgh Town Council, the report of a sub-committee on the North Bridge Street reconstruction was considered. The sub-committee recommended that the elevation plans for the reconstruction of the buildings on both sides of the street submitted by Messrs. Scott & Williamson, architects, whose designs were adjudged first in the competition, should be adopted with such modifications as the Council might think necessary. Failing satisfactory offers from outside parties to undertake the work, in whole or in part, at their own risk, the sub-committee were of opinion that the reconstruction should be executed by the Corporation itself. The Lord Provost's committee approved of this report, and agreed to ask a remit to instruct the preparation of working plans for the corner blocks meantime, and to obtain estimates.

**ASPINALL'S ENAMEL, LIMITED.**

The general meeting of the shareholders of Aspinall's Enamel, Limited, was held on February 23, when the report and accounts for the year 1896 were duly approved. The directors recommended a dividend making 5 per cent. for the year, and a substantial sum was added to reserve.

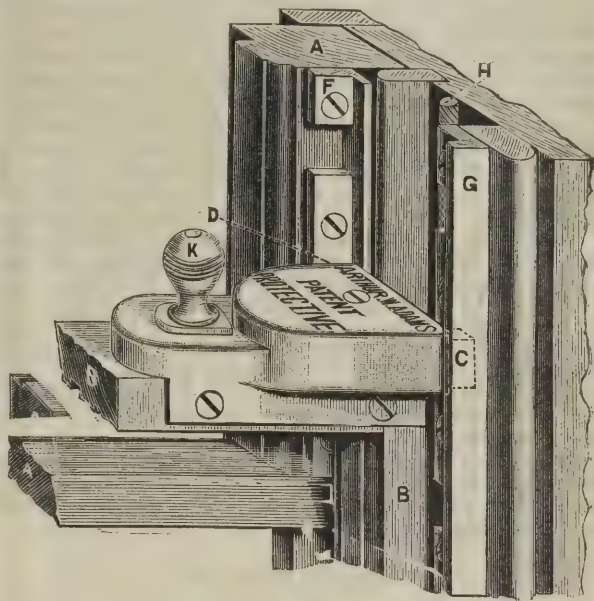
The Chairman in his address remarked that the sale of Aspinall's Enamel in tins and tinlets was as large as ever, and that the company was making a special feature of an enamel for decorative purposes which had been used with great success at some of the large hotels in the West End. He also remarked that their other manufactures were meeting with due appreciation from the public, particularly "Wapicti," the sanitary washable distemper. This is an article which is extensively used by large institutions, the War Office and others, and is highly suitable for the walls of public buildings, hospitals and private houses.

After the usual vote of thanks the meeting terminated.

**A SECURE AUTOMATIC AND ADJUSTABLE SASH-FASTENER.**

The accompanying illustration shows Arthur W. Adam's new patent sash-fastener, called the "Protective," which admits of either or both of the sashes of a sliding window to be securely adjusted independently of each other at any position desired. It will be seen that two studs, C and D, which are self-acting,

enter the spaces of plates F and G directly they come opposite. Both studs are simultaneously released by means of the knob K, and the sashes again become fastened when pushed to the next position desired. The sashes may be regulated to any degree for ventilation by the upper or lower sash or both sashes, as well as closed. Each sash being securely held, no other fastener is necessary.



The automatic principle of this fastener insures perfect security, and saves trouble; at the same time is suitable for, and can be fixed to, any sliding window without cutting away; is neat in appearance, simple and reliable.

A special form of this "Protective" sash-fastener, with a loose key instead of the knob, is supplied for asylum windows which require to be regulated only by authorised persons.

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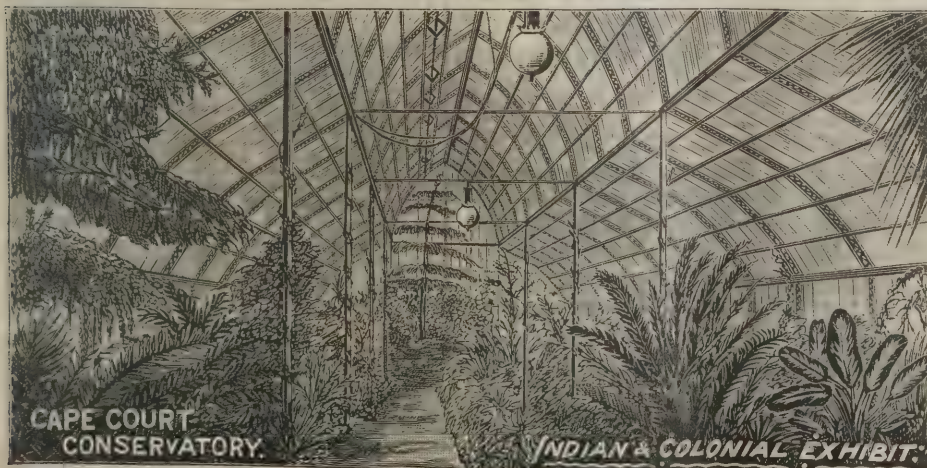
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## PUBLIC WORKS AND BUILDINGS.

ACCORDING to the statement of the Secretary to the Treasury, in 1896-97 the increase on the net total of this class over the net original estimates for 1895-96 amounted to 130,704*l.* For 1897-98 there is a decrease of 35,972*l.* as compared with the exceptional estimates for 1896-97, though the total is still 83,370*l.* higher than the total of the original estimates of this class for 1895-96. The most noticeable features of the present estimates are as follows:—In order to expedite the construction of Block 2 of the new Admiralty Buildings, a sum of 40,000*l.* is asked, as against 25,000*l.* in 1896-97. The increase of 26,000*l.* for public buildings, Great Britain, is due mainly to the Patent Office extension, the new Record Office and the extension of the General Register House, Edinburgh. Under the Survey's Estimate, which shows a net increase of 7,151*l.*, increased provision is sought for the revision of the 1-inch map of Great Britain; a new subhead has been raised for employing outside contractors to assist in engraving maps, and under a new arrangement the proceeds of the sale of Ordnance maps are brought to account under this vote, instead of the vote for stationery and printing. In 1896-97 a special item of 30,000*l.* was included under the Harbours Vote for improvements at Holyhead in connection with the mail service. For 1897-98 the total of the estimate has reverted to a more normal figure, with a reduction of 29,288*l.* The estimate for rates on Government property, which showed a net increase for 1896-97 of 55,620*l.*, shows a further increase of 24,514*l.* for 1897-98, raising the net total to about 400,000*l.* For 1897-98 the gross total for rates stands at 416,987*l.*, or nearly twice the corresponding total (226,105*l.*) for 1887-88.

## GERMAN MAXIMS ON SCHOOL SANITATION.

THE following maxims on school sanitation are the result of several conferences held by a number of prominent German physicians, architects and sanitary engineers and school teachers. They are translated by Mr. Gerhard in *Architecture and Building*:—

## 1. Light.

*Site for a School House.*—The school-house building should

as much as possible be so placed with regard to the points of the compass that the windows of the classrooms will face the north-east or else the west. The latter aspect should only be considered admissible for schools in which in the summer no teaching is done in the afternoon.

With regard to ventilation and exposure to sunlight it is to be desired that the classrooms be all located on one side of a corridor only.

*Windows.*—The windows should be wide and should reach as near to the ceiling as possible. The wider the classrooms are the higher should the windows be.

The light should always come from the left side, never from the right, nor from two sides, nor from the front.

Arched windows should be avoided, as they reduce the area of the upper part of the window, which is the most important one as regards lighting.

Window piers should be kept as narrow as possible.

The plan of the studies should be so arranged that the entire lessons are given during daylight. Particular care should be taken to have those lessons which require much use of the eyes given during the lightest hours of the day (drawing and writing lessons).

*Dimensions of Schoolroom.*—The following should be taken as the maximum dimensions of a schoolroom:—

For length, 9 metres (29½ feet).

For width, 6 metres (19½ feet).

For height, 5 metres (16½ feet).

The so-called long rooms (in which the proportion of length to width is as 3 to 2), and in which the desks stand parallel to the short side of the room, are the most desirable from a sanitary point of view. Square rooms are only admissible in the case of a small number of scholars. Classrooms of great depth, in which the desks stand parallel to the long sides of the room, are to be avoided because of the direction in which the light falls from the windows.

The least best seat in the classroom should have ample light and, if possible, on dark days, an illumination equivalent to at least ten standard candle lights at one metre distance.

*Curtains, Blinds and Shades.*—Direct sunlight or strong reflected light must be avoided by the use of curtains, blinds or shades. The latter, however, should not darken the room too much. Shades of a light buff or cream colour are the best. If shade rollers are used, the shade roller should not be placed in the window recess, as otherwise the upper part of the window will be darkened.



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**Walls and Ceilings.**—Walls and ceilings of a schoolroom should be finished in a light colour.

**Artificial Light.**—Artificial light should be used only where it is impossible to so arrange the plan of the school studies that all lessons will be given in daytime.

The electric light, and in particular the indirect reflected light, is the one best adapted to schoolrooms, because it is powerful and strong, does not heat the air of the room and does not give off injurious products of combustion.

Artificial lighting should fulfil the following requirements:—

(a) Each seat should have ample light and the writing or the book of the pupil should not be shaded.

(b) The light should not flicker.

(c) The light should not be blinding to the eyes and it should not give off too much heat.

In case electric light is not available, particular attention should be paid to the ventilation of the schoolroom during the hours when artificial light, either gas light, oil lamps or candles are used.

## 2. Air.

**Ventilation.**—The proper and ample ventilation of the schoolroom is an absolutely essential requirement. Each room should be flushed with pure air just before the school commences and also during each recess.

Natural ventilation should be effected by having all scholars leave the class after each lesson and opening all windows and doors (air-flushing). This should be done not only in summer, but in the winter as well.

In the schoolyard or the playground there should be provided a pavilion, protected by being covered over with a roof, but kept open at the sides, for use of the pupils in case of stormy weather.

The length of each recess should be about fifteen minutes. A recess should be taken after each lesson. In case of very cold weather the length of the recess may be shortened.

For the lunch in school at least twenty minutes should be allowed.

Artificial ventilation should always be combined with the heating. This is particularly desirable where there is no special system of ventilation. Even the most primitive heating apparatus—such as, for instance, the German tile stove—can be combined without much difficulty or expense with a simple means of ventilation. Where the school building is to be provided with an elaborate system of ventilation, change of air by means of fans or blowers (mechanical ventilation) should be

considered as being the best system. All fans and blowers should operate noiselessly.

Allowance should be made for at least 5 cubic metres or about 175 cubic feet of air-space for each scholar. The number of pupils in one class should not exceed fifty. According to Morin and Professor Rietschel 15 cubic metres or 525 cubic feet of fresh air should be admitted per hour per scholar.

The relative humidity of the air in the schoolroom should not exceed 70 per cent., and be not less than 50 per cent. In case no provision is made in connection with the central heating apparatus for adding a certain percentage of moisture to the air, vessels containing water should be set up in the classrooms, so that the air may not become too dry.

**Removal of Dust and Impurities.**—Overcoats, rubber coats and rubber shoes should be hung up outside of the schoolroom. Provision should be made for the cleaning of the shoes by shoe-scrappers, &c.

In the selection and construction of the floor of the schoolrooms due regard should be paid to the fact that the better the floor is the easier it is cleaned by means of moist rags or mops.

The floors of all corridors and of all classrooms should be cleaned by sweeping and scrubbing them daily by means of a moist cloth. The same rule applies to the desks, tables and seats, which should always be dusted and cleaned after the floor is cleaned. A more thorough cleansing should occur at least three times a week. There should be a few cuspidors in the rooms, of the type only which can be filled with water. Spitting on the floor should be strictly prohibited. The dust of schoolrooms may be the means of propagating contagious disease.

The walls of schoolrooms should be constructed with a due regard to protection against cold and dampness.

Once a week when the schoolrooms are thoroughly cleaned it is desirable to clean the walls. In order to facilitate the cleaning of the walls it is desirable that the surface should be perfectly smooth and non-absorbent.

Gymnasiums should be kept clean and free from dust. The floor, if it consists of wood, should be oiled once a year. The entire floor should be cleaned daily with moist rags. All apparatus in the gymnasium, the window sills and the mouldings and cornices, should be dusted once a week.

The air should be changed as often as possible by opening doors and windows and establishing a draught. All jumping mattresses should be covered with a material which keeps out dust as much as possible. Once a week the mattresses should be beaten out in the open air.

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**Water-closet Conveniences.**—One water-closet seat should be provided for each thirty children. For girls the number of seats should be doubled. It is desirable to have separate seats for the various classes on account of the varying height required for the seat.

The maintenance of cleanliness and the disinfection of the privies or water-closets and of the urinals should be constantly controlled and watched. Disinfection is not ordinarily required where a good type of water-closet is used and where the excreta are removed by the water-carriage system. During recess there should be an efficient flushing of the urinals, preferably continuously and automatically.

**Heating.**—The temperature of the air in the schoolroom should in the winter time be from 18 to 19 deg. Celsius (64 to 66 deg. Fahr.). At the beginning of the lesson it should be not less than 16 deg. C. or 60 deg. Fahr.

Every schoolroom should have a reliable thermometer, and if possible it should be so arranged that it can be read from the room as well as from the corridor, so the janitor may observe the temperature without entering the class.

In summer time, on days when the temperature outdoors registers 25 deg. C. (76½ Fahr.) at ten o'clock in the morning, the school should be dismissed at 11 A.M. In case some parts of the school-house building are very much exposed to the sun, the inside temperature in the classrooms should be taken as a guide.

### 3. School Lunch.

It is desirable that there should be a special room set apart as a lunch-room, in which the pupils may remain in case of bad or very cold weather and while the classrooms are being ventilated.

### 4. Drinking Water.

During recess ample drinking water of good quality should be provided for the children. It is best to take the supply from the public or city supply. Where this is not available a driven well should be constructed in preference to a dug or shallow well. The water of the well should be examined periodically.

### 5. Position of the Body.

Attention should be given to a good posture of the body. To enable the scholar to sit erect it is absolutely necessary that the desks should be hygienically constructed. A bad posture may ultimately result in curvature of the spine, in insufficient development of the chest, and in disturbances in the circulation

of the blood, in impairment of the digestion, and finally it may become the cause of nearsightedness. The school desk should be constructed in a simple manner, and so that it may be readily cleaned. In every class there should be provided desks of different sizes and heights. The pupils should as far as possible be placed according to their size and height.

### 6. Nearsightedness.

It has been proven by numerous examinations that nearsightedness is of frequent occurrence in schools; also that it increases in frequency and in degree in the higher classes.

Wall maps, drawings and charts should be so hung that they may be visible from every seat in the class. Blackboards of wood should be painted a dark, dull black, but should not have a glossy finish. The paint must be frequently renewed.

Children who cannot see the wall maps or read the writing on the blackboard from their seats should be given seats in the front row of desks.

Reading and writing during twilight or with insufficient light should be avoided.

The distance of the eye from the writing should be at least 25 to 30 centimetres (10 to 12 inches).

### 7. School Baths.

All schools should be provided with baths, preferably in the shape of "rain baths," because these are cheaper in first cost as well as in maintenance, and also because they require less room to fit up and do not use up such a large quantity of water as other forms of baths.

All children should take these baths, except they are exempted by special request of their parents or by advice of their physician.

It is desirable that the baths be so arranged that the feet may not come in direct contact with the floor. A thorough soaping should be applied during the running of the douche. Each child should have a bath once a week.

During the summer months a more frequent bathing is desirable. Each child should have its own separate towel.

In summer the rain bath may be supplemented by frequent outdoor bathing.

### 8. Accidents and Sudden Illness.

Teachers should be familiar with the measures to be taken in case of accidents, injuries or sudden illness.

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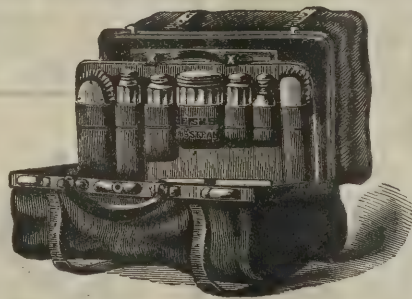
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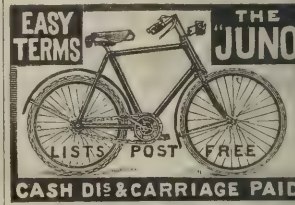
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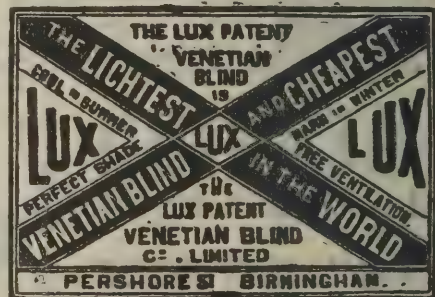
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Each school should be provided with a surgical emergency case containing the necessary articles for efficiently rendering the first aid to the injured. Printed directions of what to do in case of emergency, until the arrival of a physician or surgeon, should be conspicuously hung up in every school-house.

9. Division of Time for School Children.

The following table may be taken as a basis for arranging the divisions of time of each day for school children of all ages. The figures given in the table should be taken as maximum figures.

Age of Child.	Duration of Sleep in Hours.	Time for Dressing, Washing, Undressing, &c.	Time for Meals and Rest after Meals.	Time for Play, Sports, Exercise and Voluntary Occupations.	Time for Work at Home and at School.	Sitting Hours in School.		Singing Lessons (Weekly).	Gymnastics (Weekly).	Home Work (Weekly).	Home Work (Daily).
						Weekly.	Daily.				
7	11	1	3	6	2-3	12-15	2-2½	2-2½	3	—	—
8	11	1	3	5-6	3-4	12-18	2-3	2-2½	3	3	—
9	11	1	3	5	4-5	14-20	2½-3½	2-2½	3	6	—
10	10-11	1	3	3-4	6	24	4	2-2½	3	7	—
11	10-11	1	3	3-4	6	24	4	2-2½	3	7	—
12	10	1	3	3	7	27	4-5	2-2½	3	10	—
13	10	1	3	3	7	27	4-5	2-2½	3	10	—
14	9½	1	3	2½	8	30	5	2-2½	3	13	—
15	9	1	3	2½	8½	30	5	2-2½	3	16	—
16	8½	1	3	2½	9	30	5	2-2½	3	16	—
17	8½	1	3	2½	9	30	5	2-2½	3	19	—
18	8½	1	3	2½	9	30	5	2-2½	3	19	—

(Saturdays being a school day in Germany.)

advancement of German industry, we would particularly refer to the educational conditions upon which Germany has relied so largely in the past for the maintenance and development of her industrial progress.

The Commissioners set forth in their Second Report in 1884 the conclusions at which they had arrived with respect to the educational activity of Germany and the Continent, and it is important to record that since that time there has been no disposition to remain satisfied with past achievements. On the contrary, in nearly every case we found evidences of a determination on the part of the municipalities and of the State to increase and extend their schools, and to equip them with the most modern and improved apparatus. In these days of rapid intellectual progress the school becomes antiquated and obsolete almost as quickly as the factory or the workshop, and again and again we found that schools which had awakened our envy in 1882 and 1883 were being entirely rebuilt and replaced by larger and more serviceable edifices. We shall have to mention, even in the few towns we visited, several instances where we found this to be the case, and the manufacturers who assured us of the importance of these institutions during our previous visit were not a whit less convinced now of the urgency of the need of the additions and extensions which had since been made.

The great industrial art schools of Munich and Nuremberg vied with one another at the exhibition in the variety and extent of the works of their students, and we found that for the school at Nuremberg an entirely new building is in course of erection at an estimated cost of 45,000*l*. Separate departments are being provided for the day and the evening students, and special well-lighted class-rooms have been designed for all the different branches of art instruction, as well as for art in its varied applications to wood-carving, metal-work and general decoration. This school, when it is finished, will be one of the finest and most complete of its kind in Germany.

The Gewerbe Museum of Nuremberg has likewise outgrown its former habitation, and a handsome new edifice, conveniently situated, is even now partly occupied by the libraries and collections. In addition to the new buildings already finished, it is proposed to erect a separate range of laboratories and class-rooms for the section devoted to chemical technology, which since our former stay in Nuremberg has increased greatly in importance. These buildings when complete will cost over 50,000*l*. In connection with the Gewerbe Museum there are courses of popular lectures, similar in character to those given

TECHNICAL TRAINING IN GERMANY.

THE report on a visit to Germany, with a view of ascertaining the recent progress of technical education in that country, by Sir Philip Magnus and Messrs. G. R. Redgrave, Swire Smith and W. Woodhall, M.P., contains the following information on some of the new schools:—  
Among the many causes that have contributed to the

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at the Conservatoire des Arts et Métiers at Paris, on all new inventions likely to prove useful for trade purposes, and on other developments of science and art processes, which lectures are attended by large numbers of the working classes. In the laboratories a staff of professors and their assistants are employed on chemical research, and students desirous of conducting experiments under the direction of the professors in any special applications of chemical science to trade purposes receive gratuitous instruction. A special feature of this trade museum is the collection of specifications of patents carefully tabulated and open to all inquirers. This collection forms part of the statistical department of the museum, which also contains a history of all the factories of Bavaria, arranged in classes, giving a full account of the processes of manufacture, the number of machines used, the trade-marks and patents owned, the horse-power employed, supplemented by any details which the owner may care to furnish respecting the number of the workpeople and the annual output.

At Stuttgart a somewhat similar museum, only opened in May last, has cost close upon 200,000*l.*, and contains specimens of the art products of different countries, arranged after the manner of the South Kensington Museum. We have given a more detailed account of this museum in connection with our description of the exhibition.

If we turn from art to science we find similar evidence in the various towns visited of the remarkable development of educational institutions and of such aids to industry as education is able to provide. We are led to believe that much more is being done for the training of those destined for the higher ranks of industry in many parts of Germany than in England, and this, too, notwithstanding the large sums entrusted to county councils and borough authorities under the provisions of the Local Taxation (Customs and Excise) Act of 1890. At Stuttgart we found that an entirely new group of buildings had been added to the Technical High School, one side, the Chemical Institute, reserved for the practical study of pure chemistry, and the other for practical training in electro-technology. The Commissioners reported in 1884 that this Polytechnic had recently been enlarged at a cost of 75,000*l.* The erection and equipment of these new buildings has cost about 100,000*l.* Every new appliance that can aid the student in his scientific work is found in the series of laboratories of which this range of buildings consist. It is noteworthy that the instruction given in the

Chemical Institute is exactly of the same kind as that given in the Universities, and although a special feature of the teaching and of the equipment is the prominence given to electrolysis and to electro-chemistry generally, no attempt is made in these new laboratories to teach chemistry in its application to special industries, that part of the instruction being provided for in the main Polytechnic building. The electro-technical laboratories, housed in a separate part of the building, are perhaps only inferior to those still more recently erected in Darmstadt, and are splendidly equipped with every appliance for advanced practical instruction in all branches of physics.

At Darmstadt, a city of 57,000 inhabitants, the Polytechnic or Technical High School has been entirely reconstructed at an expenditure of about 120,000*l.* It consists of a main building for the study of mathematics, drawing, natural sciences and engineering, and of two separate detached buildings similar to but larger than those at Stuttgart for the study of chemistry, pure and applied, and of physics and electro-technology. No thought nor money appears to have been spared in the erection and equipment of these buildings, which are the most complete of those we have yet seen. It must be remembered, in connection with the expenditure on the above-mentioned institutions, that the cost of building in Germany is undoubtedly very much less than in this country.

Since this was written, we learn that a new electro-technical institute has been added to the Royal Technical High School in Hanover, opened by the Minister of Education in October 1895, which ranks side by side with these splendid establishments.

To the instances already quoted may be added the Technical High School of Charlottenburg, at Berlin, which was in process of erection in 1884, and which has since then been completed and extended (at an estimated expenditure of over 450,000*l.*), and the unique laboratories for scientific measurements and research in the immediate neighbourhood of the Berlin School; these when visited by one of our party last year were still unfinished, but they now constitute probably the most complete institute in Europe for physical research.

These instances must be taken as examples only of the steady advance made by Germany in the last few years in the further provision of facilities for the higher scientific training as a means of developing her industries.

In our report already mentioned, we stated that the number of

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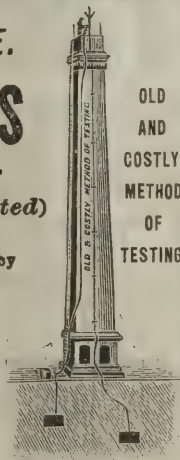
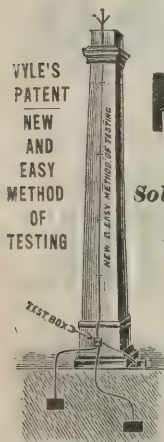
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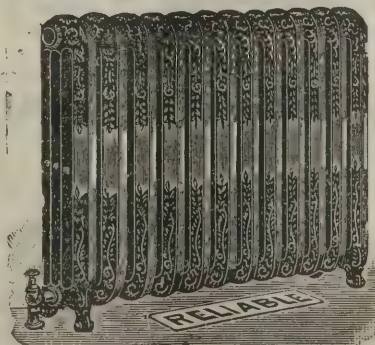
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polytechnic schools was in excess of the requirements of the people, and we attempted to explain the fact by showing that when these schools were originally erected, "Germany consisted of several independent States, which have since been united in the German Empire, and which endeavoured to rival one another in the extent and excellence of their educational institutions." Since then Germany has had time and opportunity to reconsider her position, with the result that whilst none of these institutions have been closed, others have been erected more modern in construction, more completely equipped and better adapted to the now generally recognised need for practical instruction.

To mention one instance only of the efforts made on behalf of trade teaching, we may refer to the Weaving and Dyeing School at Crefeld, which was only completed in 1883 at an estimated cost of 42,500*l.* This has been almost doubled in size by the erection of a new detached building, costing upwards of 15,000*l.*, for the departments of dyeing and finishing, and this school, which we then described as the finest of its kind in Europe, and far surpassing anything of a similar character in this country, has not remained satisfied with the position assigned to it fourteen years ago. The cost of this extension has been defrayed by the State.

In fact, our recent visit has brought it clearly home to us that the Germans have not ceased to believe in the value of the higher scientific education. On the contrary, they appear now to attach greater importance than ever to the connection between such higher scientific training and the development of manufacturing industry. No nation not overburdened with capital would continue to erect and equip institutions for advanced instruction and scientific research without a firm conviction of their industrial value. The demand, too, for such higher teaching seems to increase as the facilities for providing it are enlarged. For whereas in 1884 we stated that the total attendance at the Polytechnicums was little more than 2,000, the attendance of students at Charlottenburg alone, irrespective of the Berlin University, is now 3,000*l.*, while the number of students in the physical and electro-technical laboratories at Darmstadt is already in excess of the accommodation, and the buildings, which were only completed in October 1895, are now undergoing extension.

Indeed, it is worthy of remark that the same object which called into existence some forty or fifty years ago the technical high schools has recently led to their extension and development in a new direction. As far back as that period Germany

began to prepare herself for becoming a manufacturing people. It was her belief in the future applications of chemistry to industrial purposes that led to the erection and equipment at a great cost of chemical laboratories, and to the encouragement held out to students to pursue their studies in those laboratories for a period of five, six or even seven years. The success that has attended the efforts of the Germans to appropriate many important branches of chemical manufacturing industry is well known, and the dependence of those industries on the researches of chemical experts employed in the works is generally recognised. At the Badische Anilin- und Soda Fabrik alone 100 scientifically trained chemists and 30 engineers are now employed.

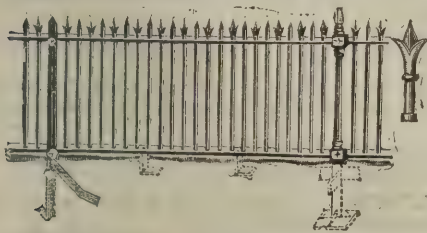
Her brilliant achievements in the field of chemical industries have encouraged her to establish well-equipped electrical laboratories and to develop the practical teaching of physics with the view of assisting the electrical trades, which are comparatively of recent growth. Twelve years ago the Commissioners had to report that the facilities for practical laboratory instruction in electrical technology scarcely existed, or were of the most meagre kind. At that time nowhere in Germany was to be found so well-equipped a laboratory for electrical engineers as at the Finsbury Technical College. Now there are no laboratories in England which can compare in the detail and completeness of their equipment with those we visited at Darmstadt and Stuttgart; and no facilities exist for original and independent research in physical subjects to be compared with those afforded at the Imperial Physical Institute at Charlottenburg.

Our recent visit to Germany has also impressed us with a sense of the advantages which the nation derives from having an organised system of secondary education. To this matter reference was made in the report of 1884, and we desire to emphasise it. The education of a secondary school is in every way more accessible in Germany than here. The grades and differences of schools are better defined and more clearly understood; the instruction is more disciplinary and exercises a deep influence in the formation of habits and in the training of character; the teaching of modern languages is insisted upon to a far greater extent than in any of our own schools, with results of the greatest possible benefit to the German clerk and commercial agent; the absence of frequent and conflicting external examinations gives more time for careful study; the remission of two years' military service to those who reach a certain standard in a secondary school is a powerful encourage-

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ment to steady application; and the fees are much lower than in schools of corresponding grade in this country. These are advantages which count for much in enabling the German youth to obtain a good secondary education and in fitting him for the subsequent period of apprenticeship in the counting-house, the merchant's office or the factory. The German boy acquires at school a stock of knowledge which is at once useful to him, and he also acquires habits of accuracy and learns the significance of attention to detail and the importance of discipline and obedience. Our consular reports are full of references to the differences between the methods of training and aptitudes for commerce in Germany and in England, which in many ways are traceable to the fundamental differences in the secondary education of the two countries.

As regards trade schools, we found that these are more common in South Germany, as, for instance, in Austria, than in Prussia, and we were struck with the recognition of their importance, as shown by the fact that in the exhibition at Nuremberg of the products of the different provinces in Bavaria specimens of the work of the pupils of trade schools were in many cases displayed in connection with the exhibits of the factory or workshop, indicating the close relation that appeared to exist between the school exercises and the work of the manufacturer. The instruction in these trade schools is essentially practical, and has been very helpful in the development of several of the smaller industries.

The lesson to be derived from all this activity in matters pertaining to education is clearly this, that our foreign rivals are determined to keep well ahead in the matter of facilities for instruction, and not only so in those institutions wherein the highest branches of scientific instruction are pursued. They are convinced that the nation which has the best schools is the best prepared for the great industrial warfare which lies before us, and no money appears to be grudged for the erection, equipment and maintenance of educational institutions of all grades, and especially of the science laboratories which, as we have seen, are being multiplied in Germany. The great industries of to-day depend more and more upon the successful application of recent discoveries to ordinary manufacturing processes and less and less upon the presence of coal, iron and raw materials. Cheaper and more speedy means of transit are placing all countries more nearly on a level as regards natural resources. Improved tools and labour-saving machinery are rapidly rendering the manual skill and dexterity of the individual workman (upon which we once so greatly relied) of

minor significance, and in the industrial race in which we are engaged nearly all the advantages upon which we prided ourselves in the past are possessed in a greater or less degree by our rivals, and count for little as compared with scientific knowledge and its ready application to the needs of the manufacturer.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

3309. Cornelious Thomas, for "A new or improved window-fastener."  
 3345. Clara Lucke, for "Improvements in presses for forming artificial stones, slabs, tiles and the like."  
 3361. Robert Joseph Judge and Harry Hunt, for "Improvements in or connected with brazing or soldering-hearths."  
 3454. Thomas Auty and Alfred Watkins, for "Improvements in or relating to machinery or apparatus for engraving and die-sinking from 'former.'"  
 3531. John Wright, for "Improvements in waste or slop water-closets."  
 3571. Albert Hendrik Van Der Vyck, Hendrik Van Der Vyck and Gerhard Van Der Vyck, for "Improvements in the construction of fireproof buildings."  
 3576. John Clayton Newburn, for "Improvements in the manufacture of anti-fouling compositions or paints."  
 3880. Henry Gibbon and William Tyrer, for "Improvements in and connected with windows and window-frames."  
 3883. John Shanks, for "Improvements in and connected with cisterns, sinks, baths and the like."  
 3895. Samuel Y. Davis, for "Improvements in blind-rollers."

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## EDITORIAL NOTICES.

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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

**\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.**

## NEW READING CASE.

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*For Advertisement Scale, see page xiii.*

## COMPETITION DECIDED.

**WALTHAMSTOW PUBLIC BATHS.**—The award of the assessor appointed by the District Council (Mr. Rowland Plumbe, F.R.I.B.A.) is as follows:—1. "Hygiene" (J. Williams Dunford, M.S.A., F.I.Inst., 100C Queen Victoria Street, E.C.); 2. "Experience" (Messrs. Spalding & Cross). The District Council have appointed Mr. Dunford their architect, subject to the plans being approved by the Local Government Board.

## CONTRACTS OPEN.

**ABERAMAN.**—March 13.—For alterations and additions to the Pen-y-lan Inn. Mr. T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

**ARGYLLSHIRE.**—March 20.—For erection of three cottages at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

**ASHTON-UNDER-LYNE.**—For four cottages, shed and stable. Mr. Early, hay dealer, Ashton-under-Lyne.

**BELPER.**—March 13.—For erection of moulding and fitting shops, covering nearly 1½ acres (with the exception of the iron-work to roof), on the Derby Road. Mr. Maurice Hunter, Belper.

**BELPER AND CHESTERFIELD.**—March 12.—For reconstruction of a bridge carrying the highway over Birches Brook. Mr. Robt. C. Cordon, surveyor, Duffield, Derby.

**BLACKPOOL.**—March 22.—For erection of cemetery registrar's house on the southerly side of new road, opposite the cemetery. Mr. T. Loftos, town clerk.

**BURNLEY.**—March 6.—For erection of an infectious diseases hospital at Kibble Bank. Mr. F. S. Button, Blannel Street, Burnley.

**CARNARVON.**—March 13.—For erection of girls' and infants' schools. Mr. Rowland Lloyd Jones, architect, 14 Market Street, Carnarvon.

**CARRICKFERGUS.**—March 15.—For erection of a Masonic hall. Mr. James Boyd, Town Hall, Carrickfergus.

**CATERHAM.**—March 17.—For erection of a nurses' home at the Caterham Imbecile Asylum. Mr. Edwin T. Hall, 57 Moorgate Street, E.C.

**CHELMSFORD.**—March 6.—For erection of seven residences. Mr. F. Whitmore, architect and surveyor, 17 Duke Street, Chelmsford.

**CHELMSFORD.**—March 11.—For erection of a laboratory and for other works at the county offices, 78 Duke Street. Mr. J. H. Nicholas, secretary to the committee, County Offices, Chelmsford.

**COLCHESTER.**—March 8.—For erection of a building in Colchester. Mr. William C. Street, architect, 7 Victoria Street, Westminster.

**COVENTRY.**—March 6.—For extensions at the City Hospital, Stoney Stanton Road. Messrs. G. & I. Steane, architects, Little Park Street, Coventry.

**DORCHESTER.**—March 13.—For additions and repairs at the Junction Hotel. Mr. A. L. T. Tilley, architect, 16 Cornhill, Dorchester.

**EBBW VALE.**—March 15.—For erection of a school to accommodate 157 children near "Steelworks Houses," with outhouses, boundaries and playgrounds. Mr. Geo. Rosser, architect, Victoria Buildings, Abercarn.

**ECCLES.**—For erection and completion of a chapel, with school buildings, lecture-hall, &c. Mr. Thomas D. Lindley, architect and surveyor, 150A Stamford Street, Ashton-under-Lyne.

**ELLAND.**—March 12.—For erection of a villa residence, with out-buildings, &c., in Victoria Road. Mr. Ed. C. Brooke, architect and surveyor, The Cross, Elland.

**FELIXSTOWE.**—March 12.—For erection of a new station at Felixstowe, for the Great Eastern Railway Company. Mr. T. D. Genllood, secretary, Liverpool Street Station, E.C.

**FOCHABERS.**—March 9.—For erection of cattle shed and repairs on offices at Upper Auchenreath, additions to dwellings at Nether Auchenreath, barn, stable and sheds at Auchenhalrig, repairs to offices at Orbliston, reroofing and repairs to offices at Bauds, servants' room at Cowfords, renewing offices at Kennethmont, servants' cottages at Burnside of Dipple, cottage at Dipple, addition to Fishery House at Lossiemouth. The Estate Office, Fochabers.

**GAERWEN.**—March 10.—For restoration of Garewen Church. Mr. P. Shearson Gregory, architect, Bangor.

**GAINSBOROUGH.**—March 15.—For erection of 10th wards, mortuary, boundary walls, stone and iron stairs, and new conveniences at the workhouse. Messrs. Eyre & Southall, architects, Gainsborough.

**GALGATE.**—March 13.—For erection of police station. Mr. Henry Littler, architect, 21 Pitt Street, Preston.

**GLASS HOUGHTON.**—March 15.—For erection of Board schools at Cutsyke. Mr. George F. Pennington, architect, Bridge Street, Castleford.

**GRANGE-OVER-SANDS.**—March 8.—For erection of workmen's cottages and extension of retort-house at the Gasworks, Meathorp Marsh. Mr. Edward Thompson, manager and secretary, at the Gasworks.

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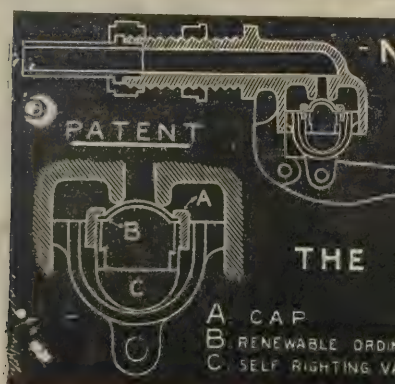
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HALIFAX.—March 8.—For extensions and additions to the King Cross Constitutional Club. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—March 11.—For erection of a brewery, stabling, &c., at Windmill Hill, Northowram. Mr. Joseph F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

HEBDEN BRIDGE.—March 6.—For alterations and additions to Croft Mills. Mr. W. Wrigley, architect and surveyor, Crossley Terrace, Hebdon Bridge.

IRELAND.—March 5.—For erection of a dispensary and doctor's residence and a skunce to enclose site. Mr. Joseph Harton, clerk, workhouse, Mullingar.

IRELAND.—March 11.—For erection of two staircases, additional buildings, and contingent work at the workhouse. Mr. R. Evans, 53 South Mall, Cork.

IRELAND.—March 20.—For erection of a church at Cashilard. Mr. E. J. Toye, architect, Strand, Derry.

IRELAND.—March 11.—For completing the building of cottages in the Carriglea and Whitechurch electoral divisions. Mr. John R. Gower, clerk and executive sanitary officer, Poor Law Office, Dungarvan.

LEEDS.—March 11.—For erection of tower of St. Martin's Church, Potternewton. Mr. John Kelly, architect, Imperial Buildings, Leeds.

LEEDS.—March 24.—For erection of a police station and branch free library at Upper Wortley. City engineer, Municipal Buildings.

LEEDS.—For the demolition of old buildings, excavating, shoring and underpinning, for the London and Midland Bank, Limited. Mr. William Bakewell, architect, 28 Park Square, Leeds.

LIMERICK.—March 13.—For erection of creamery buildings at each of the following places:—Oola; Kilmihill, co. Clare; Effin, Charleville, co. Limerick. Mr. W. Stokes, Mulgrave Street, Limerick.

LONDONDERRY.—March 8.—For erection of a shirt factory and laundry in Great James Street. Mr. Wm. Barker, architect, 25 Orchard Street, Londonderry.

LYDIARD MILLICENT.—March 6.—For erection of an isolation hospital at Purton Stone Lane. Mr. R. J. Beswick, Fleet Street, Swindon.

MANCHESTER.—March 9.—For construction of a retaining wall adjoining the river Medlock, at Helmet Street. The City Surveyor, Town Hall, Manchester.

MANSFIELD.—March 17.—For erection of an infirmary for sixty-eight beds, a maternity ward for eight beds and other works at the workhouse. Mr. R. F. Vallance, Mansfield.

MIDDLETON.—March 6.—For extension of firemen's dwellings. Mr. Wm. Wellburn, borough surveyor, Town Hall, Middleton.

MORLEY.—March 16.—For erection of a club building in Fountain Street. Mr. S. B. Birds, architect, 47. High Street, Morley.

NEW BROMPTON.—March 16.—For erection of a cookery centre at Balmoral Road. Mr. E. T. Atchison, clerk, 8 Waterloo Road, New Brompton.

NEW TREDEGAR.—March 12.—For erection of seven houses on the Gasfield, Tirphil, and four houses on the Greenfield. Mr. George Kenshole, architect, 26 Duffryn Terrace, New Tredegar.

NUNNINGTON.—March 6.—For widening, &c., of a stone bridge. Mr. Walker Stead, county surveyor, Northallerton.

OMAGH.—March 20.—For erection of labourers' cottages. Mr. William Cathcart, executive sanitary officer, Workhouse.

PORTSMOUTH.—March 23.—For erection of a public elementary school in George Street, Buckland, to accommodate 1,284 children. Mr. G. C. Vernon-Inkpen, architect, 75 King's Road, Southsea.

QUEENSBURY.—March 15.—For erection of Board schools, out-offices, boundary-walls and forming of playgrounds at Fox Hill. Messrs. John Drake & Son, architects, Winterbank, Queensbury.

ROCHDALE.—For rebuilding of Ogden Baptist Sunday School. Messrs. Butterworth & Duncan, 4 South Parade, Rochdale.

ROCHDALE.—For erection of a dwelling-house in Shaw Street. Mr. Norcliffe Mills, architect and surveyor, 67 Lord Street, Rochdale.

ROTHERHAM.—For oak screen and choir stalls at Rotherham parish church. Mr. James E. Knight, architect, 20 Moorgate Street, Rotherham.

SALTASH.—March 8.—For erection of fourteen private dwelling-houses. Mr. Paine, Saltash.

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SCOTLAND.—March 6.—For erection of a school at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

SEDGEFIELD.—March 8.—For erection of two water-closet blocks at the Durham County Lunatic Asylum. Mr. William Crozier, county surveyor, Shire Hall, Durham.

SIDDAL.—March 13.—For erection of two houses. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

SOWERBY BRIDGE.—March 15.—For erection of twelve houses in Clay Street, Beech, Sowerby Bridge. Mr. S. Wilkinson, architect, Sowerby Bridge.

STOURBRIDGE.—For erection of a brewery for the North Worcestershire Breweries, Limited. Messrs. Charles Johnson & Sons, architects, Worcester.

SUTTON BRIDGE.—March 6.—For erection of a stone bridge at Sutton-under-Whitestonecliff. Mr. Walker Stead, county surveyor, Northallerton.

SWINDON.—March 13.—For erection of premises in Fleet Street, New Swindon, for the North Wilts Conservative and Liberal Unionist Club. Mr. William Drew, architect, 22 Victoria Street, Swindon.

ULVERSTON.—March 18.—For erection of Wesleyan church. Mr. Thomas Birkett, hon. secretary, 20 Market Street, Ulverston.

WALES.—March 10.—For erection of offices at Cymmer, R.S.O. Messrs. Lambert & Rees, architects, Bridgend.

WATERLOO.—March 9.—For completion of the tower and new vestries and chapel at Christ Church, Waterloo, near Liverpool. Messrs. Austin & Paley, architects, Lancaster.

WETHERBY.—For erection and completion of proposed infectious hospital at Sicklinghall. Mr. T. E. Marshall, architect, Princes Street, Harrogate.

WHITBY.—March 13.—For erection of a pair of semi-detached villas at the top of Downtinner Hill. Mr. Jno. J. Milligan, architect and surveyor, 77 Baxtergate, Whitby.

WINWICK.—March 13.—For erection of two entrance lodges and twelve cottages for proposed new asylum. Mr. Fred. C. Hulton, clerk, County offices, Preston.

WORCESTER.—March 11.—For erection of a residence for the chief constable, alterations to the existing premises at the city police station, &c. Mr. Henry Rowe, city architect, Worcester Chambers, Pierpoint Street, Worcester.

YARM.—March 6.—For erection of a constable's house. Mr. Walker Stead, county surveyor, Northallerton.

## TENDERS.

### BACUP.

For draining, laying-out and roadmaking required in the extension to the borough cemetery. Mr. WILSON, C.E., borough surveyor.

### Accepted tenders.

Etheridge & Clark, labour . . . . . £789 0 0  
T. Peel, materials . . . . . 343 0 0

### BEDFORD.

For additions to premises, for Mr. T. Bates. Messrs. USHER & ANTHONY, architects, Bedford.  
G. E. FATHERS, Bedford (accepted) . . . . . £969 15 0

### BRADFORD.

For erection of a weaving-shed and warehouse in Bowling, Mr. FRED HOLLAND, architect, 358 Wakefield Road Bradford.

### Accepted tenders.

T. Shackleton, mason . . . . . £656 17 0  
J. Cliffe & Co., ironfounder . . . . . 650 0 0  
J. Patchett, joiner . . . . . 199 0 0  
Hill & Nelson, slater . . . . . 100 0 0  
M. Slinger & Son, plumber . . . . . 90 0 0  
A. Davey, painter . . . . . 24 0 0

Note.—All the above are amended tenders.

For erection of a detached house at Bradford Moor. Mr. ABRAHAM SHARP, architect, Albany Buildings, Market Street, Bradford.

### Accepted tenders.

R. F. Dawson, mason.  
J. Briggs, joiner.  
G. Jackson, plumber.  
S. Sunderland, plasterer.  
T. Nelson, slater.

For erection of clothing establishment in Kirkgate. Messrs. MILNES & FRANCE, architects, Bradford.

### Accepted tenders.

Broadhead & Pickering, carpenter and joiner.  
Stead & Hutton, plumber.  
T. Nelson, slater.  
J. W. Walton, painter.

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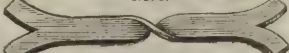
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## BRISTOL.

For making Fitzroy Street, Park Street, Brecknock Road, Fairfoot Road and Lillymeade Avenue, Totterdown, for the Long Ashton Rural District Council. Mr. MAYNARD FROUND, surveyor, 1 St. Stephen's Chambers, Bristol.

J. Perkins . . . . .	£1,939	16	0
Lloyd & Son . . . . .	1,279	0	0
H. Weeks . . . . .	1,232	0	0
W. Galbraith . . . . .	1,220	0	0
Hughes & Weeks . . . . .	1,181	0	0
W. Hurford . . . . .	1,168	0	0
M. Durnford . . . . .	1,161	10	0
A. J. Beavan . . . . .	1,095	0	0
Thomas & Webb . . . . .	989	0	0
W. HICKERY, Totterdown (accepted) . . . . .	949	0	0

## DURHAM.

For laying-down of a system of outlet sewers and sewage-disposal works for the village of Ferryhill. Mr. Wm. SNOWDON, surveyor.

Manners, Durham . . . . .	£275	3	0
Hobbs, Thornaby . . . . .	262	6	8
Heslop, Pitlington . . . . .	255	10	1
Bell, Bishop Auckland . . . . .	240	13	0
Carrick, Durham . . . . .	235	13	3
Parker, Ferryhill . . . . .	226	19	0
Manners, Coundon . . . . .	206	19	6
Wilkinson, Sedgfield . . . . .	206	18	8
MCDONALD, Barnard Castle (accepted) . . . . .	176	17	4

For the formation of the following streets for the Stanley Urban District Council, viz.:—Mary Street, Thorneyholme Terrace, Lucy Street, Delacour Street and Clifford Road, Stanley. Mr. JOSEPH ROUTLEDGE, surveyor.

G. T. Manners . . . . .	£1,576	2	10
W. Johnson . . . . .	1,432	7	0
A. Goldsborough . . . . .	1,228	12	0
J. Wardlow . . . . .	1,192	1	1
J. GOLDSBOROUGH, Chester-le-Street (accepted) . . . . .	1,183	18	0
Surveyor's estimate . . . . .	1,432	5	0

## ESSEX.

For erection of a pair of cottages and repairs to Fouchers. Mr. R. MAWHOOD, architect.

HOLLAND & UNWIN, Great Leighs (accepted) . £605 0 0

## DEWSBURY.

For enlargement and alteration of Trinity Congregational Church. Messrs. JOHN KIRK & SONS, architects, Dewsbury.

## Accepted tenders.

C. Whitehead & Sons, mason.  
Fothergill & Schofield, carpenter and joiner.  
F. Newsome, plumber and glazier.  
S. Crawshaw, plasterer.  
N. Ramsden, painter.

## FORT AUGUSTUS.

For construction of a railway between Invergarry and Fort Augustus.

J. YOUNG, Glasgow (accepted).

## HALIFAX.

For erection of residence and stabling at Lightcliffe. Mr. J. F. WALSH, architect, Halifax.

## Accepted tenders.

S. Mitchell, mason.  
J. Bairstow & Sons, joiner.  
J. Bancroft & Son, slater and plasterer.  
J. Naylor & Son, plumber.  
G. Greenwood & Sons, concretor and mosaic.

## HOUNSLOW.

For erection of detached house, Whitton Park Estate. Mr. T. MERRISON GARROOD, architect and surveyor, 172 Fenchurch Street, City.

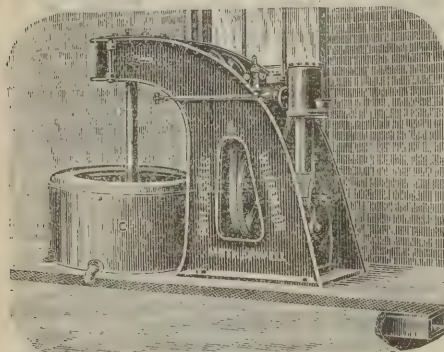
LUCAS & SON (accepted) . . . . . £1,982 0 0

## ILFORD.

For laying of tar paving on the footpath along Valentine's Park, Cranbrook Road. Mr. HERBERT SHAW, surveyor, 3 Cranbrook Road, Ilford.

D. Marchn . . . . .	£274	6	0
A. Hobman & Co. . . . .	210	1	4
J. Smart . . . . .	191	0	10
W. GIBBS & Co., Ilford (accepted) . . . . .	180	14	0
J. Ford . . . . .	159	12	0

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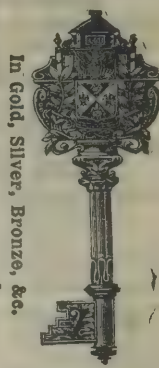
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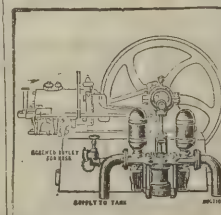
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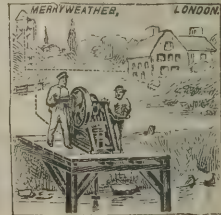


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IRELAND.

For erection of a dispensary and caretaker's residence at Castlemartyr. Mr. RICHARD EVANS, architect, 53 South Mall, Cork.

Coffey . . . . .	£383	0	0
O'Brien . . . . .	360	0	0
Hegarty . . . . .	300	0	0
SCULLEY, Midleton ( <i>accepted</i> ) . . . . .	285	0	0

For erection of new wing for the Governors of Longford County Infirmary.

P. Kelly . . . . .	£692	0	0
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ISLE OF WIGHT.

For construction of greenheart landing-stages to pier at Sandown. Mr. THEODORE R. SAUNDERS, engineer, Belgrave Chambers, Ventnor, I.W.

Pedrette & Co. . . . .	£2,890	0	0
G. Webb & Co. . . . .	2,762	2	5
A. Thorne . . . . .	2,600	0	0
ROE & GRACE, Southampton ( <i>accepted</i> ) . . . . .	2,285	0	0

KEIGHLEY.

For erection of six houses and stores in Fell Lane. Mr. JOHN HAGGAS, architect, North Street, Keighley.

*Accepted tenders.*

Sunderland & Greenwood, mason.

W. Thornton, slater.

Wilson Bros., plasterer.

J. Jackson, plumber.

Total, £1,794.

KENDAL.

For pulling-down old and rebuilding new schools, &c., at Sel-side. Mr. JOHN HUTTON, architect, Kendal. Quantities by architect.

*Accepted tenders.*

J. Thompson, builder.

A. Nelson, joiner.

L. Airey, plumber, painter and glazier.

Steel & Co., plasterer.

J. Stone, sliding partition.

Total, £600.

KENDAL—*continued.*

For extensions to Netherfield Works, Kendal. Mr. ROBERT WALKER, architect, Windermere.

J. W. Howie, Kendal, mason, &c.

Nelson Bros., Kendal, carpenter and joiner.

W. Parsons, Kendal, plumber.

W. Jackson, Kendal, painter and glazier.

KNUTSFORD.

For erection of plant for five beds. of retorts on the generator system, for the Knutsford Light and Water Company.

J. DRAKE & SON, Halifax (*accepted*).

LLANDUDNO.

For extending the sewers to new workmen's dwellings in course of erection. Mr. E. PALEY STEPHENSON, surveyor.

Gradwell & Co. . . . .	£590	0	0
R. L. ROBERTS ( <i>accepted</i> ) . . . . .	535	0	0

LINCOLN.

For excavating a space 50 yards long, 15 yards wide and 5 yards deep in the Lincolnshire limestone at Bracebridge Asylum. Mr. F. H. GODDARD, surveyor, City Chambers, Lincoln.

J. Ford, Leicester . . . . .	£595	0	0
J. Downham, Birkenhead . . . . .	382	12	0
J. Glithro, Chesterfield . . . . .	296	17	6
T. Smith, Lincoln . . . . .	276	6	4

LONDON.

For alterations and additions to three shops, Salmon's Lane, Limehouse, E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, E.C.

Hearle & Farrow . . . . .	£1,570	0	0
S. J. Scott . . . . .	1,516	0	0
M. Calnan & Co. . . . .	1,446	0	0
A. WEBB ( <i>accepted</i> ) . . . . .	1,288	0	0

NORTH BERWICK.

For about 1,800 yards of 4-inch, 5-inch and 6-inch waterpipes, for the North Berwick Commissioners. Mr. J. M'KELLAR, burgh surveyor.

A. Fraser . . . . .	£253	17	8
P. Hughes . . . . .	227	1	10
A. Cameron . . . . .	226	13	2
A. MANN, North Berwick ( <i>accepted</i> ) . . . . .	207	3	8

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## NEWCASTLE-ON-TYNE.

For reconstruction of the Redheugh Suspension Bridge.  
Sir W. ARROL & Co. (*accepted*), about £80,500.

## NORWICH.

For supply of materials, and materials and labour, for one year.

*Accepted tenders.*

W. R. Webster, Norwich, gravel, flints, &c.  
F. Warnes, Norwich, gravel, flints, &c.  
J. Vial, Norwich, gravel, flints, &c.  
S. W. Moore, Norwich, gravel, flints, &c.  
H. Allen, Norwich, gravel, flints, &c.  
Walton Brothers, Rawtenstall, paving flags.  
Joseph Wetton, Macclesfield, grit setts.  
William Grimley & Son, agents, Mountsorrel Granite Co.,  
Leicester, for Stoney Stanton stone, granite macadam.  
The Enderby and Stoney Stanton Granite Co., Leicester,  
granite curbing, channelling and setts.  
Lacey & Lincoln, Norwich, bricks and cement.  
Wright & Turner, Norwich, British wood.  
J. F. Ranson, Norwich, foreign wood.  
Tuson's Disinfectants Co., London, disinfectants.  
C. Havers & Sons, Norwich, oil, colours, &c.  
C. Havers & Sons, Norwich, ironmongery.  
Wadsworth & Sons, Halifax, wheels and axles.  
The Lilleshall Co., London, iron.  
S. Peace & Sons, Sheffield, steel.  
John Page & Co., Norfolk, cast-iron gullies, manhole covers, &c.  
The Vacuum Oil Co., London, engine oils.  
Orams & Tyce, Norwich, engine packings, cotton waste and  
sponge cloths.  
S. D. Page & Co., Norwich, brushes.  
The Pearson Pottery Co., Hanley, earthenware.  
H. R. Downes, Norwich, clothing, hats and caps.  
S. Chapman & Son, Norwich, excavator, bricklayer, slater,  
carpenter and plasterer.  
H. Fuller, Norwich, plumber, glazier, gasfitter, painter and  
paperhanger.  
Holmes & Sons, Limited, Norwich, engineer, fitter and boiler  
maker.  
Holmes & Sons, Limited, Norwich, smithwork.

## OTLEY.

For erection of thirty-two houses in Leeds Road. Messrs.  
FAIRBANK & WALL, architects, Otley and Bradford.

*Accepted tenders.*

J. Norfolk, mason, &c.	£3,290	0	0
P. Patrick, carpenter and joiner	1,440	0	0
C. J. & W. Chaffer, plasterer	540	0	0
W. Walker, slater	286	0	0
E. Mawson, plumber and glazier	209	0	0
E. Bennett & Son, painter	70	0	0

## PENZANCE.

For erection of three shops and dwelling-houses in Causeway-head. Mr. NATHANIEL C. WHEAR, Jun., architect,  
Holbein House, Penzance.

A. Chapman	£877	14	6
Perkins & Caldwell	820	0	0
J. Tucker	800	0	0
Richards & James	796	0	0
BURNETT, PERKINS & CALDWELL, Rosevean Road and Victoria Square ( <i>accepted</i> )	714	9	0

## PETERBOROUGH.

For erection of five houses on Padholme Road. Mr. M. HALL,  
architect, Huntly Grove, Peterborough.

Swaine.	£840	0	0
Grey	825	0	0
Watson & Lucas	810	0	0
Briley	791	0	0
Nicholls	760	0	0
WENLOCK ( <i>accepted</i> )	716	0	0

## PLUMSTEAD.

For alteration to boiler-house at Union Workhouse, Plumstead,  
and the removal of the present boilers and the setting  
(only) of the steam Cornish boilers, for the Guardians of  
Woolwich Union. Mr. J. O. COOK, architect, 1 Eleanor  
Road, Woolwich.

W. Noble	£559	10	0
W. Bowes	475	0	0
W. Neil	440	0	0
Thomas & Edge	427	0	0
Architect's estimate	400	0	0

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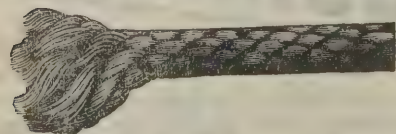
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W. G. Good . . . . .	£350	£334
Good & Co. . . . .	330	313
Geo. Couch . . . . .	315	304
J. H. Blackell . . . . .	290	285
A. N. Coles . . . . .	286	271
Thos. May . . . . .	285	279
W. E. Blake . . . . .	280	260
Pearn & Son . . . . .	279	267
G. B. Turpin . . . . .	275	270
WM. PILLOW* . . . . .	259	249

\* Accepted for boarded roof.

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For additions and alterations to Higher Start, for Mr. H. G. Morgan. Mr. H. VICKERY, architect, Torcross, Kings-bridge.

House.	
W. Edgcombe . . . . .	£812 15 0
A. BROOKING (accepted) . . . . .	735 0 0
Stables.	
W. Edgcombe . . . . .	78 10 0
A. BROOKING (accepted) . . . . .	61 0 0

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For carting, laying and jointing about 4½ miles of 24-inch cast-iron mains, together with other work connected therewith, for the Corporation. Mr. WILLIAM MATTHEWS, water-works engineer.

J. Aird & Sons, London . . . . .	£6,463 17 6
J. Galt, North Wales . . . . .	5,654 11 0
Roe & Grace, Southampton . . . . .	4,959 0 0
F. OSMAN, Southampton (accepted) . . . . .	4,440 0 0
Waterworks engineer's protecting tender . . . . .	5,140 0 0

SOUTHAMPTON—continued.

For laying a main sewer in Derby Road. Mr. W. B. G. BENNETT, borough engineer.

H. Stevens & Co. . . . .	£3,791 0 0
Dyer & Son . . . . .	3,400 0 0
W. H. Saunders & Co. . . . .	3,200 0 0
Roe & Grace . . . . .	3,156 0 0
W. W. Batten . . . . .	3,087 17 0
F. OSMAN (accepted) . . . . .	2,997 0 0

STOCKPORT.

For painting and decorating the small court-room at the Court House, Vernon Street, for the general purposes committee. Mr. JOHN ATKINSON, borough surveyor.

J. R. FAIRCLOUGH, Stockport (accepted) . . . . .	£63 0 0
Ashton & Townsend . . . . .	62 0 0
E. Hamnett & Son . . . . .	60 0 0
T. A. J. Barnes . . . . .	58 15 6
W. Booth . . . . .	55 0 0

WIMBLEDON.

For erection of three additional class-rooms at the Haydon's Road Boys' School. Mr. H. G. QUARTERMAIN, architect, Kingston Road, Merton.

R. E. Williams & Sons . . . . .	£1,730 0 0
Bulled & Co. . . . .	1,349 0 0
H. Brown . . . . .	1,310 0 0
Boothman . . . . .	1,263 0 0
Davey Bros. . . . .	1,240 0 0
J. BURGESS, Wimbledon (accepted) . . . . .	1,295 0 0

WALES.

For erection of Board schools at Cwmpadarn. Mr. J. HUGHES WILLIAMS, architect, Quebec Road, Llanbadarn Fawr.

D. Williams, Aberystwith . . . . .	£1,230 0 0
D. Williams, Llanbadarn . . . . .	1,175 0 0
R. & D. Williams, Llanilar . . . . .	1,151 0 0
J. Jones & Sons, Aberystwith . . . . .	898 0 0
Bowen, Aberystwith . . . . .	760 0 0

For construction of two service reservoirs, and for supplying and laying cast-iron water pipes and other works connected therewith, for the Mountain Ash Urban District Council.

E. POWELL, Millfield, Pontypridd (accepted) . . . . .	£4,451 10 3
Galt & Farquharson . . . . .	4,434 14 3
H. Roberts . . . . .	4,378 6 1

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MESSRS. D. & J. TULLIS, of Kilbowie Ironworks, near Glasgow, send us a catalogue of their patent rotary-pressure washing and disinfecting machines, which are specially adapted for public institutions, laundries, &c. They are entirely constructed of metal, and consist of an outside shell of mild steel boiler plate, with strong angle steel flush rivetted to ends of same. The ends are cast-iron, strongly ribbed and faced in the lathe, having bored stuffing boxes, fitted with brass liners and brass glands. The periphery is provided with a hinged steam-tight door fitted with brass mountings, hand wheel, steel screw and lever. A strong brass mouthpiece is rivetted to opening in shell with copper rivets, and made true for door to close upon. The catalogue gives prices, floor space required, speeds, weights, horse-power, &c.

## PAVILION THEATRE, WHITECHAPEL.

THE "Drury Lane of the East," as this theatre is not inappropriately named, was packed from floor to ceiling on Wednesday evening, on the occasion of the benefit of the indefatigable *impresario*, Mr. Cohen, who announced, in the course of a gracefully-worded return of thanks, that the takings for the evening had broken all previous records by a considerable amount.

The play given was the successful "Tommy Atkins," to the performance of which the occasion seemed to lead, if possible, additional dash and *verve*. Between the acts Mr. William Terriss gave a recitation, "The Lifeboatman," in his well-known manly and sympathetic manner; Miss Cohen (Mrs. Christian) gave a couple of songs in capital style; and several other good "turns" were provided by local favourites of the music-hall stage; but perhaps the feature of the evening was the well-considered and telling speech delivered by Mr. Ernest Rüntz, the architect of the theatre and chairman of the company which is running it, in the course of which he presented to the highly-esteemed benefi- ciare a handsome silver loving-cup, subscribed for by the employes of the theatre, and a gold fusee case from the members of the company. In the course of his speech Mr. Rüntz announced that the erection of the new theatre at Peckham, which is to be of a very comprehensive nature, including several features not usually found in theatres, is to be proceeded with very shortly, and will probably be ready for opening by Christmas next.

## TRADE NOTES.

THE Convalescent Home, St. Anne's-on-the-Sea, is being warmed and ventilated by means of Shorland's patent exhaust roof ventilators and special inlet tubes, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. STANLEY BROS., LIMITED, Nuneaton, have designed a Diamond Jubilee panel intended for insertion in buildings erected in the course of the present year, for which purpose it will no doubt be extensively employed. Its size is 24 inches by 24 inches. It can be had in buff and red terra-cotta, glazed or plain. It contains a portrait of Her Majesty, surmounted by the date, and surrounded by a suitable inscription and bordered by the names of the numerous colonies.

## VARIETIES.

A FINE pulpit of English oak has been erected in Barnet parish church. In niches on the eight angles beautifully carved statuettes of famous English preachers have been placed, beginning with Augustine, and ending with Wesley and Canon Liddon.

A PAINTER engaged on the Blackpool Tower was shockingly injured on the 1st inst. Whilst working at a height of over 300 feet he got in the track of the travelling balance weights, which work the lift, and one of his legs and an arm were torn off.

THREE hundred pounds for a day's use of a room some 16 feet square and containing two windows, each under 4 feet in width, is not a bad price, and that is the value set on their property by the owners of a room commanding a view of the ceremony at St. Paul's on June 22.

THE annual dinner of the Master Builders' Association was held in Jury's Hotel, Dublin, on the 27th ult., and proved one of the most enjoyable reunions yet held in connection with that institution. The company numbered eighty-seven, and included a very large number of guests.

Mr. J. G. PEAT, architect, of Hamilton, N.B., died suddenly last week. He had been laid up for a week with bronchitis, and was medically attended. The cause of death was rupture of a blood-vessel in the head.

TO-DAY (Friday) Mr. Heinemann will publish "Beauty and Art," by Aldam Heaton. The list of contents includes "The Decoration of the House," "Fabrics," "Furniture and Decora-

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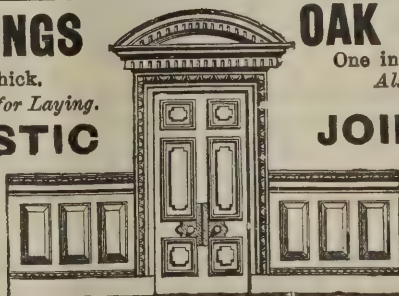
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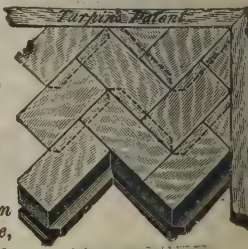
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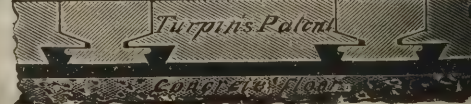
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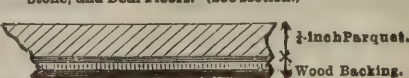
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tion of the Eighteenth Century," &c., and the book represents the author's experience of nearly fifty years' practical decorative work.

THE Liverpool Stock Exchange committee have purchased, for the purpose of extending the Exchange, a strip of property adjoining the present building at a price of 227 $\frac{1}{2}$  per square yard, being at the rate of over 1,000,000 $\frac{1}{2}$  per acre. This is the highest price ever realised for property in Liverpool.

THE next ordinary meeting of the Institution of Civil Engineers will be held on Tuesday, March 9, at 8 P.M. Papers to be further discussed:—1. "The Main Drainage of London." By Messrs. J. E. Worth and W. Santo Crimp, M.M.Inst.C.E. 2. "The Purification of the Thames." By Mr. W. J. Dibdin.

THE thirteenth ordinary meeting of the Society of Arts will be held on Wednesday, March 10, at 8 P.M., when a paper on "The Prevention of Fires due to the Leakage of Electricity" will be read by Mr. Frederick Bathurst. Mr. W. H. Preece, C.B., F.R.S., will preside.

A CURIOUS discovery has resulted from Canon Wilberforce having no use for the cellar beneath his residence in Dean's Yard. Its new owner asked an architect to inspect it with a view to its conversion to other uses, and his investigations resulted in bringing to light a fine Gothic apartment capable of holding thirty people. It will in future be used as a dining-room.

A DANGEROUS landslip has occurred at Whatstandwell Embankment, above the old station on the Midland Railway main line from Manchester to London, and a fissure has developed which threatens danger to the railway line, and to the Midland Company's canal from Cromford to Langley. Traffic on the canal has been stopped, and passenger trains are taken by very carefully. The Whatstandwell Hotel is in the course of the slip, and the landlord has removed his valuables. Other householders are alarmed for their safety.

THE annual dinner of the Commercial Travellers' Benevolent Institution will this year take place at the Hotel Cecil on March 19 under the chairmanship of Mr. Thomas Webber Jerrard, of the firm of Jerrard, Darby & Clegg, of Wood Street. The income accruing to the Institution from funds invested being but slightly more than 1,500 $\frac{1}{2}$ , it is largely dependent on the subscriptions and donations of its supporters. Last year out of thirty-five candidates it was found impossible to relieve more than seven, although all proved on inquiry to be in need of help.

A SUBSTANTIAL Portland stone wall has been erected at the Embankment side of Somerset House, near Waterloo Bridge, and a great improvement in the appearance of that handsome pile has been effected, the work having been carried out in unison with the prevailing style of architecture of the building. The part thus reclaimed was formerly known as the Dock House and was in use a few years ago as a waterway for the entrance of barges from the river into Somerset House. In addition to the erection of the wall, a large room has been constructed which will be used as a repository for papers, &c. The work has been carried out under the direction of Mr. Williams, clerk of the works, Royal Courts of Justice.

AMONG the greatest risks incurred in shooting is certainly that of meeting with an accident either from the carelessness of friends or from pure misadventure. Such a case recently happened to a well-known builder and contractor in Birmingham, Mr. F. Gowing. While he was out shooting one day with two friends a shot hit some hard object and rebounded into his left eye, causing its total loss. Fortunately he had effected a policy with the Accident Insurance Company, of St. Swithin's Lane, London, E.C., and so became entitled to the compensation of 500 $\frac{1}{2}$ .

A PARISH meeting was recently held at Ashford respecting the danger caused by the effluent from the Staines sewage farm flowing into the River Ash. It is stated that an abominable odour emanates from the works where "Bacteria" filters made of flints are employed, and it was decided to forward a copy of a resolution calling attention to the "serious nuisance caused by the Staines Urban Authority in allowing improperly filtered effluent containing sewage matter to flow into the River Ash," to the Thames Conservancy, the Local Government Board and other authorities.

IN some interesting letters concerning the protection of churches from fire, which have recently appeared in the *Guardian*, a most useful suggestion comes from Mr. J. C. Merryweather, who, referring to the dangers of fire in churches from defects in heating and lighting apparatus, proposes that each church tower should be fitted with a tank or tanks, kept full of water by means of a pump and hose or fixed pipe, the pump to take supply from a well or other available source. From the tanks he suggests that a pipe be carried into the church, with hydrants and hose in convenient positions. The water tanks would then enable powerful jets to be brought to bear immediately on an outbreak of fire being discovered. The cost of the arrangement would be small, and doubtless the



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destruction of many sacred buildings by fire would be prevented. Canterbury Cathedral has been saved three times by its own fire apparatus, and the recent fire at St. George's, Hanover Square, proves that even in London there is considerable risk of fire in places of worship.

*The House* is the title of a new monthly magazine addressed to "those who manage and beautify the home." It contains some fifty pages, well printed on good paper, profusely illustrated, with articles on "Chippendale Furniture," "Old China," "Art Needlework," "Rooms to be Remembered," "Furnishing Pictures by George Eliot," "Eighteenth-century Silver," "A Marquetry Frame and a Cosy Child's Chair and How to Make them," "Old Mirrors," "The Choice of a Wall-paper," "Odds and Ends in Japanesque," "Cuisine for the Month" and "Floral Decoration for the Table." Its price is 6d., and it ought to "catch on."

THE third annual dinner of the heads of departments and representatives of the firm of Young & Marten took place at the Holborn Restaurant on Saturday, February 20, when the guests were Mr. H. H. Marten, proprietor, Mr. E. Montague Edwards, general manager, Mr. Frank Marten and Mr. Ernest Marten. The heads of the departments present were Messrs. W. Callaghan, B. Carter, A. B. Corke, J. Emery, W. Hall, G. J. Hicks, J. B. Lupton, D. Ovens, E. Parkinson, F. W. Russell, G. R. Scott, C. Sparks, C. A. Spicer, W. Steele, S. A. Stooke, C. Wallis, C. J. Wilford, P. B. Wood; and the representatives were—Messrs. W. Doshier, W. R. Dowsing, G. K. Durrant, G. Hambridge, W. N. Joyce, R. Letby, A. Milne, R. W. Swainson, D. F. Thompson. Mr. Wright was unavoidably absent. The menu was an excellent one; and the dinner will be principally remembered for the surprises by which it was accompanied, viz. the presentation to Mr. H. H. Marten of a handsome piece of silver, and to Mr. E. M. Edwards of a silver salver. The inscription engraved on the former was, "Presented to H. M. Marten, Esq., by the heads of departments and representatives, as a souvenir of the twenty-fifth anniversary of Young & Marten, February 20, 1897"; and on the latter:

"Presented to E. Montague Edwards, Esq., the esteemed general manager of Messrs. Young & Marten, by the heads of departments and representatives, February 20, 1897."

## BUILDING AND BUILDERS.

THE Royal Infirmary, Glasgow, is to be rebuilt as a memorial of the Queen's long reign.

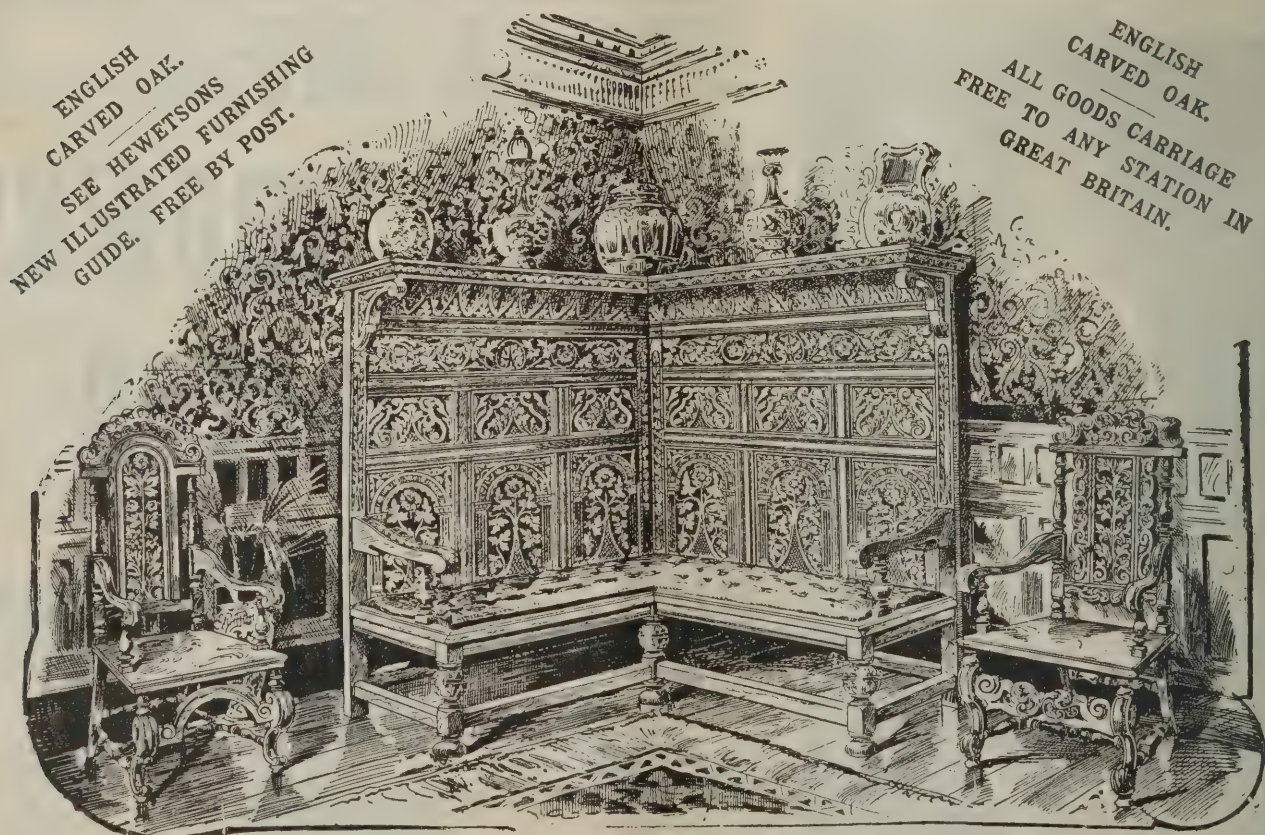
A NEW Wesleyan chapel is to be erected at Cropton, in the Pickering circuit, at a cost of 715*l*. It will be the nineteenth new chapel erected in the district within four years.

AT the meeting of the Winsford Urban Council plans were passed for the new soap works which are being erected at Winsford with all speed by the Salt Union, Limited, on ground facing the River Weaver. The works will cover an area of 720 square yards. The establishment of the new industry is eagerly looked forward to by the inhabitants of the town, especially in view of the continued depression in the salt trade.

MR. JAMES KEY CAIRD, manufacturer, Dundee, has offered to provide the necessary sum to build a hospital for the treatment of diseases of women. The full details of the offer have not been disclosed pending a conference between Mr. Caird and the chairman of directors of the Royal Infirmary; but an indication was given that in the first instance a sum of 5,000*l*. would be placed at the disposal of the directors for the purpose.

AT a recent meeting of the Croydon County Council it was decided to build a new lunatic asylum, to accommodate 400 patients, at a cost of 132,982*l*, or 332*l*. per bed. The plans adopted for this important undertaking were those selected in the open competitive principle, the first premium being 200*l*., and this was awarded to Messrs. Crisp, Oatley & W. S. Skinner, of Scottish Provident Chambers, Clare Street, Bristol. Eighteen firms entered into the competition, the assessors being Mr. C. H. Howell, then consulting architect to the Lunacy Commissioners, and Dr. Moody, the well-known expert on the treatment of lunatics.

THE public health committee of Edinburgh Town Council have instructed Mr. Morham, city superintendent of works, to complete the plans and specifications of the new city hospital, and to obtain estimates for the work. A sub-committee was also appointed to consult with Mr. Morham, with powers to obtain such special advice as they might require in regard to heating, lighting and such matters.



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

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**MASTER PLUMBERS' ASSOCIATION.**

A PARTY of about fifty met at the Colonnade Hotel, Birmingham, on the 3rd inst., on the occasion of the first annual dinner of the Birmingham branch of the National Association of Master Plumbers. The local organisation was formed towards the close of 1895, the object being to advance trade interests. The chair was occupied by the president of the branch (Mr. J. Osborn).

In proposing "The National Association of Master Plumbers," the president said the Association had not been in existence very long, but it could boast a membership of about 800. Its object was to place the plumbing trade on a higher level than had hitherto been attained, and to bring about a better class of work, so that it should not be said that the doctors had to follow the plumbers.

Mr. Peattie responded, observing that the Association now comprised forty-five branches, of which that in Birmingham was the most prosperous of all. Still, their general progression had not been so rapid as it ought to have been considering that there were over 2,270 master plumbers in Great Britain and Ireland, and that those registered represented probably not more than one-tenth of the whole. The speaker went on to complain of the encroachments on the plumbing trade by iron-mongers, blacksmiths and builders, and expressed a hope that the Association would be the means of bringing the trade into the hands of the plumbers. He suggested that they should aim at getting in more intimate touch with the architects, and show them the necessity of receiving separate tenders for plumbing work.

Before resuming his seat Mr. Peattie submitted the toast of "The Birmingham and District Branch." This was replied to by Messrs. Hill and Latham.

**PROPOSED BY-LAWS ON HOUSE DRAINAGE.\***

THE absence of a uniform code of regulations on the subject of house drainage, applicable to the Metropolis, has for a long time caused great confusion and inconvenience to those engaged in the preparation of schemes for such work, as well

\* A paper read by Mr. J. P. Barber, C.E., before the Society of Engineers on March 1.

as to those who have had to execute the work. Arrangements which are permitted in one district are objected to in another; whilst the requirements respecting the work vary considerably according to the views of the members of the local authorities on the subject, some considering that those who build houses should accept the responsibility of providing satisfactory drains and sanitary arrangements thereat, others, that the local authority should themselves prescribe in more or less detail what work is to be done and the manner in which it is to be carried out. The proposal of the London County Council to frame by-laws relating to house drainage has therefore raised some hope that in a little while uniformly satisfactory work will be insisted upon in every district in the Metropolis. The County Council have at length prepared draft by-laws which are at the present time under the consideration of the local authorities by whom they will have to be administered. Having regard to the area which will be affected by the proposed by-laws, it seems desirable that they should be carefully considered by engineers and others who will have to comply with them in all drainage works connected with buildings in the Metropolis on which they may be engaged. This paper has accordingly been prepared with a view to bringing the proposed by-laws to the notice of the members of this Society, and more with a hope of eliciting their opinions respecting them than the expectation of being able to say anything new upon the subject of house drainage.

The proposed by-laws will be made pursuant to section 202 of the Metropolis Management Act, 1855, by which the Council have power to make by-laws "for regulating the dimensions, form and mode of construction, and the keeping, cleansing and repairing of the pipes, drains and other means of communicating with sewers, and the traps and apparatus connected therewith." The same section provides that no penalty shall be imposed by any by-law to be made by the Council unless the same shall be approved by one of Her Majesty's principal Secretaries of State. They are primarily applicable to drains, &c., at new buildings, and the extent to which they affect work at existing buildings will be referred to hereafter.

**By-law 1** provides that no subsoil-drain shall communicate directly with a sewer, but that a suitable and efficient trap shall be provided with a ventilating opening at a point in the line of the subsoil drain as near as practicable to such trap.

This by-law does not prohibit the connection of a subsoil drain direct to a drain which conveys sewage, or which communicates directly with a sewage drain; but in the author's

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opinion such a connection should not be allowed, as the foul air from the sewage drain will enter the subsoil drain as readily as that from the sewer. In all three cases the trap is necessary, and it should be placed as near as practicable to the point where the subsoil drain joins the sewer or either of the drains referred to, and should be ventilated directly into the open air. The pipes between the trap and the sewer or drain into which a subsoil drain discharges should be of the same description, and should be laid and jointed in the same manner as those used for conveying sewage. This is necessary in order to prevent the escape of foul air from either the sewer or the drain into the trenches in which the subsoil drains are laid.

**By-law 2** requires that a pipe or channel provided for the purpose of conveying to a sewer any water falling on the roof of a building shall discharge over a trapped gully, or into such a gully above the level of the water in the trap.

An addition to this part of the by-law is needed in order to make it compulsory that water falling upon the roof of a building and upon paths, areas and paved surfaces within the curtilage of the premises shall be discharged into properly trapped gullies and conveyed to a sewer, or shall be disposed of in some equally effective manner to the satisfaction of the surveyor to the local authority. It will be seen that, as the by-law is at present framed no provision at all need be made for disposing of water from roofs, paths, areas, &c. Unless a satisfactory method of dealing with such water is insisted upon, the practice of erecting buildings or bay windows without eaves gutters and of allowing the rain-water therefrom to fall upon and saturate the ground adjoining the building and of making what are termed soak-away drains will be continued. It is, moreover, not uncommon for the rain-water from bay windows, porches and porticoes to be conveyed therefrom by means of a downpipe which terminates in the ground close to the building, and there is little doubt that unless this is made illegal by an alteration in the by-law, such a plan of disposing of the water will still be adopted.

The second paragraph of the by-law will make it illegal for any solid or liquid matter from a waste pipe, from a bath, lavatory or sink, or from a soil pipe, or waste pipe from a slop sink, or from a urinal to be conveyed into a pipe or channel conveying rain-water. The arrangement at present allowed by many local authorities by which waste pipes from baths, lavatories and sinks discharge into the open head of a rain-water pipe, will not be permissible under this by-law.

The following are the objections to the arrangement:—

(a) Smells arising from the decomposition of refuse and greasy matter accumulated in the rain-water pipe and head.

(b) Stoppage of the upper part of the rain-water pipe and head during frost, and the consequent overflow of water from the waste pipes.

(c) Inaccessibility of head of rain-water pipe for the purpose of cleansing and removal of obstructions.

The smells referred to in (a) might not be injurious in cases where the pipes are situated some distance from windows or other openings to buildings, whilst the liability to the stoppage mentioned in (b) can be reduced by placing the waste pipes in the head of the rain-water pipe in such a manner as to avoid splashing.

The author thinks that the by-law should be so framed as to leave the local authority at liberty to sanction the fixing of waste pipes from baths or lavatories so as to discharge into the open heads of rain-water pipes in cases where they are of opinion that the arrangement would be satisfactory; but that waste pipes from sinks should be prohibited from discharging in this way, as the greasy matter and small portions of solid material which are frequently discharged through such pipes would be more likely to cause nuisances than the discharge from bath and lavatory wastes.

The Council's proposal will involve a small increase in the cost of plumbing-work at certain buildings where the rain-water pipes might be used to take the discharge from baths and lavatories to the gullies, but it cannot be objected to on sanitary grounds.

Some local authorities require that a rain-water pipe shall discharge into an impervious channel in the open air, leading to a trapped gully 12 or 18 inches distant from the point where such pipe discharges into the channel. The object of this provision is, no doubt, the prevention of foul air from the drains passing up rain-water pipes when the gully traps become unsealed. Although the arrangement referred to is frequently impracticable in town houses, the proposed by-law of the County Council might be altered so as to allow the arrangement to be carried out by those who prefer it, provided the channels are wholly within the curtilage of the premises.

Water falling upon land, roofs, areas or forecourts should not be discharged upon any part of the public way, and it would be for the comfort and safety of the public if the proposed by-law prohibited this being done.

**By-law 3** deals with the materials for and the sizes of drains, jointing, concrete round pipes, means of access to

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drains, trapping of inlets, and other details. The by-law provides that pipes used for drains communicating with a sewer, other than sub-soil drains, shall be of glazed stoneware, semi-vitrified ware, cast-iron, or of other equally suitable material.

There appears to be no reason for the words "communicating with a sewer," for the drain referred to in the by-law should be of "good sound pipes," formed of the materials specified, whether it communicates with a sewer, with another drain, or with a cesspool.

The thickness of metal for cast-iron pipes, 3 inches diameter, is to be 5-16th inch, and 3-8th inch for 4-inch, 5-inch and 6-inch pipes.

The thickness of pipes formed of either of the other materials is not specified, but it seems desirable that the by-law should state that for 3-inch pipes the thickness of the material should be not less than  $\frac{1}{2}$  inch, and not less than  $\frac{3}{8}$  inch for 4-inch and 6-inch pipes.

Pipes must be socketed and put together with cement or other equally suitable material.

Cement is a suitable material with which to make the joints of pipes formed of stoneware or semi-vitrified ware, but lead is a more suitable material for the joints of cast-iron pipes. The by-law should therefore make the use of lead compulsory for jointing cast-iron pipes, otherwise disputes will arise when cement is used for jointing such pipes, and it will become a question for a magistrate to decide whether the use of cement in such cases is a breach of this by-law. The by-law should also specify that cast-iron pipes are to be coated with Dr. Angus Smith's composition, or other suitable material, in order that the pipes may be protected from corrosion, and that the inside may be glazed, also that the annular space for the lead with which the joints should be made shall, in 2-inch and 4-inch pipes, be not less than  $\frac{1}{4}$  inch in width, and in 5-inch and 6-inch pipes not less than  $\frac{3}{8}$  inch.

A drain is to be of adequate size and, if for conveying sewage, it must be not less than 4 inches internal diameter, and be laid in a bed of good concrete not less than 6 inches thick.

The width of the bed of concrete is not specified, nor does it seem to be intended that the sides of the pipe should be encased in concrete. An alteration in this part of the by-law is necessary in order to provide that pipes shall be more secure after being laid.

It is intended that underground drains of cast-iron shall be laid in a bed of concrete, but a thickness of 6 inches for such bed is scarcely necessary, 3 inches being sufficient for the

accurate laying and solid bedding of the pipes. Cast-iron pipes are seldom laid on concrete, but having regard to the ease with which the accurate laying of the pipes can be carried out, and the perfect bedding obtained, this method is much better than the ordinary one, in which the pipes are laid on the bottom of the trench.

A suitable fall must be given to a drain, but no minimum fall is mentioned. The drain must be constructed so as to be water-tight, and must be capable of resisting a pressure of at least 2 feet head of water. A drain must not pass under a building except where any other mode of construction may be impracticable.

So much of a drain as passes under a building must be laid in a direct line and be encased in 6 inches of Portland cement concrete. Iron drains are not required to be covered with concrete and they may be carried above ground if properly supported at each joint by piers or other sufficient supports.

Whenever practicable, means of access must be provided at each end of that portion of a drain which is under a building. All inlets, except those provided for ventilation in accordance with by-law 4, are to be efficiently trapped, and the fixing of bell-traps, dip-traps and D traps is prohibited.

**By-law 4** requires that an intercepting trap shall be fixed in every main drain or other drain which shall communicate with a sewer. The trap is to be placed within the curtilage of the building. Means of access to the intercepting trap must be provided for the purpose of cleaning, either by a separate manhole or other separate means of access.

Intercepting traps and the means of access thereto would have to be inside buildings having no forecourts, vaults or areas in front. In cases of this kind the Islington Vestry has required the manholes containing the intercepting traps to be placed under the footway, their reason for this requirement being the necessity for preventing the entrance of bad smells from manholes placed inside houses on the removal of the covers for the purpose of inspecting or clearing the intercepting traps. Under exceptional circumstances manholes have been constructed inside buildings, and the Vestry has required them to be provided with two air-tight covers, in order that smells might be excluded by the lower cover when the upper one became disarranged or damaged by the passage of people or goods over it. Great inconvenience would be caused by the cleansing of intercepting traps placed, in accordance with the proposed by-law, inside shops or houses, unless there were basements to the premises. It seems desirable, therefore,

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hat the proposed by-law should be modified to the extent of allowing some discretion to vestries as to the position in which the intercepting traps shall be placed in the case of buildings having neither basements, vaults, areas, nor forecourts.

The by-law contains no reference to the materials to be used in the construction of a manhole or other means of access to an intercepting trap. If passed in its present form builders will be at liberty to use whatever materials they choose for these appliances, and however improper the materials or the construction may be, no local authority will have power to interfere. Every advantage would be taken of this by those who seem to think that any quality of material is suitable for drainage-work, and who will do nothing properly except under the strictest supervision, or until a summons has been issued against them.

### COUNTY COUNCIL WORKS DEPARTMENT.

A RETURN has been prepared by the works committee of the London County Council showing the cost of works which have been completed during the half-year ended September 30, 1896, and certified. The committee state that comparatively few works were finished during the six months in question, but the total value of the work executed was about 149,000*l.*, including an amount of 11,357*l.* for jobbing works. The account for estimated works completed and certified during the half-year shows the final estimate to have been 23,218*l.*, and the actual cost 25,696*l.* The largest losses have been made on the Shelton Street dwellings and the Sandys Row Improvement; in the former case the difference between the final estimate and the actual cost being 2,607*l.*, and in the latter 345*l.* A saving is shown of 215*l.* on some work at Woolwich Ferry, and 153*l.* on the Boundary Street sewer. Mr. Adams, the new manager of the Works Department, in a report upon these works points out that in the Shelton Street dwellings there were considerable delays after the work was started in carrying it out, but the Works Department were not responsible for these delays, which enhanced the cost. The blocks of buildings were in very confined areas and separated from one another by intervening streets and houses, increasing the estimate of the cost of superintendence, lighting and watching. The summary of estimated works completed and reported to the Council since the commencement of operations by the works committee in March 1893 up to September 30, 1896, shows the final estimates to amount to 406,756*l.*, and the actual cost 403,339*l.*, being a net

balance of cost below estimate of 3,417*l.* The value at schedule prices of the jobbing works completed during the half-year ended September 30, 1896, and certified up to date, is 9,990*l.*, and the actual cost has been 8,981*l.*, showing a net balance of cost below schedule value of 1,009*l.*, which, added to the balance of cost below schedule value of works previously reported, amounting to 2,140*l.*, makes a total net balance in favour of the department of 3,149*l.* From these accounts it appears that the operations of the works committee since the commencement have resulted in a total net balance of cost below estimate and schedule value of 6,566*l.* The committee point out that, unfortunately, they have been unable to obtain certificates for certain works which have been completed during the half-year ended September 30, 1896. The works referred to are the following:—

Name and description of work.	Original estimate as passed by Council.	Manager's revised estimate not agreed to.	Actual cost.
	<i>£</i>	<i>£ s. d.</i>	<i>£ s. d.</i>
Colney Hatch Asylum—temporary buildings .. .. .	17,500	20,419 16 3	22,942 3 10
Battersea river station—Causeway Victoria Embankment—storeyard wall .. .. .	77	62 0 0	125 0 7
Barking outfall—alteration to pier .. .. .	880	1,024 15 11	1,058 4 4
Crossness outfall—gridiron .. .. .	2,417	2,978 2 1	2,746 16 10
Deptford pumping station—boiler seatings .. .. .	2,300	4,472 3 7	4,297 17 8
	3,250	3,073 7 8	2,801 9 10
Total .. .. .	26,924	32,030 5 6	33,971 13 1

### DUBLIN SANITARY ASSOCIATION.

THE Council met on the 25th ult. at the offices of the Association, 42 Dame Street, at 4.30 o'clock P.M. Present—The President (in the chair), Messrs. Price, Q.C., J. J. Digges La Touche, LL.D., Dr. Speedy, Dr. Newell, Dr. Francis Crawley.

The question of hospital accommodation in Dublin was before the Council, and after considerable discussion the following two resolutions were adopted:—(1) "That the Council beg to call the attention of the Corporation as the sanitary authority of the City of Dublin, to the want during the present epidemics of additional hospital accommodation for the treatment of in-

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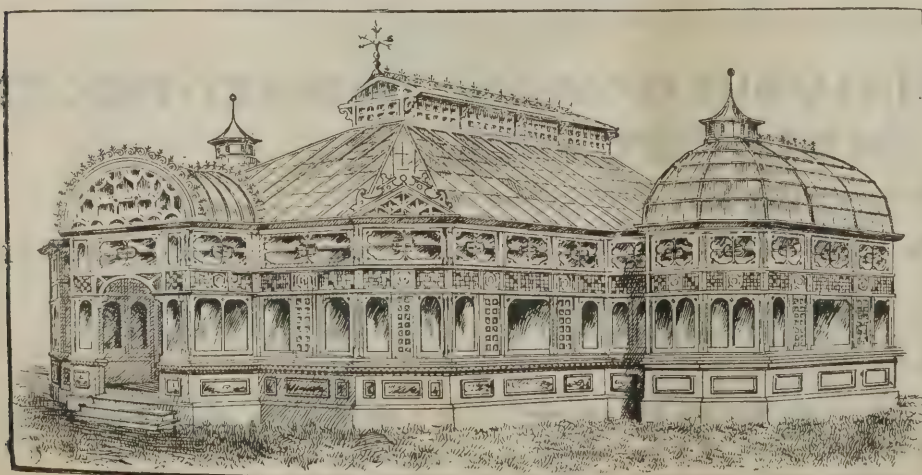
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fectious cases. (2) That the Council of the Dublin Sanitary Association are of opinion that in order to relieve the congested wards of the Dublin hospitals of patients in the convalescent stage of the prevailing epidemics, the Sanitary Authority of Dublin should be urged to represent to the respective Dublin Boards of Guardians the necessity of adequate accommodation for such convalescents being provided."

### THE WIDENING OF FLEET STREET.

THE City Commissioners of Sewers have written to the Council stating that they propose, with a view to continuing the widening of Fleet Street, to acquire the freeholds of the properties between Bride Lane and Salisbury Court (Nos. 82 to 97 Fleet Street, but excluding No. 89, in respect to which the Council has already agreed to contribute), and asking the Council to contribute half of the cost of the proposed improvement. The present width of the road at this point is about 45 feet, and it is proposed to increase this to 60 feet, the cost of so doing being estimated at 170,780*l.*; but it is probable that that amount will be reduced, as the Commissioners propose by acquiring the freeholds to allow some of the short leases to run out. The committee point out that the Council has already agreed to contribute half the cost of widening Fleet Street between Ludgate Circus and Bride Lane and at No. 89, and that the Council when so agreeing had regard to the fact that the widening of Fleet Street was necessitated, not by local, but by general through traffic to and from all parts of the country, the street being one of the main thoroughfares of London. The present application is in respect of a proposed widening of the road for a length of about 216 feet. In March 1896, when the Council agreed to contribute half the cost of widening the street between Ludgate Circus and Bride Lane, the committee made reference to the present proposal, and stated "there would still remain two other portions of the street, between Salisbury Court and Temple Bar, having together a length of about 1,100 feet, which at some future time would require to be widened. It is therefore evident that the present improvement is only the commencement of a much larger scheme, which in its entirety will doubtless cost something like 1,000,000*l.* The committee now state that they are strongly of opinion that to continue the widening of Fleet Street is a desirable work, and, the Council having already admitted the necessity of the im-

provement, they had decided to recommend the Council to accede to the request of the Commissioners and contribute 85,390*l.*, one-half the cost of the improvement.

### MORLEY NEW PUBLIC BATHS.

THE Morley Corporation, following the example of their neighbours at Batley and Dewsbury, have decided to erect a set of public baths in the borough. The site selected for the purpose is a sloping piece of ground fronting on to Fountain Street, and immediately in front of the site for the proposed electric generation station. Out of the fifteen plans that were sent in, the committee having charge of the scheme have chosen those submitted by Messrs. Holtom & Fox, of Dewsbury, the firm of architects who some years ago designed the commodious bath premises at Burnley. To be built of Morley stone, the front elevation of the building will not be unattractive. In the centre, where the bath superintendent will have his home, the building is to be two storeys high; the rest of the structure will be a single storey. The manager's house will consist of a couple of bedrooms, a kitchen and a sitting-room. There will be two entrances to the baths. On the left will be the men's slipper baths—two first-class and four second—two shower baths, a needle bath, and a vapour bath. A visitor to the first-class swimming bath will also enter by this door, and, passing the pay office, beneath the superintendent's house, will turn along a short corridor to the left, where he will find the direct entrance to the bath-room. This arrangement will prevent anyone standing near the outside entrance from seeing the bathers in the swimming bath when the door of that place is opened. The length of the first-class bath will be 65 feet, the breadth 24 feet, and the depth will vary from 3 feet to 6 feet. At the end of the passage referred to is to be a second and broader corridor, and in all probability some day or other this space will be utilised for Turkish baths, though the construction of such baths is not included in the present scheme. The entrance on the right-hand side of the building will lead to the ladies' slipper baths, of which there are to be a similar number to those provided for men. Behind these baths will be the second-class swimming bath of the regulation dimensions (water measure), viz. 75 feet by 30 feet. As this bath will often be used for entertainments, a spacious gallery has been provided, running the greater part of the way round the room. Dressing-boxes of wood, with slate partitions, are to be arranged on two sides

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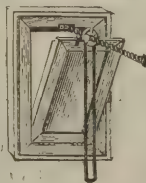
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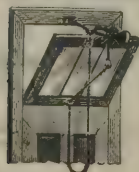
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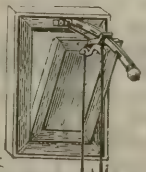
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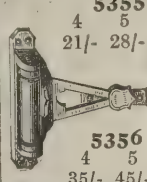
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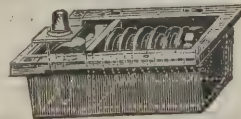
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of the room. These apartments will be about 3 feet 9 inches square, and there will be small doors to them. Both of the swimming baths are to be lined with glazed bricks, and adjoining each will be a small soap-bath. Taking advantage of the sloping character of the site, the architects have arranged to sink the second-class bath a little lower than the smaller one, so that in case of scarcity of water the contents of the latter might be run off into the second-class bath. In winter only the smaller bath will remain open, and a suggestion has been made that the second-class bath might be covered over and used as a gymnasium. Nothing, however, has been definitely decided in regard to this matter. For the washing and drying of towels there will be a laundry immediately behind the manager's house and between the two swimming baths. The estimated cost of carrying out the scheme of the Corporation is 6,000*l*.

### THE DRAINAGE OF LONDON.

At the ordinary meeting of the Institution of Civil Engineers on February 23 two communications on "The Main Drainage of London," by Messrs. W. Santo Crimp and J. E. Worth, and on "The Purification of the Thames," by Mr. W. J. Dibdin, were read.

In the first paper were described in detail the works carried out in London for the purpose of intercepting the sewage, which formerly passed directly into the river, and conveying it to outfall works at Barking and Crossness, about fourteen miles below London Bridge. The works designed by the late Sir J. W. Bazalgette, and carried out by him for the late Metropolitan Board of Works, comprised the construction of about 110 miles of intercepting and storm-relief sewers, the former having a final discharging capacity of about 540 million gallons per day, about 2·7 times the present dry weather flow. There were two main pumping-stations on each side of the river, with machinery of an aggregate of 3,000 horse-power capable of pumping 500 million gallons per day, and a like number of storm-water pumping-stations capable of pumping directly into the river 150 million gallons per day. The latter were used for preventing flooding in the lower parts of the Metropolis when a heavy fall of rain occurred at or about the time of high water, when the storm outlets were closed by the tidal water. The works undertaken by the London County Council to improve the pumping machinery by compounding the steam-engines at the principal pumping-stations were also described.

The outfall works for the purification of the sewage, the dry-weather flow of which now exceeded 200 million gallons per day, were next dealt with. They consisted of settling-tanks and their accessories for the chemical treatment of the sewage, and the means for removing the sludge produced to the German Ocean. The tanks at Barking contained 20 million gallons, whilst those at Crossness contained 31 millions. The sludge, amounting to 2,169,000 tons in 1895, was discharged into the open sea at a distance of about fifty miles from the works by a fleet of six steamers, each having a carrying capacity of 1,000 tons. The experimental filters for dealing with the effluent, and capable of effecting a purification of 78 per cent. were mentioned. The question of flood discharges from an area fully built over was referred to, and the details relating to an area of 160 acres were given; it appeared that the flow had reached a rate equal to 2·5ths of an inch per hour. The bearing of this question upon the "Separate" system was next referred to, and it was stated that, so far as London was concerned, the system was impracticable. Nine hundred and twenty men were employed in the continuous disposal of the sewage, which amounted to 75,000 million gallons per annum, the working expenses in 1895 being 104,000*l*., or about 5½*d*. per head per annum. The works now disposed of the sewage from a population of 4½ millions. The results had been the interception from the Thames of vast quantities of filth, which formerly rendered it offensive, and the conversion of the river into a relatively pure estuary.

In the second paper, the author described first the steps that had been taken in accordance with the scheme adopted by the late Metropolitan Board of Works for the treatment of the London sewage at the outfalls at Barking Creek and Crossness; secondly, the effect of that work in freeing the river from the raw sewage; and thirdly, the best method of effecting still further improvement.

On arrival at the Northern Outfall Works the sewage was screened to remove all large particles, such as rags, &c. After receiving the proper quantity of lime the sewage passed the iron-water station where the solution of iron-sulphate was added. The iron salt was dissolved in a tank of water heated by a steam coil, and the concentrated solution was sufficiently diluted and passed into the already limed sewage. The precipitation was completed in the channels, thirteen in number, about 30 feet wide, 15 feet in height and having an average length of 1,000 feet. The sludge was discharged from these to the sludge-settling channels by sweeping the deposit

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through culverts to the receiving-chamber at the engine-house, whence it was pumped into the settling channels. On its way to these the sludge was again passed through gratings to collect rags, &c., which might have escaped the first filth-gratings. The quantity of solid matter extracted by the combined action of these double sets of gratings was between 80 tons and 100 tons per week. A destructor-furnace was built close to the filth hoist for calcination of the refuse. After the sludge had settled and the top-water had been drawn off by means of lowering siphons, the sludge was let into the storage-tanks under the settling-channels, whence it was pumped to the ships. The water drawn from the settled sludge was separately treated with lime and iron, and after such treatment it was allowed to settle in the sewage-precipitation channels.

At the Southern Outfall Works, Crossness, the precipitation works were more compact. Practically the whole of the lime was in solution. The iron water was made at Crossness by the simple agitation of the crystals of iron salt with water in an ordinary mixing-mill from which the rollers were removed, stirring-arms being substituted in their place, the effect being equally efficacious with that of the steam-coil at the Northern Outfall Works. The methods of collecting the sludge, settling it, and loading the ships were practically identical with those at the Northern Outfall.

The discharge of the sludge took place in the Barrow Deep, commencing at a point 10 miles east of the Nore, about halfway between the Swin Channel and the Princes Channel. As the sludge was discharged 10 feet under water, and was thus agitated with the sea-water by the action of the twin-screws, the diffusion of the sludge in the water is very complete, so much so that its visible effect was soon lost. The heavy matters soon separated by subsidence, and the animal and vegetable debris was rapidly consumed. Although some 10,000,000 of tons of sludge had now been deposited, the most careful examination failed to detect more than the merest trace, either in dredgings or on the sandbanks, which were now as clean as in 1888. The cost amounted to about 44d. per ton of sludge.

The average character of the sewage before and after treatment was set out in tables of monthly averages of daily analyses of samples taken every two hours, day and night, at each outfall during the year 1894. At Crossness, in consequence of the better solution of the lime-water, there was a reduction of the matters held in solution of 17 per cent., a result which agreed closely with the experiments by the author in 1887. At the Northern Outfall the results were not yet so good, but this would

doubtless be remedied as soon as the new liming station was erected.

Tables showing the averages of daily analyses of the river-water since 1885 were given, and showed that the degree of aeration at high water had increased from 17.4 per cent. in 1887 to 55.5 per cent. in 1894; and this improvement has been accompanied by a large reduction in the quantity of free ammonia.

### NEW PIERHEAD BATHS, LIVERPOOL.

THE baths committee of the Liverpool City Council have approved of plans prepared by Mr. W. Court for the new Pier-head Baths. The front entrance will be facing the George's Dock, and approached by three or four steps to a sort of plateau. The ladies' entrance to the baths will be to the left and the gentlemen's to the right, the ticket office being in a central position. All visitors will have to pass through turnstiles. There will be a spacious entrance-hall about 37 feet square, with a grand staircase leading to the upper portions of the building. On the left side will be a lift to take bathers to the different parts of the building open to them. The superintendent's office is also adjacent. On the left of the entrance is the gentlemen's plunge-bath, so arranged that there is no possibility of anyone seeing into it, and this improvement is sure to be appreciated by swimmers and visitors. A spacious corridor will extend right around the building. There will be eighty-one dressing-boxes, each 4 feet by 3 feet 6 inches, and dressing-rooms—four in number—each averaging 15 feet by 9 feet, two being provided with fireplaces. The conveniences will be of the most perfect kind, and so constructed that bathers only will have access to them from the parapet of the bath. The plunge-bath will be one of the finest in the kingdom, being 100 feet by 44 feet. Close to the plunge-bath there will be hot and cold "needle" baths, and between the parapet and the dressing-boxes underneath the gallery ample space is allowed for efficient heating and ventilation; in fact, the principal feature aimed at is a sufficiency of light and air. The boilers will be in the basement. On the occasion of galas the entrance for competitors will be entirely distinct from that of the spectators.

To the right side of the entrance-hall will be the ladies' plunge-bath 60 feet by 30 feet, and this will be arranged with a sort of double parapet, high and low, the higher one enabling the bathers to avoid the splashing of water which seems to be a

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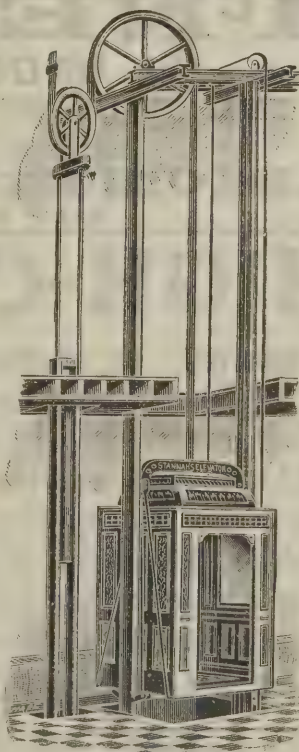
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characteristic of female bathing. The dressing-rooms will be comfortable and afford good accommodation, each room in size averaging about 16 feet by 15 feet. There will be dressing accommodation for something like 150 bathers.

On the ground floor at the north-west corner close to the bridge leading to the landing-stage provision is made for a public café, with entrance and lift giving access to the upper floors. The café, however, will have no connection whatever with the baths. On the first floor there will be a gallery for seating at least 1,300 people and a promenade giving space for an additional 700. For the purpose of safety there are special exits, while the entrance is from the main hall and by the lift. A gentlemen's smoke-room is provided on the first floor. This will be 46 feet by 15 feet, and as it will face the river it will be a favourite portion of the premises. Moreover, arrangements will be made for the supply of refreshments from the café. On this floor are also situated, according to the plans, the ladies' private baths, including five slipper-baths with seven dressing-rooms, some of the latter having fireplaces, Russian baths, sitz baths, needle-bath, Aix-les-Bains and wave baths, with dressing-rooms. There will be a wide staircase from the door to the plunge-bath, so that if the dressing-rooms on the lower floor ever become congested accommodation could be found for lady bathers on the second floor. Immediately over the entrance is a spacious cooling-room for the use of ladies, and this will be approached directly by lift from the plunge-bath.

Ascending to the top floor, there are found on the left side just over the gallery to the plunge-bath gentlemen's private baths, comprising six ordinary slipper-baths with twelve dressing-rooms, thus economising space and at the same time giving as much light and air as possible. In addition there will be three vapour-baths, one Russian and wave, a sitz, Aix-les-Bains and needle and one Roman bath similar in every respect to those provided at Harrogate and other fashionable watering-places; as a matter of fact, the baths will be such as are to be found in the various hydropathic establishments throughout the country. There is space for a gentlemen's cooling-room, also for a complete suite of Turkish baths with twelve dressing-rooms and twelve divans. An arrangement which will meet with most appreciation from swimmers is that enabling those who have used the Turkish or private baths to descend to the plunge-bath by means of a special lift. Engineer's and superintendent's offices and residence are likewise arranged for, and on each floor there is accommodation added to the café, including a commodious smoke-room

facing the river. At the top of the whole building there will be a promenade, whence a view will be obtained of the estuary of the Mersey and the principal objects of interest on the Lancashire and Cheshire sides of the river. Throughout the building oriel windows will be used, and whilst every effort has been made to plan baths that shall meet all requirements that shall be acceptable to the public and be profitable to the city, the comfort of the bathers has been thoroughly considered and carefully provided for. The buildings now planned, it is estimated, will cost about 35,000*l.*, and it is believed that from the rental of the café a yearly income of 300*l.* could be secured.

#### NORTH BRIDGE STREET IMPROVEMENT, EDINBURGH.

At the last meeting of the Edinburgh Town Council a report was presented from the Lord Provost's committee which recommended approval of elevations and plans of buildings to be erected on both sides of North Bridge Street by the authors of the design adjudged first (Messrs. Scott & Williamson), and failing satisfactory offers from outside parties, recommended that the Corporation should undertake the work of reconstruction, and craved an order to instruct the preparation of working plans meantime for the corner blocks at the south end of the bridge, to obtain estimates for the work, and report. The Lord Provost, in moving the adoption of the recommendation of the committee, stated that the committee were unanimously of opinion that the plans should be accepted, so far as the elevations were concerned. There might be some alterations internally, and perhaps even with regard to the height of the roofs, but these matters would come up again when the plans were finally adjusted. They had yet to consider how the basement flats could be so advantageously utilised as to bring out the best possible rental and the most prominent architectural features of the buildings. In the meantime they desired only to have the general approval of the elevations of the plans. This matter would come up in connection with the Bill they were prosecuting in Parliament, and they would then have to consider whether they should build this street themselves or sell the feus to somebody else. Mr. W. S. Brown pointed out that there was a standing order which prevented any of their officials doing private work. While they were all delighted that one of the young men in the superintendent's office, Mr.

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Williamson, had been successful in securing the first prize, they should have some indication how this work was to be carried out, and whether he would remain in the service of the city while the work was being executed. The Lord Provost said that no doubt Mr. Williamson would look after his own interests. The recommendation of the committee was unanimously adopted.

### LANCASHIRE FARM BUILDINGS.

IN his annual report to the Bury Rural District Council just issued, Dr. W. H. Barr, hon. medical officer to the infirmary, writes:—"Many farms in the district have been visited and found, as usual, very much wanting. It is painfully depressing to visit these overcrowded cow-houses and shippens. With few exceptions they are dirty, stuffy and dark. I have brought several cases of insanitary farms before the Council, and orders have been served upon landlords and tenants to abate nuisances. But little amelioration of a permanent character can be hoped for so long as landlords pay so little attention to structural effects and the needs of the tenants. More legal powers are necessary to enable officers of health and rural sanitary councils to deal with the owners of these disgraceful buildings. Considering the importance of this subject, and its bearing on the milk supply of the community, I think the regulations as to dairies, cowsheds and milk shops recently adopted by the city of Manchester well worthy of application to our district, and if the landlords wish to commemorate Her Majesty's diamond jubilee, they cannot confer a greater boon upon suffering animals and mankind than by rebuilding and reorganising the sanitary arrangements of their dilapidated farmsteads."

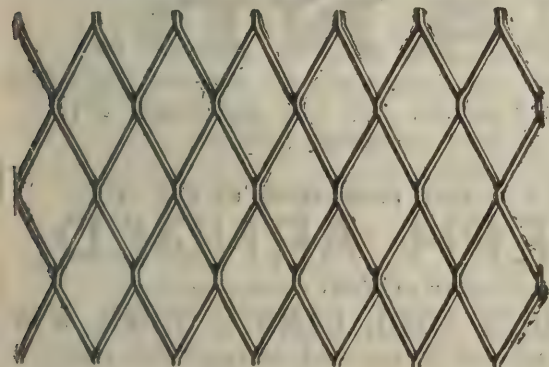
### ELECTRIC LIGHTING IN EDINBURGH.

AT the last meeting of the Edinburgh Town Council a report of the electric-lighting committee recommending that the charge for electric energy as from May 15 next be 4d. per unit, the charge for each lamp 16l. per annum, and the charge for motor power 2½d. per unit was considered.

Mr. Mackenzie, convener, in moving approval of the report, said he should like the Council to agree to still further reduce the price for motor power to 2d. It would not affect the result very much, and they wanted to encourage, if possible, a day

service. After the most successful first year's working of any electric-lighting station ever started in this country, the company began the current financial year with 452 customers and what was equivalent to 57,690 8 candle-power lamps. They were now within measurable distance of the end of the second year, and were able to estimate pretty nearly that on May 15 next they should begin the third year's working with 830 customers, having equal to 100,000 8 candle-power lamps joined on. This continued progress was most satisfactory, and as far as they could judge, was likely to continue for some time. The amount of light supplied during the current year shows an equally large increase, for while the number of Board of Trade units sold during 1895-96 amounted to 888,335, the number of units sold during the current year ending May 15 next will amount to nearly, if not quite, 1,700,000—an increase of over 90 per cent. In regard to the financial results, they were equally successful. They would not forget that the price was reduced as from May last from 6d. to 5d. per unit, continuing the large discounts as formerly. Meter rents were abolished, and public lighting was reduced from 20l. to 18l. per lamp per annum. The results were that their income would be about 26,100l., which was 2,250l. above their estimate; their total expenses would be 19,250l., which was, even with their much larger output, 950l. less than the estimate, thus leaving the very handsome balance of 6,850l. of income over expenditure for the year instead of 3,650l. as estimated. That was the result of this year's working, which the Council might take as practically correct, though there were yet a few months of the year to run. He now came to the estimated results of the coming year 1897-98, beginning in May next. The engineers had gone into this matter most carefully and thoroughly, and from the marvellous accuracy and caution of Professor Kennedy's forecasts in the past they might depend upon his figures being equally reliable in this case. It was estimated that in the coming year the total output would not be less than 2,550,000 Board of Trade units, that being 45 per cent. increase. It might be a good deal more; he thought himself it would be more like 60 or 80 per cent. of increase. The total costs for 2,550,000 units, including 16,135l. as estimated by the Chamberlain for standing charges, the engineers put at 28,200l. The total revenue they estimated at 32,120l., counting the charge for private consumers at 4d. per unit with discounts, and the charge for public lighting at 16l. per lamp, assuming that the number would be increased 80 or

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90 lamps during the year. They thus contemplated a balance of income over expenditure for the year, after the present very large reduction in price, of 3,885*l.*, or say 4,000*l.* It certainly would not be less; probably it would be 2,000*l.* or 3,000*l.* more. As there was a feeling existing in the minds of some members of the Council that the public lighting was too highly charged, and that a proportionate reduction was not being made, he would point out the exact state of the case. Assuming that the Council sanctioned an increase of 90 lamps for the year, and taking the number sanctioned already at 500, they might expect an average of 545 burning during the whole year, and for this they asked 16*l.* per lamp, or a total of 8,720*l.* For the upkeep of these 545 lamps they should have to expend 692*l.* in carbons, 1,635*l.* in trimmers' wages, and on repairs and maintenance 200*l.*, a total of 2,527*l.*, leaving them 6,193*l.* for the current, sinking fund, interest and management. The number of units required for the 545 lamps during the year was about 900,000; for this the committee got a little under 1*3*/<sub>4</sub>*d.* per unit, 6,193*l.* in all, while for the private lighting they got an average of about 3*3*/<sub>4</sub>*d.* per unit, or, taking public and private lighting together, nearly 3*4*/<sub>4</sub>*d.* per unit. This would show whether the electric-lighting department was overcharging for street lighting. For what was nothing less than the extraordinary success of the electric-lighting undertaking they were largely indebted, first, to their engineer-in-chief, Professor Kennedy, who had shown himself, what, indeed, he was acknowledged to be, one of the ablest and most reliable electrical engineers in the country, for whose prudence, sagacity and foresight those who knew him had the greatest possible admiration; secondly, to Mr. Monkhouse, who had, now left them, and to Mr. Newington, who had in a quiet, unostentatious manner done an enormous amount of difficult work during the last nine months. He was devoted to his work and had been ably supported by the members of his staff. It should not be forgotten that the introduction of the higher voltage just in progress had been largely instrumental in enabling them to attain such successful results, and consumers should bear in mind the fact and not impede the completion of this desirable piece of work. They intended shortly to ask the Board of Trade for its official confirmation of the system as a high voltage one.

Baile Anderson suggested a further reduction of the cost of public lighting to 15*l.* per lamp, so that the ratepayers might more largely participate in the success of the venture, of which originally they had taken all the risks.

Mr. Mackenzie pointed out that at the present moment they had a dead loss of 12*s.* 8*d.* per lamp, and it was almost literally true of them as of the old woman who sold all her oranges below cost price and trusted to the quantity disposed of to recoup her.

The motion was approved.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

4091. Alfred Julius Boulton, for "Improvements in or relating to bricks or blocks for use in the construction of chimneys, flues and other shafts."

4146. Hugh Donald Fitzpatrick, for "Improvements in sash-locks or fasteners."

4159. Robert K. Brown, for "Improvements in automatically locking sash-holders."

4178. Daniel Wesley Harper, Thomas Ripley Tarnsworth and Robert Leedy Matthews, for "Improvements in and relating to cash registers and recorders."

4199. Herbert Henry Barnett, for "Improvements relating to casement windows."

4399. George Pitt, for "Improvements in brick-kilns."

4455. William Speirs Simpson, for "Improvements connected with Venetian blinds and in means for fixing them when closed."

4618. William George Williams and Samuel Taylor, for "A new medium for and improvements in decorating surfaces."

4621. Arthur Grafton Herbert and Francis Robert Baker, for "An improved blind-cord rack-pulley."

4652. James George Cox, for "Improvements relating to the laying of drain-pipes."

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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xv.*

## COMPETITIONS DECIDED.

THE NEW HIGHER GRADE SCHOOL, SCARBOROUGH.—Mr. Robson, F.S.A., architect to the Education Department, who was asked by the Scarborough School Board to judge the plans sent in for the erection of the new higher school, has made his award. The first place is taken by Messrs. Hall, Cooper & Davis, Westborough, Scarborough; the second place by Messrs. Demaine & Brierley, of York; and the third by Messrs. Marshall & Dick, of Newcastle-on-Tyne. The competition was an open one, and about forty sets of plans were sent in from all parts of the country.

THE PROPOSED WESLEYAN COLLEGE, SCARBOROUGH.—Five sets of plans were sent in by local architects for the premiums offered, viz. 50l. and 25l., in connection with the proposed Wesleyan College on the Weaponess Estate, South Cliffe. The award has been made, the first premium being awarded to Messrs. Hall, Cooper & Davis, Westborough, Scarborough, and the second to Messrs. Tugwell & Barry, Westborough, Scarborough. This competition was confined to local architects, and five sets of plans were deposited.

## CONTRACTS OPEN.

ABERAMAN.—March 13.—For alterations and additions to the Pen-y-lan Inn. Mr. T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

ABERDEEN.—March 16.—For erection of stables at Whitehouse. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ABOYNE.—March 18.—For erection of an isolation hospital. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

AISKEW.—For erection of three cottages in Aiskew. Mr. Robert Imeson, land agent, Masham.

ALFORD.—March 27.—For erection of an epidemic hospital. Messrs. James Duncan & Son, architects, Turriff.

ALNWICK.—March 18.—For alterations and additions to Alnwick Castle dairy farm buildings. Mr. Kyle, Estates Offices, Alnwick Castle.

ARGYLLSHIRE.—March 20.—For erection of three cottages at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

BARNET.—March 24.—For erection of foreman's cottage, fire-engine house, stable, boundary walls and gates, Tapster Street. Mr. H. W. Poole, clerk, Barnet.

BATLEY.—For erection of the Stubley memorial wing to the Batley Technical School. Mr. Harry B. Buckley, architect, 8 East Parade, Leeds.

BATLEY.—For erection of a villa residence in Deighton Lane, Healey. Mr. Harry B. Buckley, architect, 8 East Parade, Leeds.

BELFAST.—March 20.—For erection of a masonic hall on Crumlin Road. Mr. J. H. Gault, 5 Agnes Street.

BELPER.—March 13.—For erection of moulding and fitting shops, covering nearly 1½ acres (with the exception of the iron-work to roof), on the Derby Road. Mr. Maurice Hunter, Belper.

BLACKPOOL.—March 22.—For erection of cemetery registrar's house on the southerly side of new road, opposite the cemetery. Mr. T. Loftos, town clerk.

BRADFORD.—March 15.—For erection of six houses at Prospect Road. Mr. J. H. Dixon, architect, 90 Heap Lane, Bradford.

BRADFORD.—For alterations and additions to the Robin Hood Inn. Mr. John Jackson, architect, Barry Street, Bradford.

BRADFORD.—March 17.—For fitting-up portions of the Exchange Restaurant. Messrs. Milnes & France, architects, Bradford.

BRADFORD.—March 15.—For erection of four through houses in East Parade. Mr. Abm. Sharp, architect, Albany Buildings, Market Street, Bradford.

BRECON.—March 15.—For erection of cattle stalls, &c., in the cattle markets. Mr. Rhys Davies, borough surveyor, Brecon.

BURNWOOD.—March 16.—For erection of four attendants' houses at Burnwood Asylum. Mr. Walter H. Cheadle, architect, Stafford.

CAMBERWELL.—March 15.—For wood-block flooring at the South London Art Gallery and School in course of erection in Peckham Road. Mr. C. William Tagg, vestry clerk, Vestry Hall, Camberwell.

CARDIFF.—March 22.—For conversion of dwelling-house property into shops in Cowbridge Road. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CARRICKFERGUS.—March 15.—For building a masonic hall. Mr. James Boyd, Town Hall, Carrickfergus.

CATERHAM.—March 17.—For erection of a nurses' home at the Caterham Imbecile Asylum. Mr. Edwin T. Hall, 57 Moorgate Street, E.C.

COLCHESTER.—March 15.—For taking up old and putting down new floor to dining-hall at the workhouse. Mr. G. H. Page, architect, Trinity Chambers, Colchester.

CORNWALL.—March 17.—For the erection of a classroom at St. Enoder national school. Rev. W. Horsburgh, St. Enoder Rectory, Grampound Road.

DARLINGTON.—For erection of stabling, &c., in Tubwell Row. Mr. C. N. Coates, Stapleton, Darlington.

DARLINGTON.—March 15.—For erection of a parish hall for the church of St. Cuthbert. Messrs. Clark & Moscrop, architects, Darlington.

DEVONPORT.—March 18.—For structural alterations at workhouse infirmary. Mr. Albert Gard, clerk, 19 St. Aubyn Street, Devonport.

DEWSBURY.—March 15.—For erection of dry fence wall in Halifax Road. Mr. H. Dearden, borough surveyor, Town Hall.

DORCHESTER.—March 13.—For additions and repairs at the Junction Hotel. Mr. A. L. T. Tilley, architect, 16 Cornhill, Dorchester.

DUNSTABLE.—March 18.—For repairs, renovations and alterations of town hall. Mr. C. Crichton S. Benning, town clerk.

DURHAM.—March 17.—For erection of house, &c., in Queen Street, Blackhill. Mr. George Thomas Wilson, architect, 121 Durham Road, Blackhill.

EBBW VALE.—March 15.—For erection of a school to accommodate 157 children near Steelworks Houses, with outhouses, boundaries and playgrounds. Mr. Geo. Rosser, architect, Victoria Buildings, Abercarn.

FEATHERSTONE.—March 25.—For erection of assembly-rooms, market hall and club. Messrs. Gafside & Keyworth, architects, Pontefract.

FLEET.—March 27.—For restoration of roof of nave and north and south aisle roofs of Fleet Church. Mr. W. M. Fawcett, architect, 1 Silver Street, Cambridge.

GAINSBOROUGH.—March 15.—For erection of 100 wards, mortuary, boundary walls, stone and iron stairs, and new conveniences at the workhouse. Messrs. Eyre & Southall, architects, Gainsborough.

GALGATE.—March 13.—For erection of police station. Mr. Henry Littler, architect, 21 Pitt Street, Preston.



GIRLINGTON.—March 15.—For erection of five houses and shops and two houses. Mr. J. Hainsworth, plumber, 376 Brownroyd, Thornton Road.

GLASGOW.—For fitting-up summer show on April 21 and 22, for the Glasgow Agricultural Society. Mr. Alexander Russell, secretary, 175 West George Street, Glasgow.

GLASS HOUGHTON.—March 15.—For erection of Board schools at Cutsyke. Mr. George F. Pennington, architect, Bridge Street, Castleford.

GLOUCESTER.—March 25.—For erection of three show-rooms, with a retaining wall and wrought-iron palisading, and for erection of the walls of the proposed bull ring in Market Parade, and wrought-iron palisading. Mr. R. Read, city surveyor, Guildhall, Gloucester.

GREAT YARMOUTH.—March 18.—For erection of two houses on the cliffs. Mr. H. Dudley Arnott, architect, High Street, Gorleston.

HALIFAX.—March 20.—For erection of a warehouse, with stabling, &c., in Union Street South. Mr. Arthur George Dalzell, architect and surveyor, 15 Commercial Street, Halifax.

HALIFAX.—March 24.—For additions and extensions at Washer Lane dyeworks. Messrs. R. & R. E. Horsfall, architects, 15 George Street, Halifax.

HUBB.—March 16.—For erection of a farmhouse and out-buildings. Mr. W. H. Beevers, architect, 25 Bond Street, Leeds.

HUDDERSFIELD.—March 18.—For erection of a shed at the Archill and Cudbear Works, Hillhouse Road. Messrs. John Kirk & Sons, architects, Huddersfield.

HUDDERSFIELD.—March 18.—For erection of a bottling store. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

HULL.—For pulling-down and clearing-away old material of three houses, corner of Norfolk Street and Beverley Road. Messrs. Gelder & Kitchen, architects, 76 Lowgate, Hull.

HUNSLET.—For erection of a four-storeyed warehouse in Hunslet Road. Mr. John E. Leak, architect, Hunslet.

HUNSLET MOOR.—For erection of eight houses in Arthington Avenue. Mr. W. Mason Coggill, architect, Beech Grove, Stourton.

IRELAND.—March 20.—For erection of a church at Cashilard. Mr. E. J. Toye, architect, Strand, Derry.

IRELAND.—March 20.—For erection of new bank at Portrush. Mr. Vincent Craig, architect, 5 Lombard Street, Belfast.

IRELAND.—For erection of a creamery building at Anna, near Linsagry Station. Messrs. J. P. Evans & Co., 131 George Street, Limerick.

KING'S LYNN.—March 20.—For alterations and repairs to the Prince of Wales Inn. Mr. George Thorpe, architect, Exchange Square, Wisbech.

KINSALE.—March 15.—For additions and alterations to the Convent of Mercy. Mr. Saml. F. Hynes, 41 South Mall, Cork.

LANCASTER.—March 15.—For erection of a wall on the west side of land in East Road, and erection of an iron fence on the east and south sides of land in East Road. Mr. W. O. Roper, clerk to the Governors, Bank Buildings, Lancaster.

LANCHESTER.—March 17.—For erection of three houses, &c. Mr. Geo. Thomas Wilson, architect, 121 Durham Road, Blackhill.

LANGTOFT.—March 20.—For restoration of the roof of north aisle of parish church. Mr. J. C. Traylen, diocesan surveyor.

LEEDS.—For erection of a boot factory in Compton Road, Burmantofts. Mr. W. Mason Coggill, architect, Beech Grove, Stourton.

LEEDS.—March 16.—For refronting the east and south elevations of the Oxford Place Chapel, with other alteration and remodelling. Messrs. George F. Danby, Great George Street.

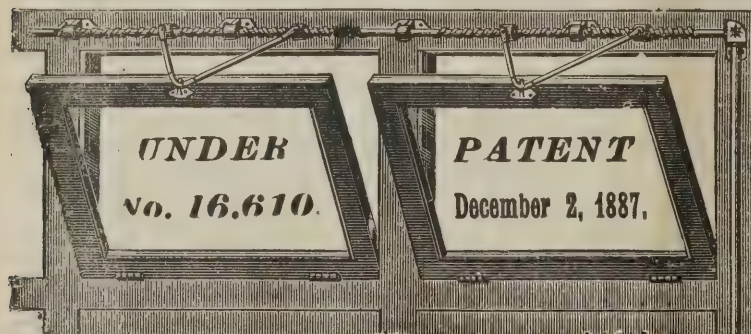
LEEDS.—March 20.—For erection of purifier-house and eight purifiers at the Meadow Lane Gasworks. Mr. R. H. Townsley, general superintendent, Municipal Offices, Leeds.

LEEDS.—March 24.—For erection of a police station and branch free library at Upper Wortley. City engineer, Municipal Buildings.

LIMERICK.—March 13.—For erection of creamery buildings at each of the following places:—Oola; Kilmihill, co. Clare; Effin, Charleville, co. Limerick. Mr. W. Stokes, Mulgrave Street, Limerick.

MANCHESTER.—March 22.—For construction of new steps from Store Street to Aqueduct Street, and the formation of a new gateway and roadway to works of yard in Aqueduct Street. The City Surveyor (Improvement and Buildings Departments), Town Hall.

MANSFIELD.—March 17.—For erection of an infirmary for sixty-eight beds, a maternity ward for eight beds and other works at the workhouse. Mr. R. F. Vallance, Mansfield.



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MIDDLESBROUGH.—March 15.—For erection of a house in Clareville Road, Grove Hill. Mr. J. Mitchell Bottomley, architect, 28 Albert Road, Middlesbrough.

MIDDLESBROUGH.—March 16.—For alterations and new mahogany shop fronts to premises in Newport Road. Mr. Walter G. Roberts, architect, 61 Albert Road, Middlesbrough.

MIDDLESBROUGH.—March 22.—For erection of an entrance lodge at the new cemetery, Linthorpe. Mr. Frank Baker, borough engineer, Municipal Buildings, Middlesbrough.

MONTGOMERY.—March 31.—For erection of the Newtown county intermediate school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

MORLEY.—March 16.—For erection of a club building in Fountain Street. Mr. S. B. Birds, architect, 47 High Street, Morley.

NEW BROMPTON.—March 16.—For erection of a cookery centre at Balmoral Road. Mr. E. T. Atchison, clerk, 8 Waterloo Road, New Brompton.

NEW TREDEGAR.—March 12.—For erection of seven houses on the Gasfield, Tirphil, and four houses on the Greenfield. Mr. George Kenshole, architect, 26 Duffryn Terrace, New Tredegar.

NORTHUMBERLAND.—For erection of new Traveller's Rest Hotel at Blyth. Mr. Savage, 12 Grey Street, Newcastle.

NORTHWOLD.—For reseating the body of the Northwold Wesleyan Chapel in pitch-pine. Mr. Henry Bovill, auctioneer, Northwold, Brandon.

OLD TRAFFORD.—March 24.—For erection of buildings for refuse destructor and sanitary works. Mr. John Bowden, architect, 14 Ridgefield, Manchester.

OMAGH.—March 20.—For erection of labourers' cottages. Mr. William Cathcart, executive sanitary officer, Workhouse.

OSWESTRY.—March 17.—For erection of stone wall in Roft Street, and construction and erection of iron sheep pens in Smithfield. Mr. R. O. Wynne-Roberts, borough surveyor, Oswestry.

OVENDEN.—March 25.—For erection of pair of semi-detached dwelling-houses in Shay Road. Mr. Medley Hall, architect, 29 Northgate, Halifax.

PONTYPRIDD.—April 3.—For erection of school to accommodate 320 boys, 320 girls and 485 infants in the Llan Wood. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

PORTSMOUTH.—March 23.—For erection of a public elementary school in George Street, Buckland, to accommodate 1,284 children. Mr. G. C. Vernon-Inkpen, architect, 75 King's Road, Southsea.

PUDESEY.—For alterations to Waterloo Inn and shop premises at Waterloo Road. Mr. John Jackson, architect, Barry Street, Bradford.

QUEENSBURY.—March 15.—For erection of Board schools, out-offices, boundary-walls and forming of playgrounds at Fox Hill. Messrs. John Drake & Son, architects, Winterbank, Queensbury.

ROCHDALE.—For erection of a dwelling-house in Shaw Street. Mr. Norcliffe Mills, architect and surveyor, 67 Lord Street, Rochdale.

SCOTLAND.—March 15.—For erection of a mission hall in Bonnyrigg. Mr. David Bett Tod, Bonnyrigg.

SHEFFIELD.—March 15.—For erection of police station-house and cells. Mr. J. Vickers Edwards, county surveyor, Wakefield.

SHEFFIELD.—March 31.—For erection of public baths at the corner of Sutherland Road. Mr. Charles F. Wike, City Surveyor, Town Hall, Sheffield.

SHEFFIELD.—March 16.—For erection of a department for girls, together with accommodation for cookery and manual training classes, and additions and alterations to the infants' and junior mixed departments at Gleadless Road Schools. Mr. C. J. Innocent, architect, 17 George Street, Sheffield.

SHEFFIELD.—March 27.—For erection of drapery establishment covering about three-quarters of an acre. Messrs. Flockton, Gibbs & Flockton, architects, 15 St. James Row, Sheffield.

SHEFFIELD.—April 3.—For erection of roof, principals, slate laths, and cast-iron guttering for retort-house at Grimesthorpe Station. Mr. Hanbury Thomas, Commercial Street, Sheffield.

SIDDAL.—March 13.—For erection of two houses. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

SOWERBY BRIDGE.—March 15.—For erection of twelve houses in Clay Street, Beech, Sowerby Bridge. Mr. S. Wilkinson, architect, Sowerby Bridge.

SWINDON.—March 13.—For erection of premises in Fleet Street, New Swindon, for the North Wilts Conservative and Liberal Unionist Club. Mr. William Drew, architect, 22 Victoria Street, Swindon.

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ULVERSTON.—For additions to the King's Arms Hotel. Messrs. Settle & Farmer, architects.

ULVERSTON.—March 18.—For erection of Wesleyan church. Mr. Thomas Birkett, hon. secretary, 20 Market Street, Ulverston.

WALES.—March 20.—For erection of a chapel and school-rooms, for the Sion Welsh Independent Church, Blaencaerau. Mr. Joseph Morris, Caerau Road, Blaencaerau.

WALES.—For building seventeen cottages at Cwmpark. Mr. Tallis, Baglan Terrace, Cwmpark.

WHITBY.—March 13.—For erection of a pair of semi detached villas at the top of Downdinner Hill. Mr. Jno. J. Milligan, architect and surveyor, 77 Baxtergate, Whitby.

WIGAN.—For erection of waiting-room and houses at Platt Bridge. Mr. R. T. Johnson, architect, York Chambers, Wallgate, Wigan.

WINCHMORE HILL, N.—March 17.—For erection of an isolation pavilion at the Northern Hospital. Messrs. Pennington & Son, architects, Hastings House, Norfolk Street, W.C.

WINWICK.—March 13.—For erection of two entrance lodges and twelve cottages for proposed new asylum. Mr. Fred. C. Hulton, clerk, County offices, Preston.

A SERIOUS accident occurred at Newcastle on Friday last, when an old building in Sandgate gave way, killing four men and injuring three others. It was an old beerhouse, which was being pulled down and rebuilt. The walls suddenly collapsed. Many of the workmen escaped, but nine of them were buried, and when they were extricated four of them were found to be dead.

A NEW school erected by the Cathcart School Board at Mount Florida, Glasgow, has just been opened. Built of red stone in the Italian style of architecture, the school has eighteen classrooms and will accommodate 1,232 pupils. Special arrangements have been made for the teaching of music and cooking, and great attention has been paid to heating and ventilating. The classrooms are so arranged that by the opening of movable partitions they can be converted into two large central halls, one on the ground and the other on the upper floor.

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For construction of small water reservoir and laying of short length of water-mains at Middleton-by-Wirksworth. Mr. BAILEY, surveyor, North Avenue, Ashbourne.

WALKER BROS., Derbyshire (accepted) . . . . . £105 17 0

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For executing drainage works at the cemetery.

F. HOGGARTHY (accepted) . . . . . £225 0 0

### BANSTEAD.

For new farmhouse in Park Road. Mr. ST. PIERRE HARRIS, architect and surveyor, 8 Ironmonger Lane, E.C. Quantities by Messrs. STANGER & SON.

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T. D. GRATY (accepted) . . . . . 1,379 0 0

### BELMONT.

For erection of Board school at Belmont for 235 scholars, for the Belmont School Board. Messrs. BRADSHAW & GASS, architects, Silverwell Street, Bolton.

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S. Seddon.

E. & D. Maginnis.

R. Mosley.

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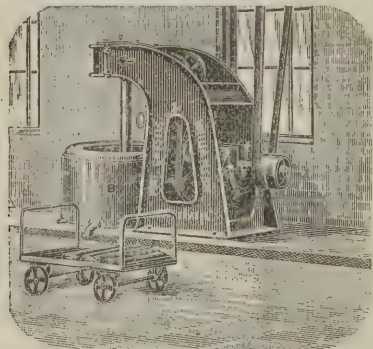
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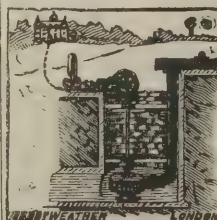


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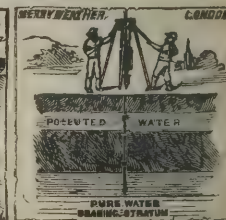
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**BOURNEMOUTH.**

For erection of new premises for the Rainbow Dyeworks Company, Boscombe. Messrs. JENNINGS & GOATER, architects, Bournemouth.

Jenkins & Sons . . . . .	£918	0	0
Meaders . . . . .	907	0	0
Jones & Son . . . . .	886	0	0
Elcock . . . . .	846	9	4
MacWilliam & Son . . . . .	825	0	0
H. DAVIS, Boscombe (accepted) . . . . .	765	0	0

**BRADFORD.**

For erection of showrooms and offices at the Marble Works, Otley Road. Messrs. EMPSALL & CLARKSON, architects, 7 Exchange, Bradford.

*Accepted tenders.*

- T. Wear, Bradford, mason.
- J. Fortune, Bradford, joiner.
- C. H. Pearson, Bradford, plumber.
- H. Dixon, Bradford, plasterer.
- T. Nelson, Bradford, slater.
- J. H. Smith, Bradford, painter.

Total, £620.

For erection of villa, stabling, &c., at Lidget Green. Mr. SAML. ROBINSON, architect, Cheapside, Bradford. Quantities by architect.

*Accepted tenders.*

- Booth & Son, mason.
- Smith & Wilkinson, joiner.
- R. Townend, plumber.
- A. Taylor, plasterer.
- Hill & Nelson, slater.
- S. Whiteley, painter.

**BROMLEY.**

For sewerage, levelling, paving, metalling and channelling in the following roads:—Wharton Road, Haxted Road, Ann's Place, Florence Road, Station Road, Glebe Road, Heathfield Road, Elmfield Road, Southlands Road (part of). Mr. S. HAWKINGS, surveyor.

Mowlem & Co. . . . .	£5,676	0	0
S. Hudson. . . . .	5,270	1	6
T. Lansbury . . . . .	4,941	12	1
E. PEILL & SONS, Bromley (accepted) . . . . .	4,583	2	9
Surveyor's estimate . . . . .	4,362	0	3

**BURGESS HILL.**

For construction of about 300 yards of stoneware pipe sewer, &c., in Ferndale Road.

W. S. Holman . . . . .	£230	0	0
H. A. Chambers . . . . .	213	0	0
W. ORAM, Mill Road, Burgess Hill (accepted) . . . . .	199	15	0

**BURSLEM.**

For alterations to Hill Top Schools, for the Burslem School Board. Messrs. WOOD & HUTCHINGS, architects, Tunstall and Burslem.

W. COOKE, Burslem (accepted) . . . . .	£354	0	0
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For extension to Middleport Schools, for the Burslem School Board. Messrs. WOOD & HUTCHINGS, architects, Tunstall and Burslem.

GRANT & SONS, Burslem (accepted) . . . . .	£845	0	0
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**CANTERBURY.**

For erection of a public library and institute. Mr. A. H. CAMPBELL, city surveyor, 28 St. Margaret's Street, Canterbury.

Johnson & Co. . . . .	£9,623	0	0
G. H. Denne & Son . . . . .	9,251	0	0
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W. W. Martin . . . . .	8,901	0	0
W. J. Adcock . . . . .	7,950	0	0
G. Bowes . . . . .	7,473	15	0
H. B. WILSON, Canterbury (accepted) . . . . .	7,563	0	0
City surveyor's estimate . . . . .	7,491	0	0

For repainting the interior of the Corn Exchange.

Smith & Co. . . . .	£118	0	0
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## CARDIFF.

For the setting-back of a portion of the front boundary wall of the Union Workhouse, Cowbridge Road, and the taking-down and removal of three casual wards and the public urinal adjoining same. Mr. HARPUR, borough engineer.

J. Hatherley	£228	15	1
F. W. Pickthall	189	0	5
F. Small	166	8	0
H. Lewis & Son	121	15	9
C. Parsons	120	0	0
Gerard & Hallett	119	0	0
W. T. Morgan	112	17	7
G. Griffiths	112	13	4
E. Turner & Sons	111	14	11
W. SYMONDS & Co., Cardiff (accepted)	102	0	0
Handford & Ellsworthy	89	19	0

For construction of a new sewer and erection of a new bridge over the Roath Brook. Mr. W. HARPUR, borough engineer.

Barnes, Chaplin & Co.	£2,047	16	8
F. Ashley	1,995	5	2
J. Allan	1,989	0	6
Lattey & Co.	1,959	0	0
E. H. Page	1,919	3	3
F. Robbins	1,895	0	0
W. T. Morgan	1,818	4	9
T. Rees	1,727	16	3
E. TURNER & SONS (accepted)	1,540	14	7

## COLCHESTER.

For supply and erection of cast-iron standards, Bessemer steel bars and gates for the reconstruction of auction mart in the Cattle Market. Mr. H. GOODYEAR, borough engineer.

C. S. Mallett & Co.	£857	7	4
Coleman & Morton	570	0	0
Appleby & Co.	554	0	10
E. C. & J. Keay, Limited	493	4	10
A. J. Ellis	469	5	3
Hill & Smith	403	14	0
LLOYD & Co., Abercarn, Mon. (accepted)	341	4	0

## COMBS.

For erection of six cottages on the Needham Road. Mr. HENRY GEO. BISHOP, architect, Market Place, Stowmarket.

W. Murray	£1,440	0	0
F. Andrews	1,410	0	0
C. Gibbons	1,325	0	0
H. Plummer	1,323	0	0
J. Death & Sons	996	0	0

## CORNWALL.

For carrying-out of the drainage of the contributory area of Porthleven. Mr. W. KINNAIRD JENKINS, engineer.

Thomas, Son & Crowan, Camborne.	£1,322	0	0
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## CROSSHAVEN.

For erection of a dwelling-house and business premises. Mr. JAMES F. McMULLEN, architect, 30 South Mall, Cork.

J. SISK, Cork (accepted)	£600	0	0
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## DARTFORD.

For laying of about 713 yards of 10-inch stoneware pipe sewer, and constructing the manholes, &c. Mr. W. HARSTON, surveyor, High Street, Dartford.

J. Mowlem & Co.	£921	0	0
Thomas & Edge	815	0	0
G. BELL, Tottenham (accepted)	697	0	0

## DEWSBURY.

For erection of seven dwelling-houses on the Northfields Estate. Messrs. JOHN KIRK & SONS, architects, Dewsbury.

## Accepted tenders.

W. Oates, mason and bricklayer.

J. Richardson & Sons, carpenter and joiner.

J. Shepley, plumber.

F. Grange, plasterer.

J. Thornton, slater.

Porritt & Bray, painter.

## DUKINFIELD.

For erection of a detached villa residence in Old Road. Messrs. JOHN EATON, SONS & CANTRELL, architects, Ashton-under-Lyne.

C. KESWICK, Ashton-under-Lyne (accepted).

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## DROYLSDEN.

For alterations to Droylsden Castle Schools. Mr. J. H. BURTON, architect, 2 Guide Lane, Hooley Hill.

J. W. Williamson . . . . .	£98	0	0
T. Bates & Co. . . . .	62	10	0
Edwin Marshall . . . . .	59	0	0
HANNAH FIELDING, Droylsden (accepted) . . . . .	55	0	0
W. Hurst . . . . .	50	4	4

## HASTINGS.

For the supply and delivery of 350 cast-iron ornamental standards. Mr. PHILIP H. PALMER, borough engineer, Town Hall, Hastings.

J. PAGE & Co., Foulsham, Dereham, Norfolk (accepted) . . . . .	£149	0	0
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## HEXHAM.

For erection of buildings at Linnell Mill, near Hexham. Mr. WM. DIXON, architect, St. John Street, Newcastle.

Johnson & Surtees . . . . .	£1,017	9	6
J. Civil . . . . .	984	10	0
J. White . . . . .	858	10	0
J. Saint . . . . .	812	8	11
C. A. KING, Newcastle-on-Tyne (accepted) . . . . .	800	0	0

## HORSHAM.

For new shops, &c., West Street, Horsham, for Col. J. Clifton Brown. Mr. G. LYNN, architect, Brighton. Quantities supplied by Mr. WM. SHEARBURN, Dorking.

Dewdney Bros., Horsham . . . . .	£2,610	0	0
Rowland Bros., Horsham . . . . .	2,549	0	0
J. Langley & Co., Crawley . . . . .	2,449	0	0
F. Potter, Horsham . . . . .	2,440	0	0
P. Peters & Son, Horsham . . . . .	2,350	0	0
Ockenden & Son, Crawley . . . . .	2,166	0	0
Cook & Son, Crawley . . . . .	2,111	0	0
Potter Bros., Horsham . . . . .	1,973	0	0

## KEIGHLEY.

For erection of pavilion at the hospital, Morton Banks Messrs. JOHN JUDSON & MOORE, architects, York Chambers, Keighley.

## Accepted tenders.

W. Foster, Bingley, mason.  
Foster & Fortune, Ingrow, joiner.  
T. Nelson, Bradford, slater.  
H. Walker, Bingley, plumber.  
J. Pickles, Bingley, plasterer.

## KESWICK.

For erection of gate lodge and museum in Fitz Park. Mr. THOMAS HODGSON, architect, Station Road, Keswick.

## Accepted tenders.

W. Cowperthwaite, builder.  
J. Greenhow, joiner.  
W. Porteous, plumber.  
T. Brown, painter and glazier.  
J. H. Bromley, stone dresser.  
Total, £1,069.

## KIDSGROVE.

For new public offices for the Kids Grove Urban District Council. Messrs. WOOD & HUTCHINGS, architects, Tunstall and Burslem.

G. Palin . . . . .	£2,393	0	0
S. Salt . . . . .	2,340	0	0
C. Brayford . . . . .	2,294	0	0
C. Smith . . . . .	2,274	0	0
Yorke & Goodwin . . . . .	2,250	0	0
Grant & Son . . . . .	2,225	0	0
W. Cooke . . . . .	2,161	0	0
Walley & Woolscroft . . . . .	2,150	0	0
C. COPE, Tunstall (accepted) . . . . .	2,046	0	0

## LANCASTER.

For erection of storey home at the Royal Albert Asylum. Mr. C. J. ASHWORTH, architect, 41 Market Street, Lancaster.

## Accepted tenders.

W. Warbrick, builder.  
W. Huntington, carpenter and joiner.  
Cross & Sons, slater and plasterer.  
Abbott & Co., plumber, &c.  
E. Payne, painter.  
Total, £4,094 17s. 6d.  
Preliminary estimate of cost, £4,000.

## LITTLEHAMPTON.

For alterations and additions to the Nelson and Victory Hotel in Pier Road. Mr. JOHN STANSFIELD-BRUN, architect, Arundel.

AYLING, Arundel (accepted).

## LIVERPOOL.

For altering and enlarging the second police-court, in Dale Street.

BROWN & BACKHOUSE (accepted).

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For heating, Gipsy Road.	
H. C. Price Lea & Co.	£92 0 0
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J. Fraser & Son	63 0 0
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Duffield & Co.*	40 0 0

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The Anchor Window Cleaning Co.	£0 15 0
THE NATIONAL PROVINCIAL WINDOW CLEANING Co. (accepted)	0 7 6

For supply of sixty pairs of dumb bells for the Maryon Park School.	
H. Bouneau	£3 0 0
Heath & George	1 19 0
G. Spencer	1 19 0
Wake & Dean	1 17 0
T. CRUWYS (accepted)	1 15 0

For repairing stoves, Hamond Square.	
G. Miller	£18 0 0
HENDRY & PATTISSON (accepted)	8 0 0

MARYPORT.

For execution of works of sewerage at Crosby, near Maryport.	
Mr. J. B. WILSON, surveyor, Court House Buildings, Cockermouth.	
J. Hunter	£266 16 3
J. T. Harrison	198 0 0
J. T. WATSON, Allonby (accepted)	187 14 3

MIDDLESBROUGH.

For construction of roads, &c., at asylum, Marton Road.	Mr.
A. J. WOOD, 3 Lancaster Place, W.C.	
BASTIMAN BROS., Middlesbrough (accepted)	£3,122 0 0

ORPINGTON.

For a new infants' school and alterations to the existing school buildings at the Chislehurst Road Board Schools.	Mr.
ST. PIERRE HARRIS, architect and surveyor, 8 Ironmonger Lane, and Orpington, Kent.	Quantities by Messrs.
STANGER & SON.	
General Buildings, Limited	£2,948 0 0
Chessum & Son	2,777 0 0
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Davis & Leaney	2,599 17 6
Holt & Son	2,594 0 0
J. Lonsdale	2,521 0 0
T. D. Grady	2,495 0 0
SOMERFORD & SON *	2,473 0 0

\* Accepted subject to the approval of the Educational Department.

For additions and drainage works to a private residence.	Mr.
ST. PIERRE HARRIS, architect and surveyor, 8 Ironmonger Lane, E.C., and Orpington, Kent.	
W. Holt & Sons	£259 0 0
SOMERFORD & SON (accepted)	166 0 0

OXENHOPE.

For erection of a house.	Messrs. JOHN JUDSON & MOORE
architects, York Chambers, Keighley.	
Accepted tenders.	
N. Akeroyd, mason.	
Foster & Fortune, joiner.	
T. Nelson, slater.	
F. T. Raw, plumber.	
J. Greenwood, plasterer.	

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For works of Sabden schools, for the Pendleton School Board.  
Mr. G. B. RAWCLIFFE, architect, 5 Nicholas Street,  
Burnley. Quantities by architect.

Accepted tenders.

A. Ratcliffe, Sabden, mason	£450	0	0
H. Haworth, Sabden, joiner	238	8	6
O. Lister, Ilkley, pavior	173	14	7
Watterson & Co., Burnley, plumber	51	1	7
J. Metcalfe, Preston, heating apparatus	49	6	0
O. Whittaker, Burnley, slater	28	19	0
A. Ingham, Whalley, painter	24	3	4
O. Lister, plasterer	12	14	4

RIPON.

For ironwork, manhole covers, &c., for sewerage works. Mr.  
H. A. JOHNSON, engineer, 14 The Exchange, Bradford.

Sheepbridge Iron Co.	£250	9	6
Webster & Bickerton	172	6	6
Adams & Co.	164	1	0
Jukes, Coulson, Stokes & Co.	142	14	0
Clay, Henriques & Co.	142	4	6
T. Howden & Sons	125	13	6
Clapham Bros.	124	0	6
E. & W. H. Haley	121	6	9
J. Blakeborough & Sons	109	1	10
J. LEES & SONS, Gomersal (accepted)	103	17	6

ROCHDALE.

For alterations and additions to the John Street Tavern, John  
Street. Mr. GEORGE A. HAMMOND, architect, Rochdale.  
R. ROBINSON & SON, Lower Sheriff Street (accepted).

RUSHDEN.

For erection of two houses, Oakley Road. Mr. H. H. PACKER,  
architect, Silver Street, Wellingborough.

Whittington & Tomlin	£639	0	0
H. Sparrow	635	0	0
Coates & Son	629	0	0
J. Willmot	617	10	0
Dickens Bros.	610	0	0
F. K. HENSON, Finedon (accepted)	565	0	0

SCOTLAND.

For construction of waterworks necessary for providing Kil-  
maurs and High Fenwick. Mr. P. CAMPBELL HART,  
engineer, 32 John Finnie Street, Kilmarnock.

Accepted tenders.

J. Wilson & Sons, Lanark	£3,149	7	6
Glenfield Company, Limited, Kilmarnock, valves, street wells and fittings	166	7	3

SOUTHEND-ON-SEA.

For construction of underground conveniences in High Street.  
Mr. HAROLD HARLOCK, borough surveyor.

Thomas & Edge	£3,127	0	0
F. Dupont	2,860	15	2
A. E. SYMES, Stratford (accepted)	2,795	18	0

STANWELL.

For erection of a dining hall at workhouse.

Jordan	£679	0	0
Bates	556	18	6
W. W. Belch	497	0	0
Stokes	478	0	0
W. GLANVILLE, Bedfont (accepted)	452	10	0

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For enlargement of St. Helens Post Office, for H.M. Office of  
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P. Tickle	£3,499	0	0
Pennington & Watson	3,144	6	3
Preston & Hirst	3,040	0	0
Whittaker & Woods	2,987	0	0
Brown & Backhouse	2,250	0	0
G. Waizbom & Son	2,752	0	0
J. ROTHWELL & SONS (accepted)	2,433	0	0
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For private street works, for the Corporation. Mr. JOHN  
ATKINSON, A.M.I.C.E., borough surveyor.

W. Briscoe & Sons	£705	12	10
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For erection of two temporary wards at Union Workhouse.  
Mr. GEOFFREY H. BRADY, architect, Underbank, Stock-  
port.

H. LOMAS, Stockport (accepted)	£514	0	0
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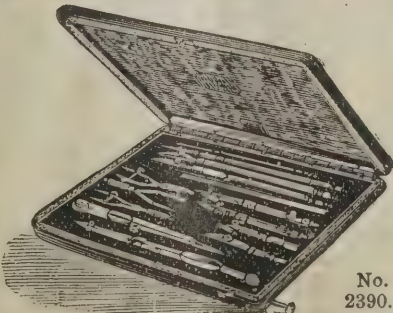
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16 scales of an inch, 4 on each edge, all reading from the  
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taining the following needle point Electron Instruments:—  
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One foot four-fold Pocket Rule. 5s. 6d.  
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## STOWMARKET.

For erection of ten cottages in Crown Street. Mr. HENRY GEO. BISHOP, architect, Stowmarket.			
W. Murray, Stowmarket	£2,400	0	0
A. Taylor, Stowmarket	2,315	0	0
H. Plummer, Rattlesden	2,250	0	0
Chenery & Gillson, Stowmarket	1,800	0	0

## SUFFOLK.

For erection of a house at Needham Market. Mr. HENRY GEO. BISHOP, architect, Stowmarket.			
J. Death & Sons, Bildeston	£1,850	0	0
W. Murray, Stowmarket	1,645	0	0
R. Girling, Ipswich	1,635	0	0
C. Theobald & Sons, Needham Market	1,610	0	0
J. Croft, Diss	1,600	0	0
H. Plummer, Rattlesden	1,599	0	0

## WALES.

For renovation and enlargement of Congregational Chapel, Aberayron.			
Lewis & Evans.	£2,453	0	0
J. James	1,840	0	0
Thomas & Lewis	1,556	0	0
J. Evans	1,495	0	0
JONES & Co., Drefach and New Castle Emlyn (accepted)	1,450	0	0
E. Rowlands	1,262	0	0

## WANSTEAD.

For making-up Pelham Road and part of Pulteney Road. Mr. J. T. BRESSEY, surveyor.			
Bell	£713	0	0
W. Gibbs & Co.	572	4	2
G. Wilson	549	0	0
Joseph Jackson	515	0	0
French Bros.	496	0	0
John Jackson	490	0	0
Jesse Jackson	444	0	0
Griffiths	428	0	0
J. REEVES, Walthamstow (accepted)	428	0	0
Surveyor's estimate	456	0	0

## WORCESTER.

For drainage works at Upper Wick, St. John's. Mr. A. HILL PARKER, surveyor, 5 Foregate Street, Worcester.			
Cooper	£195	0	0
Meredith	166	14	6
Yarnold	160	10	0
Stokes Bros.	144	15	0
J. BUTLER, Worcester (accepted)	131	10	0

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MESSRS. MESSENGER & CO., horticultural builders, Loughborough, are sending out their new catalogue, containing some excellent designs for winter garden conservatories, hot and greenhouses, from the unpretentious lean-to to the elaborate structure suitable for a Croesus. All the various appurtenances and adjuncts to horticultural building are shown, and all prices given in plain figures.

## TRADE NOTES.

MR. E. R. ARMFIELD, having an office at 787 Fulham Road, S.W., is open to receive commissions and samples of patents and other goods used in the building and decorating trades.

THE new sanatorium, Canterbury, now being erected from the plans and under the superintendence of Mr. A. H. Campbell, A.M.I.C.E., the borough engineer and city surveyor, is nearing completion. The contractors for the work are Messrs. G. H. Denne & Son, of Deal. The warming and ventilating is by means of Shorland's patent double-fronted Manchester stoves, with descending smoke-flues, patent Manchester grates, ornamental exhaust roof ventilators and special inlet panels.

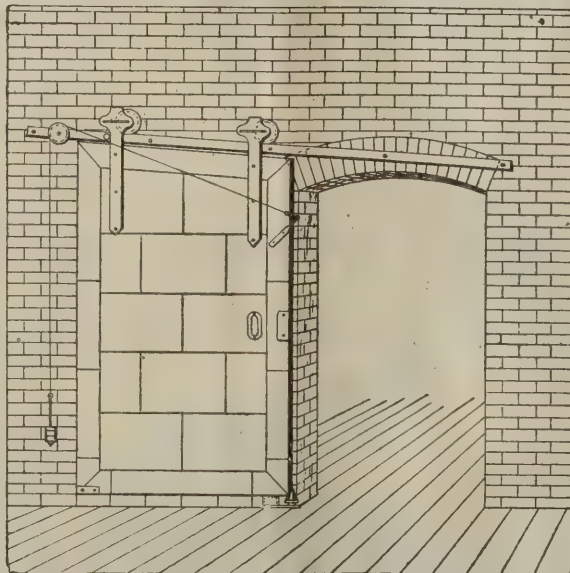
MESSRS. G. M. RESTALL & SON, manufacturers of stained and polished quick-setting adamantine plaster, having found their offices at Gerard Street, Lozells, Birmingham, inadequate to the requirements of their increasing trade, have erected more convenient ones in proximity to their works at Soho Pool Wharf.

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FIRE AT THE WORKS OF THE ANAGLYPTA CO., DARWEN, LANCASHIRE.

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FULL PARTICULARS AND ESTIMATES FREE FROM

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# ILLUSTRATIONS.

WINCHESTER CATHEDRAL.—THE NAVE.

WINCHESTER CATHEDRAL.—SOUTH AISLE, LOOKING EAST.

CHURCH OF ST. MARTIN, LISKEARD, CORNWALL.—SECOND PREMIATED DESIGN.

BUSINESS PREMISES, HESSLE ROAD, HULL.

BUSINESS PREMISES, HOLDERNESS ROAD, HULL.

# BUILDING AND BUILDERS.

THE new block of barracks about to be erected on Wellington Lines, Aldershot, will cost 165,000*l*.

IT is proposed to enlarge Elmfield Primitive Methodist College at a cost of 2,000*l*.

NEW municipal buildings are to be erected at North Berwick on the site of the present building, in commemoration of Her Majesty's Diamond Jubilee.

THE congregation of the Bar Congregational church, Scarborough, have had plans prepared for a new church which they propose to erect this year in connection with the Queen's Diamond Jubilee.

A NEW Wesleyan Reform chapel is to be erected at Glossop in place of the Howard Street chapel, which, on account of its dangerous condition, is to be taken down. The estimated cost of the new building is 2,200*l*.

A SCHOOL for juniors is to be erected at Bromley Common, for the School Board, from the designs of Mr. Charles Bell, of 3 Salters' Hall Court. Mr. Bell is also the architect of the Christ's Almshouses now being built at Buckingham.

THE foundation-stone is to be laid on May 4 of a new church at Bryn-y-maen, in the parish of St. Paul's, Colwyn Bay, the cost of the edifice, together with a parsonage-house of 2,000*l*. value (including the site), and an endowment yielding at least 200*l*. per annum, being the gift of Mrs. Frost, of Min-y-don, Old Colwyn.

THE Board of Management of the Dewsbury Technical School have approved of plans submitted by Mr. J. L. Fox, the architect of the original buildings, for an addition to the

accommodation, which has been for some time inadequate. The school has 869 students, representing a class list of over 1,500, with 541 boys attending the elementary science classes. The proposal is to erect a wing of three storeys, having a frontage to Carlton Road. The cost is estimated at about 3,500*l*., and the Board of Management decided to recommend the execution of the work. It was also suggested that part of the money to be raised in the town for celebrating the Queen's Diamond Jubilee should be devoted towards the cost of building and furnishing the new wing.

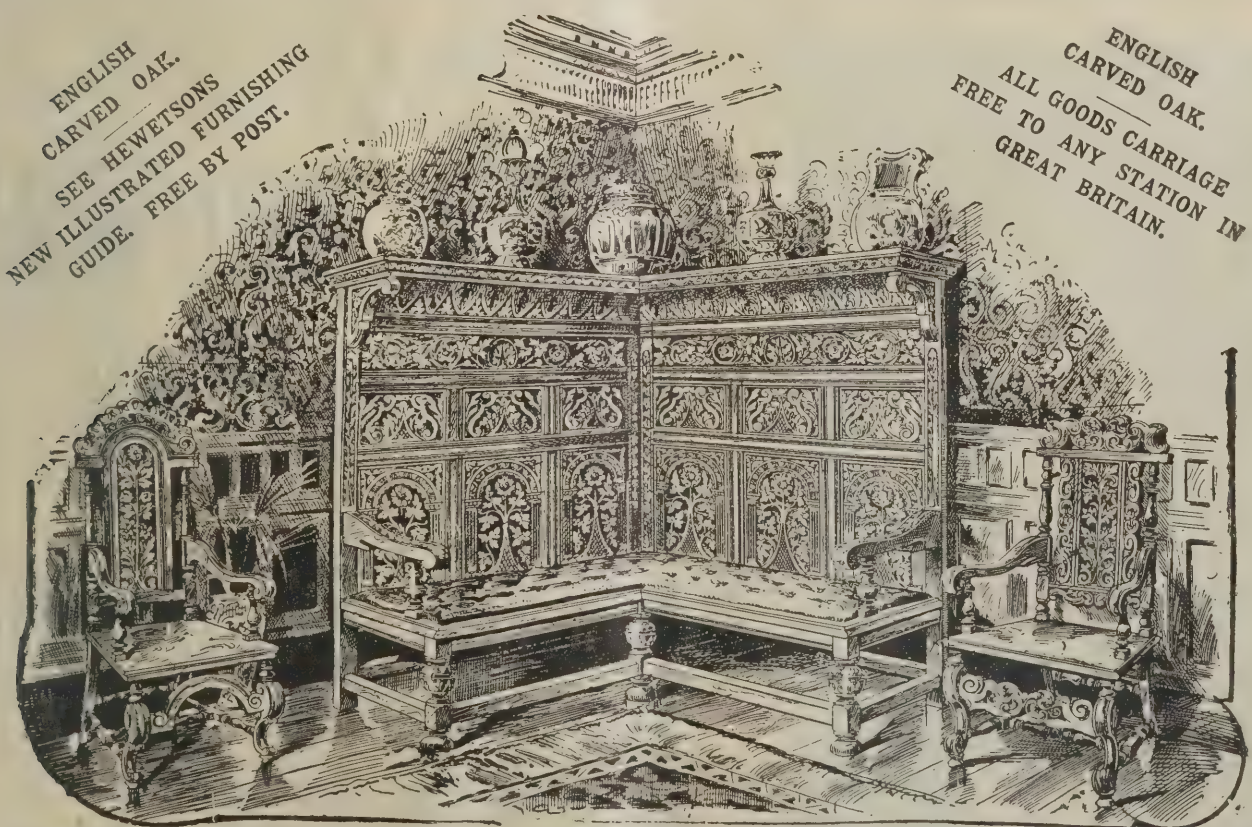
A DECISION of considerable interest to builders in Glasgow has just been given by the Glasgow Dean of Guild Court. A petition was presented to the Court by the Procurator-Fiscal against Archibald Stewart & Co., builders, Glasgow, that they had failed to comply with a notice served upon them by the master of works to hinge or construct the windows of dwelling-houses in a tenement erected by them, in Garngad Avenue, so as to admit of the outsides of the windows being cleaned from the inside of the apartments. Messrs. Stewart objected that the by-law of the Glasgow Buildings Regulations Act, 1892, upon which the petition was founded, was *ultra vires* and incompetent. The decision of the Court is that the by-law is invalid so far as it requires "that in dwelling-houses all window sashes above the ground floor shall be hinged or constructed so as to admit of the outsides of the windows being cleaned from the inside of the apartment," finds that it was *ultra vires* of the Glasgow Police Commissioners to enact a by-law to this effect, and therefore finds that it is not necessary for the respondents to execute the work specified in the notice of the master of works.

# VARIETIES.

A NEW chapel in the Female Convict Prison at Aylesbury was on the 4th inst. consecrated by the Bishop of Reading.

UNDER the direction of Mr. Herbert Riches, of 3 Crooked Lane, King William Street, some extensive alterations are being carried out in Salisbury Lane, Limehouse.

A CO-OPERATIVE store, which has been erected in Field Lane, Batley, at a cost of 1,000*l*., and which forms the twelfth branch of the Batley Co-operative Society, was opened on the 6th inst.



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

No. 319.—The "WORTLEY" CARVED OAK ARM-CHAIR, £4 15s.

No. 320.—CARVED OAK HALL COSY CORNER, 6 ft. 6 in. high, £24 10s.

No. 321.—The "KNIGHT" CARVED OAK ARM-CHAIR, £4 5s.

HEWETSONS, ARTISTIC FURNISHERS AND HIGH-CLASS DECORATORS, TOTTENHAM COURT ROAD, LONDON.



THE fourteenth annual dinner of the Sanitary Inspectors' Association took place on the 6th inst. at the Holborn Restaurant, under the presidency of Sir John Hutton, L.C.C., president of the Association.

The new St. Alban's Church at Vron, in the parish of Brymbo, near Wrexham, was dedicated on the 8th inst. The church has been erected on land given by the Vron Colliery Company, and the cost has been about 1,000*l.*, and there is seating accommodation for 240.

THE District Council of Walthamstow have appointed Mr. J. Williams Dunford, M.S.A., F.I.Inst., of 100c Queen Victoria Street, their architect for the public baths. Mr. Dunford's designs were placed first in a limited competition by the Council's assessor, Mr. Rowland Plumbe, F.R.I.B.A.

AN interesting ceremony took place at the Vatican on Monday, the 8th inst., when the restored Borgia apartments, composed of six magnificent rooms painted by Pinturicchio, were opened. The Pope and his court, the cardinals and the diplomatic body were present. The frescoes were white-washed over under Pius VI. at the end of the eighteenth century. The restoration both of the pictures and of the majolica pavement is considered a triumph of modern art.

A HANDSOME and costly reredos has just been placed in the lady chapel in the church of St. Michael's, Headingley, Leeds. It is a triptych, and the central panel represents the Resurrection, the two smaller panels the Blessed Virgin and St. Mary Magdalene on one side and St. Peter and St. John on the other. The base is ornamented with angels and emblems of the Passion. The reredos is a great addition to an already magnificent church, which is said to have cost about 24,000*l.*, inclusive of special gifts.

### ST. MARYLEBONE NEW BATHS AND WASHHOUSES.

THE Marylebone Road presented a festive appearance on Saturday afternoon last on the occasion of the visit of the Duke and Duchess of York to formally open the handsome and admirably-appointed new baths and washhouses which have arisen on the site of the old baths which were erected in 1848, when the surroundings were of a thoroughly rural description such as it is difficult to imagine at the present day.

The old establishment having been in work for nearly fifty years, and having become by constant use and hard wear too dilapidated for further restoration, was demolished. It is interesting to note that during the period mentioned 7,655,694 bathers visited the institution, the largest number in one week being 12,000, and the largest number in one day 3,429. The number of poor women who used the washhouses during the time was 1,281,295. The cost for water was 17,817*l.*, and the quantity consumed *one thousand millions of gallons.*

In 1895, as the result of a competition in which upwards of thirty leading architects took part, Mr. A. Saxon Snell, F.R.I.B.A., was appointed architect of the new buildings, which comprise 4 swimming and 101 warm baths, a public washhouse and laundry to accommodate 74 women, establishment laundry, boiler-house, engine-room, administrative offices, waiting-rooms and superintendent's apartments.

The first-class swimming-bath, which was erected from the designs and under the superintendence of the same architect more than twenty years ago, was found to be in such good condition that the Commissioners decided only to lengthen and re-decorate it, and add a gallery and other small improvements. It is a handsome and lofty hall, well lighted by a wide lantern the whole length of the roof, and is known as the Pompeian Bath. The recesses formed by the arcading of the sides contain 42 dressing-boxes, with galleries over, and large galleries at either end afford capital accommodation for witnessing sports and matches. This bath is 100 feet in length, 6 feet 6 inches in depth at one end and 4 feet at the other, and it holds 83,000 gallons. There are lavatories and shower baths in addition, and a spacious club-room at one end is specially adapted for the use of public school, regimental and other swimming clubs. In the winter the bath will be covered with a substantial flooring and converted into a public gymnasium. It is approached by a wide corridor from Marylebone Road, and has an entrance from Seymour Place.

The second-class bath has a water area of 170 feet 6 inches by 25 feet, and the third-class bath 66 feet by 25 feet, with a depth in each case of 6 feet 6 inches at one end and 3 feet 6 inches at the other. The walls of the baths are lined with white glazed tiles, relieved with coloured bands, and the bottoms paved with white and blue glazed bricks. The surrounding walls of both bath-rooms are faced with white glazed bricks and brown glazed brick dado. The footways round each bath are paved with bright red tiles. There are provided in the

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second-class bath 56 dressing-boxes and club-room, and in the third-class 50 boxes.

The ladies' swimming-bath has a water area of 60 feet by 25 feet, with a capacity of 44,000 gallons. It is 6 feet in depth at one end and 3 feet 6 inches at the other. The floor and walls are lined with white glazed tiles, relieved with faience tiles and coloured borders and bands. The footways are paved with ornamental coloured tiles, with a wide marble margin.

The warm baths, which are situated on the first floor, comprise 21 first-class and 48 second-class gentlemen's baths and 10 first-class and 19 second-class ladies' baths. The compartments are arranged in blocks divided by tile-paved corridors, and each bath is enclosed by enamelled slate divisions 7 feet high, and has an area of at least 40 square feet. The enamelled slate in the first-class baths is provided by Messrs. E. C. Braby & Co., and in the second-class by Messrs. E. Matthews & Co., and Bingley, Son & Folliot. Each compartment has an enamelled porcelain bath with American whitewood top and enamelled slate riser, and fitted with Busby's latest pattern full-way gun-metal valves and waste. The rooms generally are amply lighted and ventilated by large and lofty lanterns. Hot and cold douches and warm showers are also fitted to every first-class, and a large number of the second-class, baths.

The vapour bathrooms (of which two are arranged for gentlemen and one for ladies) are provided with a complete vapour bath, and a combined shower, needle, spray and sitz bath. The floors are paved with tiles, and the walls lined with glazed tiles.

The public washhouse and laundry are contained in one large area, 76 feet long by 64 feet wide, sub-divided by two partitions into a washhouse, and drying, ironing and mangling-rooms.

The washhouse is arranged with six rows of separate washing compartments, numbering 74 in all. Each compartment contains two wash-tubs, with hot and cold water and steam supplies and the necessary pails, scrubbing-boards, &c. Centrally situated are a set of four steam-driven centrifugal wringing machines, and the high rate of speed attained (1,200 revolutions per minute) insures effectual wringing of each load in three minutes. The drying-room is fitted with two large hot chambers and 74 separate drying-horses. They are heated by flues from two large coke furnaces in the basement, over which air is driven by means of a large blast fan. The ironing-room contains two steam-driven mangles, large ironing tables, two radial drying horses and two gas-heated ironing stoves. The

washhouse is lighted by a large lantern-roof, and the ironing-room by side windows, while special care has been taken as to the ventilation.

The boiler-house and engine-room are in the basement. The former is fitted with three large double-flued Galloway's patent boilers, each 30 feet long by 7 feet 6 inches in diameter, and having a capacity of 5,000 gallons of water. They are capable of working at a continuous pressure of 100 lbs. to the square inch, and are so connected that they can be used together or independently, either for steam generation or hot-water circulation. The engine-room contains two 12-horse power coupled engines, manufactured by Messrs. Marshall, of Gainsborough. Feed pumps of Picking & Hopkins's manufacture are provided in duplicate.

The whole of the hot and cold water, steam and waste pipes in the building are open to view, the large pipes having flanged joints for facility of examination or renewal. All the hot water and steam pipes are covered with asbestos. Storage is provided for 100 tons of fuel in close proximity to the boilers, and furnaces and a system of tram lines and turn-tables provides for a speedy distribution of the fuel.

A large tank containing 30,000 gallons of water is placed in the centre of the building, all parts of which are supplied therefrom. The swimming-baths, however, have separate connections to the water company's mains. Special attention has been given to the drainage, which is of the latest description; a separate deep-level iron drain is provided from all the swimming baths. The administrative block, which faces the Marylebone Road, is three storeys in height above the basement, and contains on the ground-floor a double entrance for gentlemen in the centre, a separate entrance for ladies and a private entrance. Between the entrances are two handsome and commodious waiting-halls, "first-class gentlemen's" and "first-class ladies" respectively. The main entrance leads into a lofty hall, with a central pay-office, giving access to all the gentlemen's swimming and warm baths.

The first floor contains the board room and superintendent's office, and the top floor the private apartments. The whole of the building has been designed with the special view of easy and economical supervision and ready access to all parts, and is furnished with electrical and telephonic communication from every department to the chief office.

The lighting throughout is by electricity, supplied through meters from the mains of the Metropolitan Supply Company.

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building, no less than in its substantial construction, the building is worthy of the parish of St. Marylebone. The front of the building is faced with Portland stone up to the first floor level, and above that with red bricks relieved with Portland stone dressings. The forecourt is paved with bright tile footways, and is surrounded with red brick and stone walls and piers. The railings and gate in front and dividing the entrances are of wrought iron. The lamps on the piers are constructed with wrought-iron scrolls and copper frames, glazed with bevelled plate-glass, made to the architect's designs.

The screen and central pay office in the entrance hall are constructed in polished mahogany. The mosaic floor was laid by Messrs. Minton & Co., of 50 Conduit Street, Regent Street, W., who also executed the whole of the tile pavings and wall linings, including the swimming-baths and the hand-painted panels, and of the first-class (Pompeian) bath.

The painting of the large iron water tank, the boilers, the walls and divisions of the washing-boxes, the fronts and runners of the drying-horses and the fronts of the dressing-boxes in the Pompeian bath has been executed by Messrs. Rhus & Co., Limited, of 149 Fenchurch Street, and High Wycombe, with their patent Japanese lacquer, for which it is claimed that it withstands the weather and atmospheric influences four times as long as any ordinary paint, which is a great desideratum where work is situated in places difficult of access, such, for instance, as the great tank in question. It is also impervious to the effects of heat or acids, and as a matter of fact, in the washing-boxes, where it has been subjected to the constant splashing of soap and soda since the informal opening of the washhouses some three months since, is as fresh as when first applied. For interior work, in addition to its inherent gloss, which is a high one, it is susceptible of hand-polishing, which gives it all the brilliancy which is found in goods of Japanese manufacture.

The entire cost of the building is 50,000/. The contractor for its erection is Mr. Charles Wall, of Chelsea. The engineering work has been executed by Messrs. J. & F. May, and the electrical works by Mr. L. Alwyn. The whole has been carefully supervised by Mr. F. W. Lee, the clerk of works. Quantities and measurements by Messrs. Northcroft, Son & Neighbour.

All the swimming baths are emptied every night during the summer months and refilled in the early morning, about 250,000 gallons of water passing from the baths daily, to the benefit of the sewers in the vicinity.

### ALHAMBRA THEATRE.

A LARGE and appreciative company was invited by the directors of the Alhambra on Tuesday afternoon to inspect their new entrance in Charing Cross Road. The old entrance to the best parts of the house left much to desire, both as regards appearance and convenience, but the new one, which was first thrown open to the public on Wednesday evening, is a superb piece of Moorish work, correct in design and admirable in colour, and should alone be sufficient to attract all lovers of the beautiful.

The circular vestibule panellings have been treated with Pavonazza, Devonshire and other marbles, and the slender columns in Sicilian, the whole treated in florid Turkish and Cairene styles, the ceiling decorations being identical with a treatment of one of the saloons in the Viceroy's Palace at Cairo. The newels and banisters to staircases have been especially designed by the architect in the same character.

The fibrous plaster friezes, reliefs and panellings have been specially modelled from originals in the Alcazar and Alhambra palaces of Seville and Granada. On either side of the arches are stalactite pendentives adapted from Moorish designs. A handsome shelter has been erected in front of the new vestibule entrance, the columns and caps of which have been adapted from the Hall of Justice in the famous Alhambra, Granada, reproduced by Messrs. Hart, Son & Peard, of Drury Lane. The doors of the grand entrance, including corridor, vestibule, scene dock and residence, are reproductions of an old Moorish carved work. The walls of the grand entrance corridor have been treated in exceptional richness, and the handsome tiles which have been adopted in great variety are identical with those at present being used for the renovation of the Alhambra and Alcazar Spanish palaces, and were specially selected by Mr. Alfred Moul during a visit to Spain in the early part of last year. The tiles are the manufacture of the famous Spanish artist potter, Mensaque, entrusted by the Spanish Government with the renovations of their historic and magnificent palaces.

The treatment of the new subway constructed for the convenience of the public for passage from the corridor to the north side of the auditorium for all reserved stalls and private boxes, is especially striking, the bold relief in fibrous plasters being an exact copy of one of the finest friezes of the Granada Alhambra. The whole of the decoration of the subway is a faithful reproduction of sections of the Granada Alhambra decoration. The effect of all this beautiful work,



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when illuminated by electric light, is brilliant in the extreme, and at the same time exceptionally refined and elegant.

The entire work has been designed and its execution superintended by the Alhambra Company's architect, Mr. W. M. Bruton, of Trafalgar House, Green Street, Trafalgar Square, the contractor being Mr. H. L. Holloway, of Deptford (Mr. Weymouth, chief foreman); the decorations of the vestibule and corridor by Messrs. S. & S. Dunn, of Brewer Street (Mr. Walters, chief foreman); the special stencilling and decorations of subway by Mr. Watson, of Kingston; electric lighting by Messrs. F. W. Henton & Co., and the heating by Messrs. Berry & Co.

The directors took the opportunity to introduce their latest "find" in the person of Signor Leopoldi Fregoli, whose entertainment should draw all London for a long time to come. He possesses all the essentials of a first-class draw, being comely, young, and artistically as well as mechanically clever, and the possessor of a fine voice, his entertainment is a revelation to the present generation at least. The feature of his "show" is the marvellous rapidity with which he changes his dress and appearance. His repertoire, too, is of the most extensive description. The pieces he selected on Tuesday afternoon were "The Impossible Duet," in which he represents a male and a female character; "The Singing Lesson," in which he is at once the professor and the pupil; "Relampago," in which he impersonates seven characters, and "The Medallion," in which he appears in no less than fifteen parts, sings, dances, &c., making his changes with a rapidity which is simply incredible. With the combined attractions of the new entrance and Fregoli the Alhambra shareholders should be in for a "good time."

### THE ELECTRIC CURRENT.

In his lecture at Carpenters' Hall on the 3rd inst., Professor J. A. Fleming, D.Sc., gave an outline of the development of electricity during the present century. Volta in 1800 presented his discovery rather as a curiosity than as anything likely to be the first step in a wonderful series of discoveries and inventions which has produced such marvellous results. In every large town the electric current is being conducted like water or gas by means of copper bands, finding employment for thousands of workers and for millions of capital, and, in addition, crosses in every direction, not only the land, but the great ocean beds, just as the nerve fibres bind the living body.

Experiments demonstrating the various effects produced by two metals in the voltaic cell, the evolution of heat, the induction of magnetic influence and the deflection of a magnetic needle coming within the field of this influence, which forms the basis of all telegraphic work, were effectively made. An electric current passing along a wire deflects a magnetic needle at right angles to its normal position; if the current is reversed the needle is deflected in the opposite direction. Just as in flag signalling, the waving of a flag to left or right a varying number of times is made to form an alphabet, so by a series of long and short deflections, technically the "dot and dash" system, the telegraphic alphabet is formed, and is read by the skilled operator with all the ease that a musician reads music. For the purpose of ocean telegraphy very delicate signalling apparatus was necessary. Sir W. Thomson invented a "mirror galvanometer," in which a very light mirror delicately poised is arranged to reflect the rays of a lamp on to a scale in such a way that the movement of a spot of light indicates the slightest movement of the mirror and the extent of each movement. This has been to a great extent superseded by the "syphon recorder" of the same inventor. Attached to a sensitive galvanometer by a silk fibre is suspended a fine syphon of glass, one end of which dips into an ink vessel, and the other records on a roll of paper, moving automatically, the deflections of the needle. A magnified copy of a message recorded in this way, with the series of long and short waves, drew forth the comment that it was not worse than the handwriting of many people.

Demonstrations of the electrolytic action of the electric current were also given, the decomposition of water and of chemical salts, and the electro deposition of metals, as used in electro-plating or in forming meters for measuring the amount of current passing. Investigation showed that the magnetic influence flowed round a wire while current was passing in a series of circular waves, which, first known as the magnetic circle, is now generally styled the magnetic field. The production of electro-magnets—that is, the magnetisation of metal by means of electricity—was found to be best effected by means of a spiral wire passing round the bar of metal. At first the spiral wire only enclosed the bar once, but Professor Joseph Henry, in America, by covering wire with silk, produced much stronger results by passing the wire so insulated a great number of times round the metal. In the case of steel very powerful magnets were obtained, but soft iron only remains magnetic while the current continues to flow.



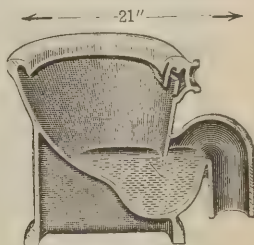
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Some local authorities who are conducting their own electrical supply are in a flourishing condition, notably Edinburgh and Brighton, where the profits are being utilised in reducing the rates. Energy is uncreateable; the dynamo is only a transformer of energy. At Niagara, after employing 1,000 men for three years in tunnelling the rock, we have turbines conveying power to the house 150 feet above, where dynamos, on same principle as that of Faraday's, collect and transform the power of Niagara into electrical energy, and transmit it for use at Buffalo, eighteen miles away. The amount of water taken is so small as to have made no apparent diminution; it may rather prolong the life of the falls by lessening the amount of erosion. At Rome the engineers have taken the water from the falls of Tivoli without diminishing their æsthetic value. The water is led to the turbines by hydraulic fall pipes 6 feet in diameter, which are connected to dynamos in the powerhouse developing over 2,000 horse-power. The water is then returned to the lower fall, which is not in any way affected. Nine miles across the Campagna, and nine miles from Rome, is an observation half-way house; and just outside Rome is the transforming station, where it is lowered down to be distributed throughout Rome.

Electro-metallurgy and electro-chemistry are not receiving the encouragement or appreciation they deserve from our manufacturers. Extensive businesses are carried on without a single specialist or scientific man on the staff, where in a similar establishment in Germany we should find not one but several.

The Right Hon. Lord Reay, who presided, in proposing a vote of thanks to Dr. Fleming, mentioned a case that came under his notice while he was Governor of Bombay. A gentle-

man proposed to establish at his own cost technical schools, not from any philanthropic motives, but in order to use India to create a market for a material which he was manufacturing cheaply in Germany. The dependence of trade upon applied science is very great, and every effort should be made by Government and public to facilitate the labours of those who devote themselves to scientific research.

The vote of thanks was cordially carried, as was also a vote of thanks to the chairman, Lord Reay, which was moved by Professor Banister Fletcher.

### ADMIRALTY CONTRACTS.

ACCORDING to the statement presented to the House of Commons by the First Lord of the Admiralty, the new electric shop at Portsmouth will be completed during the year. Work on the two new jetties is nearly finished, and the new boiler shop has been commenced. At Devonport, the enlargement of No. 2 dock and the extension of No. 1 jetty with foundations for 100-ton shears have been begun.

On the “Admiralty Mole” extension, Gibraltar, a length of 860 feet has been brought up to low-water level, and 116 feet more to 10 feet below low-water level. The rubble mound forming the base of the detached mole is in progress, and about 206,000 tons of stone have been deposited on the site. Two dredgers are at work deepening the harbour.

The railways and incline at Portland from the quarry have been relaid, and the new shipping jetty is completed. The construction of the new breakwater between the dolphins has been begun.

The survey and plans have been completed of Dover harbour, and are now under consideration by an inter-departmental committee, composed of representatives of the Admiralty, the War Office and the Board of Trade.

The work provided for under the loan at Chatham has been completed.

At Portsmouth the dredging of the bar is finished. The rest of the work is being proceeded with.

Good progress has been made at Devonport.

The contractor for the Keyham Dockyard extension is making satisfactory progress.

The two new Portsmouth docks have been completed and are in use. The railways and approaches will be finished as soon as the ground has sufficiently consolidated.

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The site of the new Gibraltar dockyard extension is being embanked and reclaimed. The excavation of the New Mole Parade is practically finished. The lengths of the docks are finally settled are:—No. 1 (double) dock, 850 feet; No. 2 dock, 550 feet; No. 3 dock, 450 feet. Owing to the length of time occupied in communicating with such a distant station as Hong Kong and to the necessary negotiations with other departments, it has not been found possible to commence the dockyard extension as yet, but it is hoped that plans will be shortly settled and the work will then be put in hand without delay.

The necessary land has been acquired for the Chatham Naval Barracks. The reconstruction of the Brennan Torpedo Factory, which occupies part of the site, is proceeding, and the new buildings will be begun early in the summer. The War Office are arranging for the transfer of the Anglesea Barracks at Portsmouth at an early date. Plans for the new naval barracks are under consideration.

The plans have been approved of Keyham Naval Barracks and tenders will shortly be invited.

Considerable difficulty was experienced in finding a suitable site for the Chatham Naval Hospital not too far removed from the naval establishments, but land has now been acquired, and plans for the hospital are being prepared.

The new buildings of the Walmer Marine Dépôt have been completed and handed over for occupation.

The new wing of Keyham Engineer Students' College will be completed about April next.

Much time was spent in an endeavour to arrange terms of purchase for the site selected for Dartmouth College by friendly negotiation with the representatives of the owners of the land, but unfortunately without success. Steps have now been taken to acquire the land under the provisions of the Naval Works Act of 1895.

The North Gorge Magazine at Gibraltar is nearly completed, and the new magazine at Corradino (Malta) is more than half finished.

Provision will be made in a Bill to be submitted to Parliament for the continuation of the unfinished works contained in the schedule of the Naval Works Act, 1896, and for certain new works which Parliament will be asked to sanction. The Bill will also include provision for the completion of the improvements to the dockyards at Pembroke and Haulbowline, which are already in progress.

## PROPOSED BY-LAWS ON HOUSE DRAINAGE.\*

(Concluded from last week.)

**By-law 5** prohibits right-angled junctions, and requires that a branch drain shall join another drain obliquely in the direction of the flow of such drain.

If the words "and as near as practicable to the invert thereof" were added, it would prohibit a branch drain being joined to another at or near the top of the drain, and the risk of solid matter being deposited on the invert or splashed on the sides of a drain would be avoided.

It is desirable, also, that the use of double Y junctions should be prohibited, on account of the tendency of a portion of the liquid and solid matter discharged by the branch drains to be washed up one or other of the branches, or up that part of the main drain immediately above the junction of the two branch drains.

**By-law 6** requires that the drains shall be ventilated in the manner generally adopted, viz. by two untrapped openings to the drain. One of the openings is to be near the surface of the ground and is to communicate with the drains by means of a suitable pipe, shaft or chamber; the other is to be obtained by carrying-up from a point in the drains, as far distant as practicable from the first opening, a pipe or shaft vertically to such a height and in such a position as to afford a safe outlet for foul air. The sectional area of every ventilating pipe or shaft is to be not less than that of the drain with which it communicates.

A soil pipe or the waste pipe from a slop sink may be used as the pipe or shaft which this by-law requires to be carried up from the drains provided its situation, sectional area, height and mode of construction are in accordance with the requirements applicable to the pipe or shaft to be carried up from the drains. Any such soil pipe or waste pipe which has an internal diameter of not less than 3½ inches, and which complies in all other respects with the requirements of the by-law as to the pipe or shaft to be provided for the ventilation of any drain shall be deemed to provide adequate ventilation for any drain having an internal diameter of not more than 4 inches.

It appears unnecessary to require, that where a person chooses to have a 6-inch drain to a house he should be

\* A paper read by Mr. J. P. Barber, C.E., before the Society of Engineers on March 1.

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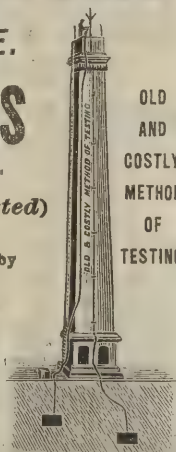
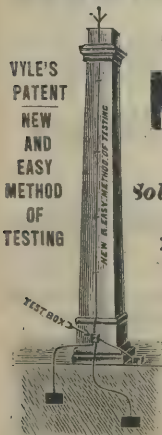
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required to fix ventilating pipes 6 inches in diameter, as one of 4 inches diameter would be sufficiently large to ventilate the drain.

In all cases it is prudent to place the ventilating opening which is to be near the level of the ground as far as practicable from any door, window or other opening to a building, as such ventilating openings, although commonly regarded as "fresh air inlets," are found to act at times as outlets for foul air. The proposed by-law does not recognise this, but it might be safer to make the necessary addition, which would direct attention to the matter, as the ventilating openings referred to are often placed near windows or doors, and though provided with valves for the purpose of preventing the outlet of foul air, the valves become defective, or are prevented from closing by the accumulation of dust or other substances which are blown into them.

It is the author's practice not to require the ventilating opening near the surface of the ground to be provided at a building where the drains can be satisfactorily ventilated by means of two soil pipes carried above the roof, and he considers that the by-laws should be altered in order to allow a similar practice and also to permit both the ventilating openings which the by-law requires to be provided to be furnished by pipes carried to such a height as will provide a safe outlet for foul air.

The material of which ventilating pipes are to be made is not specified. The by-law should contain provisions similar to those in by-law 8, and the suggested additions thereto relating to soil pipes and ventilating pipes.

The by-law should prohibit the connection of a rain-water pipe or a waste pipe from a lavatory, bath or sink, except a slop sink, to a ventilating pipe.

**By-law 7** is directed against the fixing of gullies inside a building in such a manner as to be connected to a drain communicating with a sewer.

There are cases in which this arrangement cannot be avoided, and it is, therefore, desirable that it should be allowed, subject to the sanction of the local authority.

The by-law further provides for the trapping of waste pipes from baths, lavatories and sinks. The traps are to be ventilated into the open air whenever necessary for the preservation of the seal of such traps. The waste pipes are to be taken through an external wall, and are to discharge in the open air over a trapped gully or into such a gully above the level of the water in the trap.

Waste pipes from baths or lavatories should, with the

consent of the local authority, be allowed to discharge into the open heads of rain-water pipes as stated in connection with by-law 2.

The material of which waste pipes and traps are to be formed is not mentioned, nor is the method of jointing them specified. The author has seen houses in which waste pipes have been formed of zinc, the joints being made by pushing the end of one length of pipe into that of the adjoining length and smearing the junction with putty. Those whose ideas of sanitary work are so low will readily take advantage of the proposed by-law and provide waste pipes of a similar description unless the by-law is amended, and the material of which waste pipes and traps shall be formed is specified. The only materials which should be allowed for such pipes and traps are drawn lead, galvanised wrought-iron, stoneware or material equally suitable, and the joints should be respectively wiped soldered joints, screwed sockets or Portland cement. Another necessary addition to the by-laws is a provision that the traps referred to shall be provided with movable caps for the inspection and cleansing of the traps. The necessity for prescribing that waste pipes shall discharge over gullies or into gullies above the level of the water in the traps will be appreciated by those who have seen, as the author has, waste pipes discharging into eaves gutters and even upon zinc flats and roofs, which have thereby been covered with grease and filthy refuse, the smell from which has been most offensive and injurious to the occupants of the houses.

The by-law also requires that the overflow pipes from cisterns and from safes under baths or w.c.'s shall discharge into the open air.

The overflow pipes from lavatories or baths should be required to discharge into the waste pipes on that side of the trap which is nearer to the lavatory or bath. This provision has been omitted from the proposed by-law.

**By-law 8** relates to soil pipes and the materials of which they are to be formed, also to the method of connecting traps thereto and of connecting soil pipes and waste pipes to drains.

At new buildings soil pipes are required to be placed outside wherever practicable; a proviso not contained in the existing by-law of the Council, which requires that soil pipes to such buildings shall in all cases be placed outside. The proposed by-law, by requiring that soil pipes outside buildings shall be formed either of drawn lead or cast-iron, will prevent the use of zinc or stoneware for such soil pipes, such materials being allowed under the existing by-law in consequence of the Council

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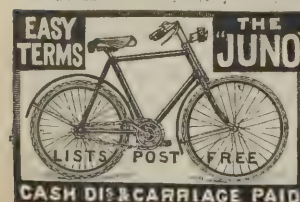
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having omitted to prescribe the material of which outside soil pipes shall be formed.

No soil pipe is to be less than  $3\frac{1}{2}$  inches diameter. The weights of lead and of iron soil pipes are specified, the former being equal in thickness to 8 lbs. lead. Cast-iron soil pipes  $3\frac{1}{2}$  inches and 4 inches diameter are to be not less than  $\frac{1}{4}$  inch thick, 5 inch and 6 inch must be not less than  $\frac{1}{8}$  inch thick. The sockets of cast-iron pipes must in no case be less than  $\frac{1}{8}$  inch thick.

It is important that cast-iron soil pipes should have a smooth interior, and that they should be protected from corrosion; and ventilating pipes through which no water is discharged need to be specially protected internally from corrosion, otherwise the bends connecting them to the drains become stopped by rust and the ventilation of the drains impeded. The by-law should therefore require that all cast-iron soil pipes and ventilating pipes shall be either galvanised or coated inside with Dr. Angus Smith's composition.

It is perhaps the experience of most engineers who have to deal with house drainage that a cast-iron soil or ventilating pipe perfectly constructed is difficult to obtain. Usually the spigot ends are ragged and weak, the bottoms of the sockets badly formed and sloped so that the spigots get little or no bearing upon them, and the width of the sockets insufficient, so that when the molten lead is run in it seldom fills the sockets, but forms a shallow band round the upper part only. With such pipes firm and sound work is impossible, and it appears to be necessary that the by-law should specify that cast-iron pipes used for soil or ventilating pipes shall be made with the spigot ends beaded, with the bottom part of the sockets at right angles to the axis of the pipes, and that the annular space for the lead with which the pipes are to be jointed should not be less than  $\frac{1}{8}$  inch wide.

The method of connecting lead or iron soil pipes with the traps of w.c.s and with drains is the same as the County Council's by-laws at present in force.

Whilst the subject of the connection of soil pipes and waste pipes to drains is dealt with in detail in the by-law, it might be still further extended so as to describe the construction of the pipe forming the connection between the soil or waste pipe and the drain. This usually consists of an ordinary bend which, unless encased in a block of concrete, is liable to slip, and the movement would destroy the joints at its upper and lower ends. Better and sounder work would result by the use of a bend with a flat foot or base attached.

In all cases where a "wiped or overcast joint" is referred to

the word "metallic" should be inserted, so that the by-law may read "wiped or overcast metallic joint."

The proposed by-law differs from that at present in force, by requiring that the open end of a soil pipe shall be carried to such a height as to afford a safe outlet for foul air, instead of to a point above the highest part of the roof of the building to which it is attached. An important omission from the by-law is the requirement that a wire guard should be provided for the protection of the open end of every soil pipe.

**By-law 9** provides for the ventilation of the traps of water-closets in order to prevent their being syphoned by the discharge from other water-closets connected with the same soil pipe. The ventilating pipe, provided for this purpose is to be formed of drawn lead, and with wiped joints if inside a building.

This pipe should in all cases be formed of drawn lead, and if it has an open end, a wire guard should be provided for its protection. The word "metallic" should be inserted between the words "wiped" and "joint."

**By-law 10** relates to the construction of slop sinks and the traps and waste pipes connected therewith.

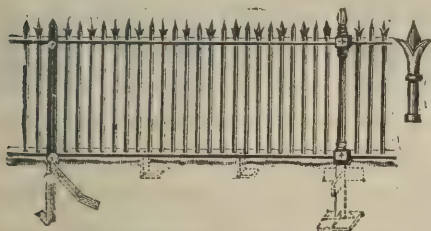
Similar provisions to those referred to in connection with cast-iron soil pipes under by-law 8 should be added to this by-law with respect to cast-iron waste pipes. A wire guard should be specified for the open end of every waste pipe.

**By-law 11** requires that the pipes, drains, traps and apparatus connected therewith at any building shall be maintained in a proper state of repair by the owner of such building.

**By-law 12** provides that any person offending against any of the foregoing by-laws shall be liable to a penalty of 2*l.* for every such offence, and in the case of a continuing offence to a further penalty of 20*s.* for each day after written notice of the offence from the vestry.

The last, **By-law 13**, is as follows:—"These by-laws shall, so far as practicable, apply to any person who shall construct any pipe or drain or other means of communication with sewers, or any trap or apparatus connected therewith so far as he shall effect any such works in any buildings erected before the confirmation of these by-laws, as if the same were being constructed in a building newly erected."

From this by-law it would appear that the by-laws will, as mentioned at the commencement of the paper, apply primarily to work at new buildings, and in the case of existing buildings only to new work thereat, and that the local authority will have no power to require that the repair or reconstruction of drains shall be carried out in accordance therewith. Section 202 of



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the Metropolis Management Act, 1855, under which the proposed by-laws are being made, does not limit the power of the Council to the making of by-laws for the purposes of regulating the construction of drains, &c., but included the "repairing of pipes, drains, &c." in the list of matters respecting which by-laws may be made.

It is, of course, important that the repair or reconstruction of drains, &c., at existing buildings should be properly carried out, especially as the necessity for the work generally arises from nuisance and illness caused by the defective condition of the drains and sanitary arrangements. Frequently the owner of the building, after the receipt of a notice from the local authority requiring the abatement of a nuisance, will have as little work carried out as possible, and where the whole of the drains need reconstructing to improved lines and levels he will do no more than relay them on the existing lines, and will then defy the local authority to compel him to do more so long as the nuisance is abated. Having regard to such cases, it seems desirable that the words "or repair" should be inserted after "construct" in the by-law if the Council is advised that it would not be contrary to the section under which the by-laws are made.

The following is a list of matters not dealt with in the proposed by-laws, and the necessity for by-laws relating to them will probably be self-evident.

1. The submission to the local authority of plans and sections of proposed drainage works.

2. The scales to which the plans and sections are to be drawn, and the particulars which are to be shown thereon.

3. Work not to be commenced until plans, &c., have been approved by local authority. Manner in which such approval is to be given.

4. Work to be carried out in accordance with approved plans, &c.

5. Time for completion of work

6. Work not to be covered until inspected and approved.

7. Notice to be given when work is completed and ready for inspection and testing.

8. Persons responsible for execution of work to fill drains with water in order that they may be tested by officials of local authority.

9. Work covered before being inspected and approved to be uncovered within forty-eight hours after notice so to do.

10. Time to be fixed during which work found contrary to by-laws is to be constructed so as to comply therewith.

11. Thickness of material for drains 9-inch and 12-inch diameter.

12. Materials of which gullies are to be made. Covers to gullies. Method of fixing gullies.

13. Surfaces adjoining gullies to be formed so as to prevent overflow of liquid discharged on grating, and to be paved with impervious paving where necessary.

14. The construction of urinals, and the traps, pipes and flushing arrangements connected therewith.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

4681. William Henry Prestwich, for "An improved door-spring."

4719. John Baxter Corrie, for "Improvements in pipe joints."

4740. John Cryer, for "Improvements in flushing apparatus for waste or slop water-closets."

4745. James Zeare, for "Improvements in ventilators."

4797. David Younger Annan, for "Improvements in and relating to windows and their frames."

4838. George Louis Vogel, for "Improvements in shutter-fasteners."

4854. Fritz Eisenbeis, for "Improvements in ventilators."

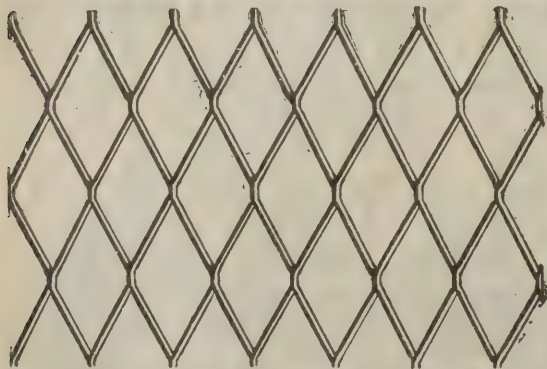
4909. Henry William Stones and Frederick Higgs, for "Improved construction of lock-up houses or sheds for cycles."

4913. Thomas Henry Sullivan, for "Improvements in ladders."

4920. Basil Edgar Bailly, for "Improvements in tiles for kiln floors."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 73 Chancery Lane, London, W.C.

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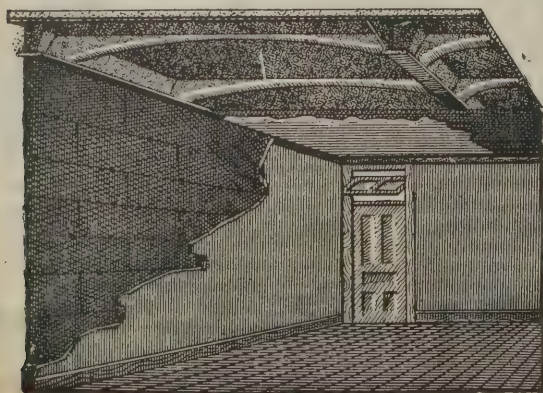
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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

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*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

ABERBEEG.—For building offices and stores, and rebuilding hotel. Messrs. Swash & Bain, architects, 3 Friar's Chambers, Newport, Mon.

ABERDARE.—March 31.—For supplying and erecting lattice girder footbridge. Mr. Wm. Fox, 5 Victoria Street, Westminster, S.W.

ALFORD.—March 27.—For erection of an epidemic hospital. Messrs. James Duncan & Son, architects, Turriff.

ANDOVER.—March 24.—For providing and laying 3-inch water-main and fittings. Mr. A. Purkess, Town Hall, Andover.

ARGYLLSHIRE.—March 20.—For erection of three cottages at Gigha. Mr. Hugh Douglas, Gigha, Argyllshire.

ASHTON-UNDER-LYNE.—For building stores. Mr. Thomas D. Lindley, architect, 150A Stamford Street, Ashton-under-Lyne.

AYLESBURY.—April 1.—For making roads. Mr. J. H. Bradford, 2 Rickford's Hill, Aylesbury.

BANFF.—March 26.—For work in building police station. Mr. F. D. Robertson, architect, 92 Mid Street, Keith.

BARDON.—April 2.—For main drainage works. Mr. J. B. Everard, 6 Millstone Lane, Leicester.

BARNET.—March 24.—For erection of foreman's cottage, fire-engine house, stable, boundary walls and gates, Tapster Street. Mr. H. W. Poole, clerk, Barnet.

BATLEY.—March 26.—For building ten scullery houses. Mr. James B. Buckley, architect, Batley.

BATLEY.—April 5.—For making-up roads. Mr. O. J. Kirby, Market Place, Batley.

BECKENHAM.—March 29.—For supply of broken granite. Mr. John A. Angel, Urban District Council Offices, Beckenham.

BELFAST.—March 20.—For erection of a masonic hall on Crumlin Road. Mr. J. H. Gault, 5 Agnes Street.

BELFAST.—For building West Belfast Orange Hall and caretaker's residence. Mr. William Batt, architect, Garfield Chambers, Royal Avenue, Belfast.

BELPER.—March 31.—For erecting iron roofs, columns, gutters, &c. Mr. Maurice Hunter, Bridge Street, Belper.

BIRKENHEAD.—April 7.—For sinking bore-hole. Mr. George Miller, 9 Hamilton Square, Birkenhead.

BISHOP AUCKLAND.—April 1.—For erecting movable partitions in school. Mr. S. Adams, School Board Offices, Tudhoe, Bishop Auckland.

BLACKBURN.—March 24.—For erecting iron railing. Mr. James Aspinall, architect, Victoria Street, Blackburn.

BLACKPOOL.—March 22.—For erection of cemetery registrar's house on the southerly side of new road, opposite the cemetery. Mr. T. Loftos, town clerk.

BLARNEY.—March 25.—For building schools. Rev. D. Lynch, Blarney, Ireland.

BRANDON.—For alterations and additions to Board schools. Messrs. E. Boardman & Son, Queen Street, Norwich.

BRISTOL.—April 7.—For erecting condensing plant for the electrical committee. Mr. H. Faraday Proctor, Temple Back, Bristol.

BURNLEY.—March 29.—For constructing iron pipe sewer. Mr. G. H. Pickles, borough surveyor, Burnley.

BURY.—For building church. Mr. J. D. Mould, architect, Silver Street Chambers, Bury.

BUSHMILLS.—April 10.—For enlarging church. Mr. David Douglas, Bushmills, Ireland.

CARDIFF.—March 22.—For conversion of dwelling-house property into shops in Cowbridge Road. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CARLISLE.—For alterations and additions to school and master's house. Mr. Joseph Graham, architect, Bank Street, Carlisle.

CARK-IN-CARTMEL.—March 30.—For building church. Messrs. Austin & Paley, architects, Lancaster.

CASTLEFORD.—March 24.—For building dwelling-houses. Mr. Arthur Hartley, architect, Carlton Chambers, Castleford.

CHATHAM.—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

CHATHAM.—March 27.—For making roads and drainage works. Mr. J. W. Nash, High Street, Medway Terrace, Rochester.

CLACTON-ON-SEA.—For building three houses. Mr. T. H. Baker, architect, Town Hall, Clacton-on-Sea.

CLAYTON-LE-MOORS.—March 27.—For supplying road materials. Mr. A. Dodgson, surveyor, Clayton-le-Moors.

CLEISH.—March 27.—For alterations and additions to church. Messrs. Hardy & Wight, architects, 74 George Street, Edinburgh.

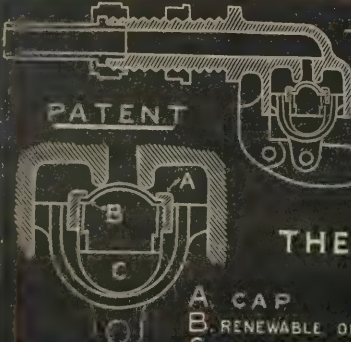
COCKFIELD.—March 27.—For additions to schools. Mr. Weedop, National School, Cockfield, Durham.

COLCHESTER.—March 24.—For erecting entrance-gates, &c. Mr. H. Goodyear, borough surveyor, Colchester.

CONSETT.—March 30.—For building eight dwelling-houses. The Consett Industrial and Provident Society, Limited, Gibson Street, Consett, Durham.

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**CORK.**—March 29.—For supplying and delivering cast-iron pipes and special castings. Mr. H. A. Cutler, Municipal Buildings, Cork.

**DOVER.**—March 30.—For building car-shed. Mr. H. E. Stilgoe, Town Hall, Dover.

**DRIGHLINGTON.**—March 31.—For building schools. Mr. W. Hanstock, architect, Branch Road, Batley.

**DULLERTON.**—March 27.—For building gate lodge. Mr. W. E. Pinkerton, architect, 8 Diamond, Derry.

**EDINBURGH.**—April 3.—For constructing reservoir. Mr. James Wilson, 72A George Street, Edinburgh.

**EPSOM.**—March 30.—For building laundry and engine-house. Mr. H. D. Searles Wood, architect, 157 Wool Exchange, London.

**FEATHERSTONE.**—March 25.—For erection of assembly-rooms, market hall and club. Messrs. Garside & Keyworth, architects, Pontefract.

**FLEET.**—March 27.—For restoration of roof of nave and north and south aisle roofs of Fleet Church. Mr. W. M. Fawcett, architect, 1 Silver Street, Cambridge.

**FOCHRIW.**—March 31.—For building dwelling-house. Mr. Lewis Evans, Penybank, Fochriw, Wales.

**GLOUCESTER.**—March 25.—For erection of three show-rooms, with a retaining wall and wrought-iron palisading, and for erection of the walls of the proposed bull ring in Market Parade, and wrought-iron palisading. Mr. R. Read, city surveyor, Guildhall, Gloucester.

**GLOUCESTER.**—March 27.—For laying sewers. Mr. J. F. Trew, County Chambers, Gloucester.

**HALIFAX.**—March 20.—For erection of a warehouse, with stabling, &c., in Union Street South. Mr. Arthur George Dalzell, architect and surveyor, 15 Commercial Street, Halifax.

**HALIFAX.**—March 24.—For additions and extensions at Washer Lane dyeworks. Messrs. R. & R. E. Horsfall, architects, 15 George Street, Halifax.

**HARROGATE.**—March 31.—For constructing pipe sewers. Messrs. Martin & Fenwick, 1 Park Place, Leeds.

**HOOLEY HILL.**—For completing six partially built cottages. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill, near Ashton-under-Lyne.

**HORNSEY.**—March 28.—For making-up and sewerage roads. Mr. E. J. Lovegrove, Southwood Lane, Highgate, N.

**HORNSEY.**—March 29.—For constructing stoneware pipe sewers. Mr. E. J. Lovegrove, Southwood Lane, Highgate, N.

**HOUNSLOW.**—April 5.—For making-up and sewerage roads. Mr. W. A. Davies, Town Hall, Hounslow.

**ILKESTON.**—For building bakery and warehouse. Secretary, Ilkeston Co-operative Society, Limited, 12 South Street, Ilkeston.

**IPSWICH.**—April 13.—For alterations and additions to Tower House, for the School Board. Mr. J. S. Corder, architect, Tower Street, Ipswich.

**IRELAND.**—March 27.—For building residence at Kinitty. Mr. James Kennedy, Parsonstown, Ireland.

**IRELAND.**—March 20.—For erection of a church at Cashilard. Mr. E. J. Toye, architect, Strand, Derry.

**IRELAND.**—March 20.—For erection of new bank at Portrush. Mr. Vincent Craig, architect, 5 Lombard Street, Belfast.

**IRELAND.**—For erection of a creamery building at Anna, near Lisnagry Station. Messrs. J. P. Evans & Co., 131 George Street, Limerick.

**IRTHLINGBOROUGH.**—For building villa residence. Mr. H. Adnitt, architect, High Street, Rushden.

**KENDAL.**—March 26.—For building dwelling-house, stable, sheds, &c. Mr. John Slacker, architect, Kendal.

**KILBURN.**—April 1.—For building greenhouse. Mr. Henry Cecil, Vestry Hall, Harrow Road, W.

**KING'S LYNN.**—March 20.—For alterations and repairs to the Prince of Wales Inn. Mr. George Thorpe, architect, Exchange Square, Wisbech.

**KING'S LYNN.**—April 5.—For constructing covered service reservoir. Mr. E. J. Silcock, borough engineer, King's Lynn.

**KINGSTON-UPON-THAMES.**—March 31.—For making roads. Mr. H. A. Winsor, Clattern House, Kingston-upon-Thames.

**KNOWLTON.**—March 27.—For rebuilding hop oast. Mr. W. J. Jennings, architect, St. Margaret's Street, Canterbury.

**LANGTOFT.**—March 20.—For restoration of the roof of north aisle of parish church. Mr. J. C. Traylen, diocesan surveyor.

**LAUNCESTON.**—March 31.—For building parsonage. Mr. Otho B. Peter, architect, Launceston.

**LEEDS.**—March 20.—For erection of purifier-house and eight purifiers at the Meadow Lane Gasworks. Mr. R. H. Townsley, general superintendent, Municipal Offices, Leeds.

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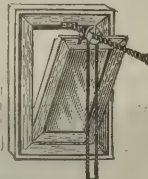
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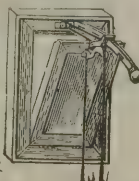
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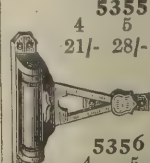
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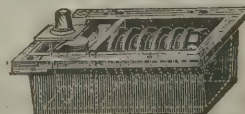
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LEEDS.—March 24.—For erection of a police station and branch free library at Upper Wortley. City engineer, Municipal Buildings.

LEEDS.—March 31.—For erecting stone abutments and wing walls for steel bridge. City Engineer, Leeds.

LEEDS.—March 31.—For building steel girder bridge. City Engineer, Town Hall, Leeds.

LERWICK.—April 14.—For constructing waterworks. Mr. A. Sanderson, 72A George Street, Edinburgh.

LIVERPOOL.—March 23.—For building storage accommodation. Mr. C. W. Bayley, Lancashire and Yorkshire Railway Co., Hunt's Bank, Manchester.

LONDON.—March 31.—For underpinning isolation ward. Metropolitan Asylums Board, Norfolk House, Norfolk Street, W.C.

LONDON.—For building two blocks of stabling. Mr. King, 10 Agar Street, W.C.

MANCHESTER.—March 22.—For construction of new steps from Store Street to Aqueduct Street, and the formation of a new gateway and roadway to works of yard in Aqueduct Street. The City Surveyor (Improvement and Buildings Departments), Town Hall.

MANSFIELD.—April 6.—For making-up streets. Mr. Frank Vallance, Mansfield, Notts.

MARSDEN.—March 25.—For alterations and additions to National Schools. Messrs. John Kirk & Sons, architects, Huddersfield.

MICKLETON.—March 26.—For rebuilding chapel. Rev. J. Forster, The Manse, Middleton-in-Teesdale, via Darlington.

MIDDLESBROUGH.—March 22.—For erection of an entrance lodge at the new cemetery, Linthorpe. Mr. Frank Baker, borough engineer, Municipal Buildings, Middlesbrough.

MILNROW.—March 31.—For sewage disposal works. Mr. James Diggle, 29 Alexandra Street, Heywood, Lancs.

MONTGOMERY.—March 31.—For erection of the Newtown county intermediate school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

NANTYMOEL.—March 29.—For building ten houses. Mr. John Owen, Ocean Colliery, Nantymoel, Wales.

NESTON.—For cutting trench and laying cast-iron pipes. Surveyor, Town Hall, Neston, Cheshire.

NEWTON ABBOT.—March 25.—For building house and shop and six cottages. Messrs. J. W. Rowell & Sons, architects, Newton Abbot.

NEWTOWN.—March 31.—For building school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

OLD HILL.—For painting and decorating Tabernacle. Mr. John Wills, architect, Victoria Chambers, Derby.

OLD TRAFFORD.—March 24.—For erection of buildings for refuse destructor and sanitary works. Mr. John Bowden, architect, 14 Ridgefield, Manchester.

OMAGH.—March 20.—For erection of labourers' cottages. Mr. William Cathcart, executive sanitary officer, Workhouse.

OVENDEN.—March 25.—For erection of pair of semi-detached dwelling-houses in Shay Road. Mr. Medley Hall, architect, 29 Northgate, Halifax.

PAISLEY.—March 27.—For building drill-hall. Mr. T. G. Abercrombie, architect, 13 Gilmour Street, Paisley.

PETERBOROUGH.—For building house. Mr. J. G. Stallebrass, architect, North Street, Peterborough.

PONTYPRIDD.—April 3.—For erection of school to accommodate 320 boys, 320 girls and 485 infants in the Llan Wood. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

PORTSMOUTH.—March 23.—For erection of a public elementary school in George Street, Buckland, to accommodate 1,284 children. Mr. G. C. Vernon-Inkpen, architect, 75 King's Road, Southsea.

RAMSBOTTOM.—March 24.—For paving streets. Mr. James Halliwell, Urban District Council Offices, Ramsbottom.

ROCHDALE.—For building eight houses in Nile Street. Mr. Norcliffe Mills, 67 London Street, Rochdale.

RUGBY.—March 26.—For additions to infirmary. Mr. T. W. Willard, architect, Rugby.

SANDBACH.—April 2.—For building shop. Mr. Alfred Price, architect, Elworth, Sandbach.

SELBY.—March 31.—For building engine-shed, coaling stage, &c. Mr. Wm. Bell, North-Eastern Railway Company, York.

SHEFFIELD.—March 31.—For erection of public baths at the corner of Sutherland Road. Mr. Charles F. Wike, City Surveyor, Town Hall, Sheffield.

SHEFFIELD.—March 27.—For erection of drapery establishment covering about three-quarters of an acre. Messrs.

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Flockton, Gibbs & Flockton, architects, 15 St. James Row, Sheffield.

SHEFFIELD.—April 3.—For erection of roof, principals, slate laths, and cast-iron guttering for retort-house at Grimesthorpe Station. Mr. Hanbury Thomas, Commercial Street, Sheffield.

SOUTHAMPTON.—April 13.—For constructing brick and concrete and stoneware pipe sewers. Mr. W. B. G. Bennett, Municipal Offices, Southampton.

SOUTH MOOR.—March 25.—For building lodge. Mr. James W. Thompson, architect, Newcastle-on-Tyne.

SPITAL.—March 31.—For building fifteen houses. Mr. John L. Miller, architect, 39 Hide Hill, Berwick-on-Tweed.

STAVERTON.—March 25.—For alterations and additions to school. Mr. C. G. S. Acock, architect, Totnes.

STRONTHIAN.—March 31.—For building cottage. Mr. Alex. Shairp, architect, Oban.

SWINTON.—March 24.—For alterations and additions to Board school. Mr. H. L. Tacon, 11 Westgate, Rotherham.

TOTTENHAM.—March 31.—For alterations and additions to public-house. Mr. V. P. Rawlings, architect, 19 Willoughby Road, Tottenham, N.

TUNBRIDGE WELLS.—March 30.—For laying stoneware pipe sewers. Mr. W. Harmer, 137 London Road, Southborough.

UPPERMILL.—March 27.—For masonry required in rebuilding bridge. Mr. Rowbotham, Urban District Council Offices, Uppermill.

WALES.—March 20.—For erection of a chapel and school-rooms, for the Sion Welsh Independent Church, Blaencaerau. Mr. Joseph Morris, Caerau Road, Blaencaerau.

WALSALL.—March 30.—For making road. Mr. J. R. Cooper, Borough Offices, Walsall.

WEST HAM.—April 13.—For building sewage pumping engine, boiler and electric lighting houses. Mr. F. E. Hilleary, Town Hall, West Ham, E.

WEST HARTLEPOOL.—April 2.—For building post office. Secretary, H.M. Office of Works, 12 Whitehall Place, London, S.W.

WHITFIELD BRIDGE.—March 31.—For masonry, &c., in widening bridge. County Surveyor, Moot Hall, Newcastle.

WINCHESTER.—March 25.—For painting Municipal Buildings. Mr. Walter Bailey, Guildhall, Winchester.

WINDSOR.—April 6.—For making-up roads. Borough Surveyor, Helena Road, Windsor.

WOKING.—April 22.—For constructing cast-iron, concrete and stoneware sewers. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, S.W.

WRANGLE.—March 26.—For building school. Mr. Alfred Rose, Wrangle Hall, Boston.

## TENDERS.

### ANDOVER.

For alterations to the Town Hall, for the Town Council.

Annett & Son	£245	0	0
F. Beale	215	0	0
H. Cook	197	0	0
S. BELL, London Street (accepted)	169	10	0

### ASHTON-UNDER-LYNE.

For building four cottages, shed and stable, for Mr. Earley.

J. Whitehead	£599	10	0
Hadfield Bros.	590	0	0
Greaves	575	0	0
J. Lord	540	0	0
J. Braithwaite	515	0	0

No tender accepted.

### BANGOR.

For alterations and additions to 322, 324, 326 and 328 High Street, Bangor, for Mr. J. E. Roberts. Mr. R. GLYNNE DAVIES, architect, 220 High Street, Bangor.

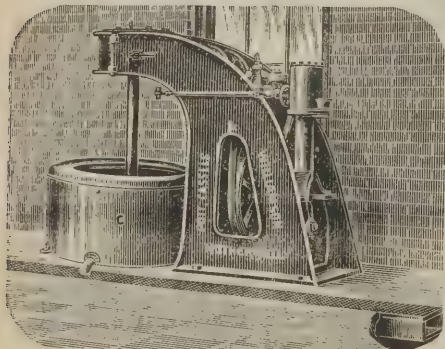
E. Williams	£1,060	0	0
Jones & Williams	893	0	0
W. Parry, jun.	880	0	0
R. & J. Williams	853	0	0
W. Jones	788	10	0
W. O. DANIEL, Upper Bangor (accepted)	750	0	0

### BATH.

For forming drying-grounds, &c., at the workhouse, for the Guardians.

E. STOCKMAN, Sladebrook (accepted)	£275	10	0
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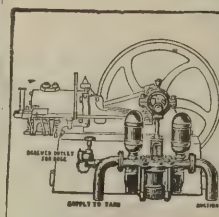
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For reconstructing bridge over Birches Brook, for the Belper and Chesterfield Rural District Councils. Messrs. R. C. CORDON, Duffield, and H. C. RANSLEY, Clay Cross, Chesterfield, surveyors.

J. Haynes	£120	0	0
A. Hingley	98	0	0
G. F. TOMLINSON, City Road, Derby (accepted)	93	15	0
Surveyor's estimate	90	0	0

**BISHOP AUCKLAND.**

For paving, &c., Back Surtees Streets (north and south) and Back Gibbon Street (west), Bishop Auckland, for the Bishop Auckland Urban District Council.

J. Manley	£700	0	0
G. H. Bell	407	0	0
N. WATSON, Bishop Auckland (accepted)	404	0	0

**BRIDLINGTON QUAY.**

For erecting landing-stage, for the Commissioners of Bridlington Piers and Harbour. Mr. J. EARNSHAW, architect, Carlton House, Bridlington Quay.

B. ROBINSON, Hull (accepted)	£139	10	0
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**BRISTOL.**

For restoring, partially rebuilding and making alterations and additions to Cotham Wesleyan Church, Redland Road, Bristol. Mr. ROBERT CURWEN, London, and Mr. HERBERT J. JONES, Bristol, architects.

Cowlin & Sons	£7,245	0	0
C. A. Hayes	6,850	0	0
Wilkins & Sons	6,690	0	0
STEPHENS, BASTOW & CO., LIMITED (accepted)	6,555	0	0
G. Humphreys	6,426	0	0

**BURNHAM-ON-CROUCH.**

For providing and laying about 250 yards of 3-inch, and about 440 yards of 2-inch iron water-mains on the Church Walk Estate, Burnham-on-Crouch, for the Maldon Rural District Council. Mr. N. G. KEYWOOD, surveyor, Maldon.

C. S. Mallett & Co.	£187	14	9
H. Roberts	176	6	4
F. W. Bateson	157	3	3
F. Bentham	139	0	0
H. Farrow	135	3	6
E. B. Trussell	132	4	6
A. M. COOK, Burnham-on-Crouch (accepted)	129	9	11

**BRYNMAWR.**

For new parish church, Brynmawr, Breconshire. Messrs. NICHOLSON & HARTREE, architects, Hereford.

**Whole Church.**

H. Smith	£3,989	10	6
J. Morgan	3,914	0	0
J. Jenkins	3,789	0	0
J. JENKINS, Brynmawr (modified and accepted)	3,094	0	0

**Nave Portion.**

Thomas & Sons	3,290	0	0
H. Smith	2,871	12	6
J. Morgan	2,828	16	0
J. Jenkins	2,753	0	0
J. Jenkins	2,228	0	0

**CHELMSFORD.**

For erection of new Wesleyan Chapel. Messrs. GORDON, LOWTHER & GUNTON, architects, Finsbury House, E.C.

Thomas Hunt, Ware	£7,768	0	0
Choat & Son, Chelmsford	7,021	0	0
Chessum & Sons, Haggerston	6,743	0	0
Kerridge & Shaw, Cambridge	6,740	0	0
Patman & Fotheringham, Islington	6,670	0	0
F. Johnson, Chelmsford	6,590	0	0
Henry Potter, Chelmsford	6,440	0	0
A. J. Bateman, Ramsey	6,324	0	0
J. Smith & Sons, Witham	6,280	0	0
Ernest West, Chelmsford	6,263	0	0
Wm. Saint, Cambridge	6,259	0	0
John Feast, Haddenham	5,898	0	0

**COLCHESTER.**

For building warehouse in Priory Street. Mr. WILLIAM C. STREET, architect, 7 Victoria Street, Westminster.

G. Dobson	£1,679	0	0
H. Everett & Son	1,568	0	0
W. CHAMBERS, Magdalen Street (accepted)	1,369	0	0

**CORK.**

For additions to Inchera, Dunkettle, Cork, for Mr. George Ievers. Mr. JAMES F. M'MULLEN, architect, 30 South Mall, Cork.

C. MULLANY, Lower Glanmire Road (accepted)	£1,050	0	0
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For erecting and completing a group of schools for boys, girls and infants, including cookery and laundry-rooms, play-sheds, water-closets and offices, boundary walls, asphaltting, &c., in Dering Place, South Croydon, for the Croydon School Board. Mr. ROBERT RIDGE, architect, 12 Katharine Street, Croydon. Quantities by Mr. MANSFIELD PRICE, Sutton, Surrey.

W. Smith & Sons	£8,750	0	0
J. Smith & Sons	8,650	0	0
S. Page	8,456	0	0
W. Holt & Sons	8,400	0	0
J. & C. Bowyer	7,900	0	0
E. P. Bulled & Co.	7,693	0	0
E. J. Saunders *	7,200	0	0

\* Accepted, subject to the approval of the Education Department.

For alterations and additions to Board schools, Sydenham Road, Croydon, including new cookery and laundry-rooms, emergency staircase, new water-closets and offices and playsheds, for the Croydon School Board. Mr. ROBERT RIDGE, architect, 12 Katharine Street, Croydon.

J. & C. Bowyer.	£1,344	0	0
W. Akers & Co.	1,292	0	0
W. Holt & Co.	1,275	0	0
J. Smith & Son.	1,212	0	0
H. Bacon.	1,197	0	0
E. P. Bulled & Co.	1,195	0	0
Umlandt & Nicoll *.	1,147	0	0

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CYMMER.

For erecting offices at Cymmer, R.S.O., for the Glyncorrwg Urban District Council. Messrs. LAMBERT & REES, architects, Bridgend.

J. Davies	£1,050	0	0
T. Roberts	896	15	0
E. Davies & Sons	895	0	0
Rattray & Jenkins	892	6	0
Rowland & Lloyd	890	0	0
D. LLOYD, Cymmer, R.S.O., Port Talbot (accepted)	890	0	0
Architect's estimate	893	15	0

DERBY.

For rebuilding branch post office and sorting office, Midland Road, Derby, for the Commissioners of H.M. Works and Public Buildings.

Walker & Slater	£6,900 0 0	A.
GROOM & CO., LIMITED (accepted)	6,020 0 0	£30 0 0
A. Old Materials.		20 0 0

FRIERN BARNET.

For making-up, &c., portions of Friern Barnet Road, Colney Hatch Lane, and Oakleigh Road South, for the Friern Barnet Urban District Council. Mr. E. J. REYNOLDS, surveyor.

W. Nicholls	£1,205	8	2
T. Adams	1,038	0	0
W. GRIFFITHS, Kingsland Road ( <i>accepted</i> )	883	11	2

GREAT CROSBY.

For works required in the widening and improvement of Liverpool Road from the end of College Road to Myer's Road—viz. (Contract No. 1) wooden railing, (No. 2) taking down and setting back wall, (No. 3) labour on street works—for the Urban District Council. Mr. WATKIN HALL, surveyor.

No. 1.			
D. Williams.	.	£43	10
J. F. Williams	.	38	10
T. Breckell	.	28	10
P. Lunt	.	26	15
B. McBRIEN, Great Crosby ( <i>accepted</i> )	.	24	8

<i>No. 2.</i>	
J. Sawyer . . . . .	139 0 0
T. Horrocks . . . . .	113 1 0
T. MULHOLLAND, Great Crosby ( <i>accepted</i> ) . . . . .	76 8 0

No. 3.		
T. Horrocks . . . . .	487	2
B. Balmer . . . . .	471	9
P. GILBERTSON, Great Crosby ( <i>accepted</i> ) . . . . .	418	5

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- Middle Left:** A large, ornate fireplace with a wide mantel and a central arched opening.
- Middle Right:** A staircase with a decorative railing and a central pillar.
- Below Middle Left:** A small, ornate fireplace with a decorative mantel and a central arched opening.
- Below Middle Right:** A decorative iron fence or gate with a central pillar.
- Bottom Left:** A small, ornate fireplace with a decorative mantel and a central arched opening.
- Bottom Middle:** A large, ornate fireplace with a wide mantel and a central arched opening.
- Bottom Right:** A decorative iron fence or gate with a central pillar.

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For erecting two dwelling-houses, Swallow Lane, Golcar. Mr. ARTHUR SHAW, architect, Golcar.

*Accepted tenders.*

J. Haigh & Sons, mason	£368	0	0
White & Brierly, carpenter and joiner	140	0	0
Allisons, Limited, plumber and glazier	80	5	0
D. Shaw, plastering and painting	50	0	0
Allisons, Limited, slating	33	15	0

**GUILDFORD.**

For forming, metalling, paving, kerbing and channelling Bedford Road, for the Town Council. Mr. C. G. MASON, borough surveyor.

Free & Sons	£342	10	0
G. A. Franks	288	0	0
STREETER BROS., Croydon and Godalming (accepted)	259	16	0

**HALIFAX.**

For constructing about 200 yards of 12-inch pipe sewer, for the Halifax Rural District Council. Mr. F. GORDON, engineer.

N. Culpan	£114	0	0
H. & W. Barraclough	103	0	0
T. Noble	100	0	0
Bower Bros.	96	0	0
T. Kitchin	95	0	0
J. Brook	92	0	0
S. Mann	89	0	0
J. BALMFORTH, Elland (accepted)	73	0	0

**HEREFORD.**

For erecting a hall, &c., for the parish of St. Peter, Hereford. Messrs. NICHOLSON & HARTREE, architects, Hereford.

E. W. Wilks	£1,347	0	0
W. P. Lewis & Co.	1,241	10	0
J. Davies	1,176	0	0
BEAVEN & HODGES, Hereford (accepted)	1,173	0	0

**HOVE.**

For roadmaking and other works in Ranelagh Villas, Shakespeare Street, and Sheridan Road, Hove. Mr. H. H. SCOTT, town surveyor.

*Accepted tenders.*

J. Parsons & Sons, Church Road—Ranelagh Villas, 445*l.*; Shakespeare Street, 167*l.*; Sheridan Road, 99*l.*

**HULL.**

For supply of about 181 lineal yards of 12-inch sanitary pipe drain, cast-iron pipes, tidal flap outlet, &c., at North Ferriby, for the Sculcoates Rural District Council. Mr. WILLIAM H. WELLSTED, engineer, Prince's Dock Chambers, Hull.

Fisher & Young	£174	13	8
J. Sangwin	138	10	0
A. H. ATKINSON, Hull (accepted)	135	11	0

**KINGSBURY.**

For fences, gates and retaining wall, Fairfields, Kingsbury, Middlesex. Mr. GEORGE HORNELOWER, architect, London.

THOMAS TURNER, LTD. (accepted)	£203	8	0
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**KINGSWEAR.**

For alterations and additions to Dart Bank, for Lieut. G. F. Whitmore, R.N. Mr. W. TAPPEL ALLEN, architect, London and Kingswear. Quantities by Mr. VINCENT CATERMOLE BROWN, of Paignton.

R. T. Pillar, Dartmouth	£800	0	0
E. P. Bovey, Torquay	690	0	0
E. Pike, Torquay	678	0	0
JOHN E. SHORT, Kingswear (accepted)	645	0	0
W. G. Row, Dartmouth	610	0	0
R. C. Pillar, Dartmouth	603	0	0

**LONDON.**

For alterations at the Duke of York public-house, Bow, London, E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.

G. E. Todd	£953	0	0
T. OSBORN & SONS (accepted)	911	0	0
S. Salt	852	0	0
J. T. Robey	845	0	0
W. Harper	839	0	0

**MOTHERWELL.**

For about 960 yards of 9-inch fireclay pipe-sewers in Orbiston Street, Glencairn Street and Thorn Street, for the Commissioners.

*Accepted tenders.*

*Orbiston Street sewer.*

P. McTaggart	£176	3	0
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*Glencairn Street sewer.*

P. McTaggart	119	13	11
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*Thorn Street sewer.*

D. McInnes	53	3	2
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# THE BATH STONE FIRMS, LTD.

TELEGRAMS,  
"OOLITE, LONDON."  
"OOLITE, BATH."

Head Offices: **BATH.**

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G.W.R. WESTBOURNE PARK, W.  
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INCORPORATING PIOTER & SONS, RANDELL, SAUNDERS & CO. Ltd., I. SUMSION, CORSHAM BATH STONE CO., Ltd.  
R. J. MARSH & CO. Ltd., S. R. NOBLE, STONE BROS., Ltd.



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CORSHAM DOWN.  
CORNGRIT.  
FARLEIGH DOWN.

*Fluate,*  
FOR HARDENING,  
WATERPROOFING & PRESERVING  
BUILDING MATERIALS.  
To be  
obtained only of  
The Bath Stone Firms, Ltd.

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WESTWOOD GROUND.



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One inch and  $\frac{1}{2}$ -inch thick.  
Immense Stock always ready for Laying.

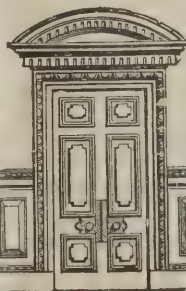
**ARTISTIC**



Turpin's Patent 5-16 inch thick.  
Laid in Patent Composition on Concrete,  
Stone, and Deal Floors. (See section.)



ESTABLISHED 28 YEARS



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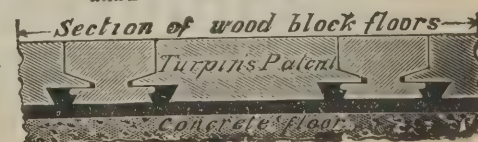
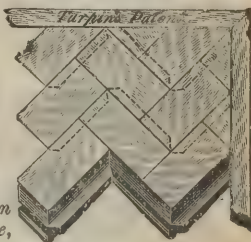
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## OAK BLOCK FLOORINGS

One inch thick, from 4/10 $\frac{1}{2}$  per yard super.  
Also in Pitch Pine, Teak, Deal, &c.

**JOINERY.**

**TURPIN'S  
PATENT  
INTER-  
LOCKING  
SYSTEM**  
for Laying  
Block Floors on  
Concrete, Stone,  
and Deal Floors



22  
QUEEN'S RD.,  
Bayswater,  
London.  
**TURPIN'S**  
Parquet Floor,  
Joinery and  
Wood Carving  
Co., Ltd.



**MOULTON.**

For erecting cookery-room at the Board schools, for the Moulton School Board. Mr. JOSEPH CAWLEY, architect, Northwich.

J. Wilson . . . . .	£244	0	0
A. Marsden & Son . . . . .	227	0	0
E. W. Bostock . . . . .	212	10	0
W. Carter . . . . .	205	15	0
S. Appleton . . . . .	205	0	0
H. Sargent . . . . .	205	0	0
J. RYLAND & SONS, Northwich (accepted) . . . . .	203	0	0

**MULLINGAR.**

For building a dispensary and doctor's residence, and also for erecting a skunce to enclose site, for the Guardians of Mullingar Union.

F. Darcy . . . . .	£1,320	0	0
SWEENEY & SON, Birr (accepted) . . . . .	1,240	0	0

**NEW MILLS.**

For sewer works, for the New Mills Urban District Council. Messrs. SPINKS & BEEVER, engineers, 9 Albert Square, Manchester.

L. & W. Meadows . . . . .	£8,699	0	0
B. Graham & Sons . . . . .	6,708	0	0
A. Brunton & Son . . . . .	6,687	11	0
W. Underwood & Bros. . . . .	6,329	0	0
E. Tempest . . . . .	6,218	8	2
A. Braithwaite & Co. . . . .	6,190	0	0
G. Freeman & Sons . . . . .	5,925	0	0
Etheridge & Clarke . . . . .	5,824	12	0
A. Taylor . . . . .	5,551	3	5
A. KELLETT, Manchester (accepted) . . . . .	5,544	0	0

**NEWTON ABBOT.**

For erecting two storage tanks and division tanks in cement concrete with water-main fittings, at the Newton Abbot workhouse grounds, for the Newton Board of Guardians and the Urban District Council. Mr. LEWIS STEVENS, surveyor.

F. A. Stacey . . . . .	£523	0	0
Mingo & Boone . . . . .	496	0	0
W. A. Goss . . . . .	490	0	0
C. H. DOBELL, Newton Abbot (accepted) . . . . .	470	0	0

**NEWTOWN.**

For two houses, Llanidloes Road, Newtown, Montgomeryshire (exclusive of fittings). Mr. GEORGE HORNBLOWER, architect, London.

J. W. SWAIN, Newtown (accepted) . . . . .	£1,209	0	0
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**NORTHOWRAM.**

For building two houses and shops, Town Gate, Northowram, near Halifax, for Messrs. Hinchcliffe and Hamsworth. Mr. JOSEPH F. WALSH, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

*Accepted tenders.*

E. Balmforth, Queensbury, mason.  
Sowood & Sykes, Northowram, joiner.  
F. Bates, Shelf, plumber.

Hinchcliffe & Hamsworth, Northowram, slater, plasterer and painter.

For erecting brewery, stabling, &c., at Windmill Hill, Northowram. Mr. JOSEPH F. WALSH, architect, Halifax.

*Accepted tenders.*

A. Ramsden, Ambler Thorn, mason and bricklayer.  
J. Booth, Hipperholme, carpenter and joiner.  
W. Travis, Hipperholme, plumber and glazier.  
G. Greenwood & Sons, Halifax, concreting and asphaltting.  
Rushworth & Firth, Halifax, slating and plastering.  
T. Tattersall & Son, Elland, iron and steel.

**NORTHWICH.**

For room, Blanket Loan Society, Northwich, for Mr. Henry Neumann. Mr. J. CAWLEY, architect, Northwich.

P. Taylor & Sons . . . . .	£440	0	0
W. Molyneux . . . . .	440	0	0
T. Leicester . . . . .	434	0	0
J. Ravenscroft . . . . .	420	0	0
Stelfox & Son . . . . .	419	0	0
E. W. Bostock . . . . .	405	0	0
J. Ryland & Son . . . . .	389	0	0

**NUNEATON.**

For widening bridge and approaches in New Bridge Street, for the Nuneaton and Chilvers Coton Urban District Council.

Mr. J. S. PICKERING, surveyor.			
J. WILSON, Nuneaton (accepted) . . . . .	£548	0	0

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## HIGH-CLASS PLUMBING.

**M**ESSRS. B. FINCH & CO., Ltd., 82 Belvedere Road, Lambeth, S.E., Manufacturing Sanitary Engineers, beg to remind Architects, Surveyors, and Builders that they undertake High-class Plumbing. They are prepared to Estimate on a schedule of prices, and they can refer the profession and others to large Plumbing Contracts recently executed by them both in London and the Provinces, amongst others to the Trocadero Restaurant, Piccadilly Circus. Messrs. FINCH & Co. have in their constant employ a large staff of registered plumbers. Architects and others can rely upon the work being executed with efficiency and despatch.

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Photographs taken and proofs delivered same day. 50,000 Architectural and Decorative Views. Price List and Catalogues Free.

**147 STRAND, LONDON, W.C.**



**OMAGH.**

For building a bridge across the River Strule, at Omagh, for the Grand Jury of County Tyrone.

J. NEILLY, Omagh (*accepted*) . . . . . £2,400 0 0

**PENZANCE.**

For paving work at the western promenade, for the Corporation.

J. RUNNALLS, Penzance (*accepted*) . . . . . £1,803 19 9

**PETERBOROUGH.**

For constructing new street, for Messrs. Keeble Bros. Mr. F. H. COOKE, surveyor. Quantities by the surveyor.

J. Guttridge . . . . . £685 0 0

J. W. Rowe . . . . . 460 12 0

D. Gray . . . . . 447 0 0

Hockley & Son . . . . . 400 0 0

**PLYMOUTH.**

For reconstructing sewer in Thistle Park Road, for the Corporation.

W. C. Shaddock . . . . . £1,467 0 0

A. N. Coles . . . . . 830 19 6

C. L. Duke . . . . . 774 1 6

T. SHADDOCK (*accepted*) . . . . . 756 13 6

**SHILLINGFORD HILL.**

For house at Shillingford Hill, Berkshire. Mr. GEORGE HORN-BLOWER, architect, London, W.

*First Contract.*

BRASHER & SONS, Wallingford (*accepted*) . . . . . £3,330 0 0

**SOUTHALL.**

For making-up, kerbing and paving Avenue Road (section 1), for the Southall-Norwood Urban District Council. Mr. HOWARD R. FELKIN, surveyor.

S. Hudson . . . . . £268 0 0

Free & Son . . . . . 265 0 0

W. BROWN, Southall (*accepted*) . . . . . 214 10 0

**SUTTON.**

For erecting three dwelling-houses at Sutton, co. Dublin. Messrs. A. SCOTT & SON, architects, 16 William Street, Drogheda.

P. Monks . . . . . £4,000 0 0

P. Hanway . . . . . 2,500 0 0

Scott & Co. . . . . 2,365 0 0

R. JOHNSON (*accepted*) . . . . . 2,150 0 0

**SOUTHEND-ON-SEA.**

For constructing winter garden on Southend Pier, for the Corporation. Messrs. THOMPSON & GREENHALGH, architects, Bank Chambers, Southend.

Duncan, Tucker & Co. . . . . £6,401 19 1

Davis & Lenev . . . . . 6,377 0 0

A. E. Symes . . . . . 6,323 10 0

Shelbourne & Co. . . . . 6,219 0 0

C. S. Mallett & Co. . . . . 5,655 14 6

E. West . . . . . 5,479 0 0

Dupont & Co.\* . . . . . 5,316 0 0

H. R. Rons . . . . . 5,185 8 0

\* Recommended for acceptance.

**SWANWICK.**

For erecting dwelling-house. Mr. R. ARGILE, architect, Ripley, Derby.

J. Roe & Sons . . . . . £373 10 0

H. Clark . . . . . 365 10 0

J. Earnshaw . . . . . 340 10 0

TAYLOR & PARKIN, Leabrooks, near Alfreton (*accepted*) . . . . . 297 0 0

**SWORDS.**

For dispensary, for the Balrothrey Board of Guardians. Messrs. A. SCOTT & SON, architects.

F. Gogarty . . . . . £555 0 0

T. Quinn . . . . . 495 0 0

J. REID, Garristown, co. Dublin (*accepted*) . . . . . 490 0 0

**TOTNES.**

For erecting new hospital, Totnes. Mr. W. M. TOLLIT, architect, Totnes.

T. Brook, Bridgetown\* . . . . . £1,786 0 0

\* Lowest tender, but not accepted owing to a change of site.

**UCKFIELD.**

For sewage-disposal works, for the Uckfield Urban District Council. Mr. G. MAXWELL LAWFORD, engineer, 13 Victoria Street, Westminster.

B. Cooke & Co. . . . . £691 0 0

J. Piper . . . . . 610 0 0

C. Pelham . . . . . 579 17 7

F. Brunton . . . . . 550 0 0

J. Jackson . . . . . 548 15 7

W. H. Holman . . . . . 522 3 6



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# MOSAICS,

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CHURCH  
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SCHOOL  
FURNITURE.

BRASS  
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TILES



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(FLOOR, WALL, AND ROOFING).  
Price Lists on Application.  
ARCHITECTS' OWN DESIGNS CARRIED OUT.  
Branch Offices, BELFAST, SWANSEA, WORCESTER, & DUBLIN.  
Agents for Wood Carving Co., Ltd., Birmingham.—Mouldings, Friezes, Panels, &c.  
Samples can be seen at Duff & Spagnoletti's London Showrooms.



## WATFORD.

For sewerage, levelling, paving, &c., Francis Road, for the Urban District Council. Mr. D. WATERHOUSE, engineer.

Siddons & Freeman	£399	7	6
Bracey & Clarke	337	0	0
G. R. Mann	350	0	0
F. DUPONT, Watford (accepted)	323	0	0

## WALSALL.

For constructing 633 yards of main sewer of 12-inch and 9-inch pipes in Mellish Road, with manholes, ventilators, &c., for the Corporation.

H. HOLLOWAY, Wolverhampton (accepted) £328 6 0

## TRADE NOTES.

FOR the ventilation of St. Paul's Street Schools, Aberdeen (Messrs. D. & J. R. M'Millan, architects, Aberdeen), Messrs. Cousland & Mackay's "Climax" patent direct-acting turret ventilators have been used and supplied from their works at Glasgow.

THE Wheatley Schools are being warmed and ventilated throughout by means of Shorland's patent Manchester grates, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

ON the 16th inst. the Tottenham District Council sought an injunction to restrain Messrs. Williamson & Sons, Limited, brickmakers and dust contractors at Tottenham, from using brickfields of which they are occupiers in such a way as to create a nuisance. After witnesses to the nuisance gave evidence the jury intimated that they did not want to hear any more evidence of that kind. The managing director of the defendant company denied that there was any nuisance caused by them. The jury sent a communication to Mr. Justice Hawkins saying they considered there was no evidence of an actionable nuisance. Counsel for the District Council said the case would go to the Court of Appeal. Judgment was entered for the defendants.

## THE BUILDING TRADES EXHIBITION AT THE AGRICULTURAL HALL.

THE long line of annual exhibitions devoted to the interests of the building trades having been interrupted last year, the show this year bears unmistakeable signs of benefit derived from the rest, and the old *locale*, the Royal Agricultural Hall at Islington, is packed from floor to ceiling with exhibits, which are for the most part excellent of their kind, and the greatest taste has been exercised in their advantageous display. The Lord Mayor and Sheriffs will formally open the exhibition to-morrow (Saturday) at noon, and the Architectural Association will visit it at three o'clock the same day. There will be handicraft competitions every evening. Next week visits will be paid by the Association of Municipal and County Engineers, the Institute of Clayworkers, and the Builders' Merchants' Association of London. On the 24th inst. a conference of painters and decorators will take place at the hall, and on the following Saturday the craftsmen will receive their prizes at the hands of Sir Arthur Arnold. Altogether this year's exhibition promises to be the most successful and attractive that has been held for many years. We shall, as usual, give full descriptive accounts of the various exhibits which, commencing in this, will be continued in the next and following issues.

*Mural Decorations Company.*

Amongst the many interesting exhibits, that of the Mural Decorations Company, at Stand 63C, in the Central Avenue, deserves notice. Here are to be seen specimens of ceilings, panels, mouldings, cornices, centreflowers and other plaster goods of exceptionally bold relief and great elegance of design. The method of fixing, and the easy way in which the surface of these goods can be stippled, coloured, silvered or gilded, will be explained by expert attendants at the stand. Photographs and drawings of special work executed by this firm at theatres, music halls, mansions, &c., both in this and other countries, will also be shown. The manufactures of the company have been referred to in these columns before now, and architects and builders will find a visit to this stand well repaid.

*H. Hermann, Limited.*

Messrs. Hermann have again brought the picturesque pavilion which proved such an attractive feature at the last Builders' Exhibition, and again it is fitted up with specimens of their now well-known machine-carved panels, pilasters, capitals,

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**Specimens** of the **High-class Workmanship** and **Materials** supplied by **Wm. Wallace & Co.** may be inspected at the under-mentioned Clubs and Institutions:—

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MIDDLESEX HOSPITAL (Convalescent Home),  
LONDON FEVER HOSPITAL (Nurses' Home),  
BANSTEAD ASYLUM (L.C.C.),  
ROYAL ASCOT GOLF CLUB,  
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,  
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ONLY ADDRESS—CABINET MAKERS, UPHOLSTERERS & DECORATORS, ONLY ADDRESS—

151, 152, 153, 154 & 155 CURTAIN ROAD, LONDON, E.C.



piano fronts, &c. All this work is carefully and artistically finished by hand, and is equal to the best class of handwork,



from which it is indistinguishable. Messrs. Hermann are now producing carved mouldings up to 14 feet long, at a price very much lower than that hitherto paid for these goods, and have

lately executed three beautifully carved screens, which have been greatly admired. They have in hand some important contracts with the leading railway companies and piano manufacturers, for whom their productions are singularly suitable. The panels shown above give an idea of the firm's designs, but do not convey any impression of the sharpness and admirable finish of the work.

*Blackman Ventilating Company, Limited.*

The Blackman Ventilating Company are showing a 30-inch Blackman fan, electrically driven by a continuous current motor fixed on the spindle of the fan—this is of the usual Blackman type, driven by 100-volt current at about 600 revolutions, as used for the ventilation of buildings, billiard-rooms, smoke-rooms, kitchens, dining-rooms, &c.—a 48-inch Blackman fan of usual type, not driven, and a Blackman type air-warmer for steam, containing forty tubes, each 7 feet long by 4 inches diameter. Attached to this is one 30-inch Blackman fan (belt driven) forcing air through the heater or through a cold air by-pass, so that the air may be delivered into the buildings or drying-rooms for ventilating or drying purposes at any requisite temperature. The quantity of air passing through the heater or by-pass is controlled by a simple valve.

*The Expanded Metal Company, Limited.*

This company, which has again taken possession of the central position in the Hall, make a brave show of the various uses to which their expanded metal can be applied. Since the last exhibition the business of the Company has made important strides alike in the output, the application and the metal used for their specialty, and they are now showing samples in steel, brass, copper, aluminium, &c., also specimens of fencing, hurdles, tree-guards, &c., of various descriptions, and samples showing the application of the metal for concrete floors, suspended ceilings, solid partitions, encasing ironwork, pillars, &c.

*Peters, Bartsch & Co.*

This firm is showing at Stand 58, Row B, samples treated with their *Carbolineum Avenarius*, which is extensively used by leading railway companies, estate agents and contractors, and always with exceptionally satisfactory results. Its great merit consists in its penetrating the wood by its own action, without any pressure. It therefore does not require any



# EWART'S COPPER "CROWN" VENTILATOR

WILL BE EXHIBITED AT THE

## BUILDING EXHIBITION AGRICULTURAL HALL,

MARCH 20-27, 1897,

OR MAY BE SEEN AT THE

## FACTORY—346, 348, 350 EUSTON RD., LONDON, N.W.



machinery for its application, as creosote does, and it does not clog the pores of the wood, and thereby engender dry rot, as tar and other similar materials frequently do. It imparts to the wood a nice nut-brown colour, which is still further improved by the application of Antioxide, another production of the firm, which, in addition to the purpose just referred to, effectually protects iron and other metals from rust and oxidation. It is absolutely non-poisonous, and effectually resists steam, noxious gases and salt water. It combines well with metal, sets hard, and gives to bright and polished surfaces a burnished appearance, thus doing away with the trouble of continued cleaning. It is suitable for all iron structures, bridges, piers, &c., all kinds of machinery, maritime, stationary and locomotive engines, agricultural machinery and implements, and all articles which require permanent protection from rust and oxidation. It is also particularly recommended as a protection from the action of sea water. Several of the railway companies now coat their signal-boxes with Carbolineum and afterwards with Antioxide, which gives them a beautiful mahogany-like appearance.

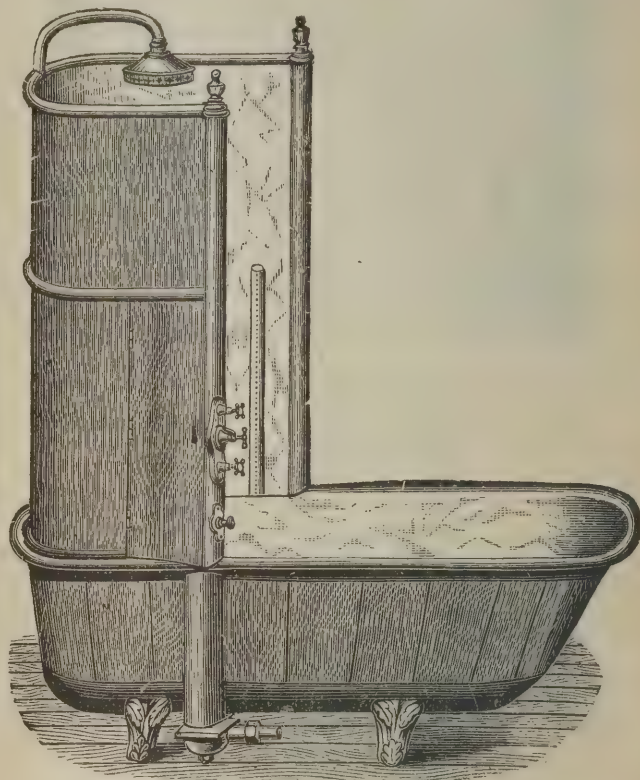
The indestructible combination washers which are also shown consist of rings of soft metal, grooved outside, and holding in the groove packing material, such as asbestos, rubber, hemp, &c. The soft metal, in conjunction with the packing included, will accommodate itself readily to any unevenness in unplanned flanges. The rings give a metallic and indestructible protection to the packing material against any injurious action or pressure of steam, heat, &c., from the inside of the pipe. Owing to their construction, the washers resist the highest pressures, cannot blow out, and must therefore recommend themselves to all users on account of their efficiency and extraordinary durability and safety. With these washers no difficulty will be experienced in opening a joint, as is very often the case with other packing materials, and the flanges of joints made with the indestructible combination washers will be found on opening to be perfectly clean.

Carbolineum is a splendid material for the treatment of wood-paving blocks, and the firm have during last season carbolised all the blocks for Northumberland Avenue, Whitehall and other thoroughfares.

*Shanks & Co.*

Messrs. Shanks & Co. have in Bay 1 a really imposing display of their well-known sanitary appliances, the more noteworthy among which are their "Fin de Siècle," "Independent," "Modern" and "Times" baths, their "Barrhead" closets,

their "Modern" lavatory, &c. The baths named above possess the following strong points:—In the cases of the "Fin de Siècle" and "Modern" instead of concealed standing waste and overflow there is an open recess in which the valve rod works,



and which is finished like the interior of the bath. The grating, of specially large size and opening, is fitted above valve with a slotted or bayonet catch arrangement, so that it can be removed with the fingers for cleaning or other purposes. The valve rod being usually of strong nickel-plated brass, and working through



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Louis XIV, XV, & XVI, Fittings etc.*



# ILLUSTRATIONS.

GREAT SCREEN, WINCHESTER CATHEDRAL.

PICTURE GALLERY, STAFFORD HOUSE.

THE EMBARKMENT FOR THE ISLE OF CYTHERA

See Article, p. 184.

this grating, is a most cleanly, strong and simple arrangement. The overflow is cast on immediately behind the waste recess, and enters the waste just above seal of trap. Every time the taps are turned on, a special nozzle, led from the taps to the top of overflow, throws a jet of clean water down the sides of

The trap is made a circular full way throughout, glass enamelled inside, and being removable and adjustable to suit different directions, it is much preferable to the older forms of dip trap. A flange is put on the trap at floor line for a neater finish. The hot and cold taps are of the best screw-down description, and are covered by a massive slab of porcelain, containing two commodious soap trays. The whole apparatus is a combination of the most "up-to-date" ideas on sanitary science, and, besides, the shape and style of finish of the bath are of the newest and most improved description. An open overflow, with a connection for overflow pipe, can be made on this bath to suit the requirements of the water companies who insist upon this construction of overflow.

The "Independent" fulfils the sanitary requirements of the age, in that there is an entire absence of wood enclosure, and



the overflow channel, and so keeps it always clean. Furthermore, it is raised as high as possible in the bath, so that the chance of overflow and consequent soiling is slight, except in the case of taps left running with waste valve closed, in which case the overflow is sufficient to take away all the water.

the possibility of filth collecting behind that enclosure is completely obviated. The plunge bath is of enameled cast-iron, with Shanks's patent waste and overflow arrangement. The spray may be of enameled zinc or copper, with an outer casing of zinc enclosing all the pipes, but with a hinged door for access

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CARVED OAK.  
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NEW ILLUSTRATED FURNISHING  
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CARVED OAK.  
ALL GOODS CARRIAGE  
FREE TO ANY STATION IN  
GREAT BRITAIN.



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

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ARM-CHAIR, £4 15s. 6 ft. 6 in. high, £24 10s.

No. 321.—The "KNIGHT" CARVED OAK  
ARM-CHAIR, £4 5s.

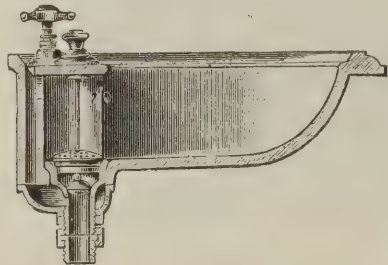
**HEWETSONS,** ARTISTIC FURNISHERS AND HIGH-CLASS DECORATORS, **TOTTENHAM COURT ROAD, LONDON.**



to the pipes and fittings at any time. The shower is of brass, nickel-plated, and the fittings are Shanks's patent Eureka fittings. The whole thing is perfect and complete in itself. Only three joints are to make and the bath is fixed. Great saving in carpenter and plumber work is secured. This bath is an improved pattern, with circular spray, and with the waste pipe and supply pipes covered in at side of bath. It is enamelled and decorated in best style, and may be finished in various designs.

"The Times" is a plunge-bath with improved standing waste and overflow, cast in one piece with bath; white porcelain slab, with soap dishes covering taps and so securing increased cleanliness; "glass-enamelled" trap, insuring quicker discharge, immunity from choking, and better sanitary condition of waste. Glass-enamelling renders the trap as free from rust as a piece of glass. This trap being made removable and adjustable to any position is much superior to fixed or cast-on traps.

Shanks's new patent "Modern" lavatory is designed to meet a growing demand of sanitary engineers that all fittings in connection with sanitary appliances shall be open and accessible, anything in the shape of concealed waste pipes and inaccessible valves not being looked upon with favour. The difficulty has been to combine neatness and beauty of appearance with exposed discharge arrangements and perfect accessibility of all parts. Shanks & Co. believe that a combination of this kind has been attained in their new patent "Modern" lavatory.



The ordinary plug and chain has been avoided, and an entirely new system of waste-pull has been adopted. At the back of the basin an open recess is made, over the top of which there is a projection in porcelain, as shown, through which the waste-

pull works. The valve rod, being of nickel-plated brass, is not an eyesore in the basin, and is perfectly cleanly. Quick discharge is looked upon as an important point by everybody, and particular attention has been paid to this in the "Modern" lavatory, which will discharge in less than one-half the time of ordinary basins. The outlet grating is of specially large size and opening, and is fitted above the waste valve with the slotted or bayonet catch arrangement, previously referred to. Insufficiency of overflow has been a defect in many lavatories, and this lavatory has been so constructed as to carry away the water from both taps, running full bore, with the waste valve shut. Two small orifices are arranged for sending a little stream of water down the overflow, in order to keep it always sweet and clean; other two jets impinge upon the grating, so that it may always be cleansed; while the other perforations introduce the water direct to the basin. The taps are fitted into a special recess made for them in the basin, and are perfectly simple and strong in construction. This method reduces materially the amount of brasswork shown in the lavatory.

The school lavatory range, with strong fireclay enamelled basins of improved shape, accessible overflow, top, front frieze skirting and basin in one solid piece, is well worthy the attention of school boards. The basin is large and shallow, so that a wash may be obtained with a small quantity of water. The taps are self-closing or otherwise, as may be desired. Discharge with the ordinary plug and chain, or on the new quick-discharge principle, and a recess is made at the back of basin to accommodate it and take it out of the way. The soap dishes drain into basin, and the cover of overflow is easily removed for cleansing purposes. The waste is a horizontal pipe made in cast-iron, painted, and the standards are also in cast-iron, painted. Instead of standards the basins may be supplied with brackets for building into wall. It is a cleanly, durable and compact arrangement.

Among the closets shown are the "Levern," the specialty of which is that the siphonage is produced by the direct action of the water from the service-pipe, and notwithstanding the great depth of seal, the contents of the basin are completely discharged with the most powerful suction, and the basin is again filled up with clean water from the cistern. The lower part of the long leg of the siphon is of specially patented construction, and is made of lead. The lead is soldered direct to the earthenware by Shanks's patent process, so that a perfectly tight and indestructible joint is secured, being in accordance with the requirements of the London County Council,

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and the "Combination" silent closet and cistern, in which the instantaneous flush compensates for lack of height and gives perfect results. It must not be supposed that these closets are suitable only for situations where height for overhead cisterns is not attainable. They are suitable for all situations. They are strong and simple, easily fitted and not liable to get out of order. They are much more silent than closets with overhead cisterns. Large numbers of these closets have been fitted in private houses and public institutions all over the world and have given unqualified satisfaction. As drain flushers they are much superior to closets with overhead cisterns. An eminent sanitary engineer has made experiments and has calculated that the discharge from this closet rushes through the soil-pipe in three times the volume of that from an overhead cistern. Many improvements in construction have been effected since they were first introduced. They are fitted with special full-way silent ball taps, and are so silent in action that they cannot be heard outside the walls of the room in which they are fitted. We have only mentioned a few of the more striking features of a stand which contains much which is interesting and noteworthy.

*United Asbestos Company.*

A stand which will attract deserved attention is that of the above company, who are exhibiting some very fine specimens of their patent "Salamander" decorations, which, added to the inestimable advantage of being absolutely unflammable, possess those of extreme lightness and comparative cheapness. The designs are the productions of leading artists, and are at least equal to any in the market. The material is capable of decoration in any manner, and the style can be altered at any time subsequently as desired. Among the specimens shown are patterns suitable for dadoes, friezes, fillings, ceilings, panels, pilasters, &c., and in many cases they are remarkable for the extreme sharpness of the relief, in which respect they are indistinguishable for plaster mouldings costing twice or three times the amount, while they are superior to these in the fact that they cannot chip or fracture. We are informed that "Salamander" has been extensively adopted by the Lords of the Admiralty for use in H.M. Navy as a protection from fire, and battleships now building are being fitted therewith. It was also selected by the White Star Steamship Company for the decoration of the walls and ceilings of their special building at the Chicago exhibition, representing the smoking saloons and state-rooms of their magnificent steamers *Teutonic* and *Majestic*.

It is now, in fact, extensively used for buildings of every description, and especially where it is desired to combine economical, effective and sanitary decoration with additional security from fire, as, for instance, in public buildings, museums, picture galleries, theatres, hospitals, asylums, industrial schools, hotels, mansions, residential chambers and all kinds of wooden structures. Among the samples of decorated work a very attractive frieze—an entwined garland of flowers and foliage finished in natural colours in bronze paint—cannot fail to be admired alike for its boldness and originality, and several dadoes and panels also finished in bronze colours have a very pleasing effect.

*The Sandstone Syndicate of London.*

At stand 90, row B, the above company are showing some specimens of their artificial sandstone, which has proved thoroughly successful in England, as it has been for some years on the Continent, where it has given general satisfaction to those who have used it. It has been subjected to pretty severe practical tests, and has weathered well in exposed positions; for instance, it is said that in a building in the West End of London, of which a small portion is in Portland stone, the difference now between the Portland and the Syndicate's stone cannot be told by mere examination. The stone has been used pretty extensively in the heart of London, and the atmospheric test has demonstrated its value. Buildings completed with the stone can be seen, amongst others, at 56 Charlotte Street, Fitzroy Square, 92 Chancery Lane, several houses in course of construction at Wells Street, Oxford Street, &c. The stone has also been used for numerous houses, shops and cottages in the suburbs. The Syndicate claims special attention to its stone on the ground that the purchaser obtains a stone equal to Portland at a less price than Bath stone.

*The N.A.P. Window Company, Limited.*

This firm is showing a fine series of examples of their steel in-and-out opening casements. These casements embrace a variety of inventions which have been perfected with great care during the past few years at considerable cost. Every method is guaranteed to be perfectly water-tight in any situation. As the novel parts of each casement form the subject-matter of separate Royal Letters Patent, almost any desired combination of the patented parts is possible. The company is thereby enabled to comply with the special wishes of architects upon matters of detail. All movable parts are of gun-metal. All

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non-movable parts are of rolled steel of a high grade, possessing great strength and rigidity. Consequently the casements are much lighter in appearance than if they were of iron. The advantages claimed for these casements are the following:—

They open for ventilation in the same way as ordinary casements, and each is secured while open or shut by the usual casement-stay and fastener. When it is desired to clean the outside it is only necessary, before swinging the casement inwards, to lower the sill water-bar in the case of the "slip patent." With respect to each of the other methods illustrated the operations necessary prior to opening the casements inwards are equally simple. They effect a considerable annual saving on the cost of window cleaning, and thereby earn a handsome dividend (from 10 to 30 per cent.) upon the very small additional expenditure which their adoption entails. As they open outwards for ventilation, fresh air can be admitted without disturbing the window drapery, a desideratum which is absent from an inward-opening casement. Repainting or reglazing can be conveniently done from within, and the injury which the use of ladders (carelessly handled) does to the sills and window masonry generally is thereby obviated. The absence of risk to life or limb attending the cleaning or repair of the N.A.P. casements enables owners and occupiers to avoid all the moraland legal liabilities generally connected with every "window-cleaning accident." The specimens shown comprise:—The patent N.A.P. sliding and revolving sashes, in ordinary cased frames, as issued to their contractors by the London School Board; the patent N.A.P. "sliding and revolving" sashes, in patent "weightless" frames, obviating the use of lines, weights and boxing (this model shows the special fittings for asylum windows, to comply with the regulations); the patent N.A.P. sliding sashes, divided stile "top suspension" patent, in ordinary cased frames, for use where bars outside the windows or other obstructions prevent the sashes from revolving; the N.A.P. "top bolt" patent for the alteration of existing windows; the patent N.A.P. double-knuckle wood casement, to enable casements to open both outwards for ventilation and inwards for cleaning; the patent N.A.P. "gearless" fanlight fittings, for centre-hung lights; the patent N.A.P. "passable" cheeks for bottom-hung lights, enabling them to be brought over into the room for cleaning; the patent N.A.P. "flush" stay top-hung fanlight (inward and outward opening); the patent N.A.P. steel "slip" casements (opening outwards for ventilation and inwards for cleaning); the N.A.P. No. 2 rolled iron side-hung casement (opening

outwards only); the patent N.A.P. No. 3 rolled iron side-hung casement (opening outwards only); the patent N.A.P. steel top-hung light (opening outwards for ventilation and inwards for cleaning); the N.A.P. No. 1 rolled iron bottom-hung light fitted with "passable" stay; the N.A.P. No. 1 rolled iron centre-hung light; the N.A.P. leaded lights.

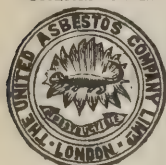
#### *Waller's "Grip-fast" Tile Company.*

This company have erected a structure representing a full-sized house, showing with admirable effect the application of their tiles to various portions of the building. As is already well known, Waller's "Grip-fast" tiles are composed of the very best Portland cement, sand and other materials, and made under pressure of 40 tons to the square inch by the most modern and improved patent machinery, specially adapted for securing the efficient handling of the cement used in their manufacture. Having a glazed surface introduced by special process they afford great weather resistance, being wholly impervious to moisture in any shape. Tiles made of sand and cement are not impaired by frost, and, owing to the nature of the materials used, are practically imperishable, and improve with age and weathering, unlike clay tiles and slate, which, from the nature of their composition, more or less rapidly deteriorate. They are made in nine different shapes and in any colour, with a surface almost equalling polished granite. The various shapes all interlock, whereby handsome designs in different colours are readily made, and a neatness of appearance arrived at which in these days of elaborate and aesthetic ornaments is so essential. These tiles are specially adapted for churches, Board schools, mansions, dwelling-houses, railway stations, barracks, and all kinds of public and private buildings, and are capable of being used as low as one-seventh pitch, and are well suited for mansard roofs. They can be readily cut without interfering with the locking arrangement, and in the case of hips and valleys require to be treated as an ordinary slate roofing. As an instance of the rapidity with which they can be prepared for the market, it may be mentioned that those used on the roof of the building in question have been made within the last two days and are in perfect condition for use.

#### *F. McNeill & Co.*

Immediately facing the principal entrance will be found a compact little stand on which Messrs. McNeill & Co. are showing the various purposes to which their slag wool or

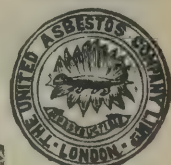
"SALAMANDER"



TRADE MARK.

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silicate cotton may be advantageously applied. Slag wool is essentially a pure mineral glass-like fibre, manufactured from iron slag. It is made by converting this while in a melted condition into fibres by means of a blast of steam or air. It consists of a mass of very fine fibres varying somewhat in thickness, interlacing and crossing each other in every direction, thus forming an innumerable number of air cells. Slag wool partakes of the nature of glass without its brittleness, the fibres being soft and pliant though inelastic. One of its most important qualities is its unequalled power to prevent radiation of heat or transmission of hot or cold air. No other material, either natural or manufactured, which can be used practically in the arts approaches this as a non-conductor of heat. This can readily be accounted for by the fact that slag wool holds in confinement a greater proportion of air than any other material. It is a perfect protection against frost, and is perfectly non-combustible, and practically indestructible by heat; therefore, as a protection against fire, it may be of inestimable value if rightly applied; and indeed, the use of wire lathing or wire-netted slag wool slabs in connection with the filling of slag wool between the studding is being now largely adopted by progressive architects and builders. It is largely used in car-building and for other railway purposes, as a pipe and boiler covering and in many other ways which we have not room to specify.

Messrs. McNeill have another speciality in their patent damp course, which consists of a layer of thin sheet lead between two layers of bituminous felt. This has already been used with very satisfactory results, and promises to be taken up as an indispensable adjunct by all conscientious builders.

*Ewart & Sons.*

Messrs. Ewart & Sons have two large stands facing each other in Row A. On these they are exhibiting an imposing selection of specimens of their deep stamping in copper, consisting of copies of life-sized figures in full relief designed as architectural ornaments for some buildings which have recently been erected in Siberia, where the climate in a very short time proves fatal to any kind of stone ornament. These copper ornaments, which comprise, in addition to the figures mentioned, capitals, panels, mouldings, masks, balustrading, &c., are absolutely impervious to climatic influence; they are extremely light, and although they can be painted to imitate stone, if such treatment be approved of, or from any cause desirable, if applied *au naturel* they rapidly

acquire a delicately-tinted bluish green patina which is distinctly pleasing. Another important feature of Messrs. Ewart's display is their copper "Crown" and "Standard" ventilators, of which they have several varieties on show. These ventilators possess the valuable qualifications of extreme efficiency, lightness, sightliness — indeed they are really ornamental — extraordinary durability, and comparative cheapness. They, moreover, require no woodwork in fixing. The same patterns can be supplied in zinc at considerably less cost; but, of course, they will not last anything like so long. Messrs. Ewart have a method of flat roofing in copper, which is also shown.

*Johnson Manufacturing Company.*

The patent hinge front pulley exhibited by this firm has the advantage that it can be opened after the sash is hung, for access to the interior for oiling or cleaning, which prevents undue wear on the axle, and causes it to run freely and silently. The wheel and axle are solid gun metal, revolving on free bearings. It is impossible for the wheel to bind, which is frequent with ordinary pulleys, and the direct cause of cords breaking. It can be opened and oiled in one minute. It will be found very useful in hospitals where it is necessary that sashes run silently, and has already been used in many of the largest railway station hotels, infirmaries, lunatic asylums, barracks, and mansions, with great satisfaction.

### THE NEW INCANDESCENT GAS LIGHTING COMPANY.

THE New Incandescent (Sunlight patent) Gas Lighting Company, having triumphantly emerged from the worries of litigation, are now coming rapidly to the fore, and we recently had the pleasure of inspecting their well-equipped show rooms at 33 and 34 Shoe Lane. The light given by their patent burners equals that of three ordinary burners, and has the advantage of being free from that greenish tinge which one usually associates with incandescent burners, and which so many find disagreeable and unsuitable for domestic purposes. It has in fact a warm tone very closely approaching to that of sunlight, whence its name. It is also claimed that the mantle is more durable than any other in the market.

We were especially interested in the artistically designed fittings, too, the lines of some of which are extremely graceful, for which reason they are likely to very speedily supersede the

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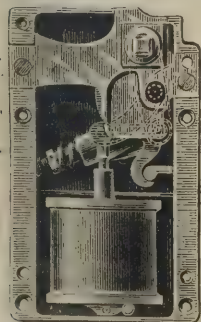
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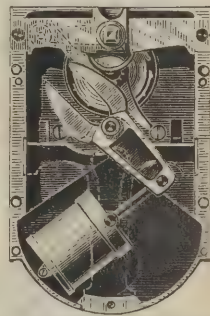
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PATENT GOLDEN EAGLE SASH LINE, COPPER WIRE CENTRE.  
NOTHING TO TOUCH THEM..  
**MIDLAND ROPERY, BIRMINGHAM.**



old clumsy form of gasaliers and brackets to which we have grown accustomed, but which can scarcely be said to have been at any time particularly satisfactory or pleasant to look upon, even though they served their plain utilitarian purpose well enough. A novelty introduced by the company is their electric lighter, which is affixed to the burners, and to which the power is supplied by a very small battery which could be easily hidden away in the corner of any room. This obviates the need for the bye-pass, which, although extremely useful and in some cases hitherto indispensable, is not without its disadvantages. Owing to a prevalent misconception the company have found it necessary to issue a circular, from which the following is an extract:—"It has come to our knowledge that our mantles are being used upon imperfect cheap burners which give poor and miserable results. We have tested some of them, and the utmost illuminating power that we have been able to obtain with our mantles has been 17 candles, whereas if our mantles are used upon our own burners, which are specially constructed for their use, they will give about 50 candle-power."

### VARIETIES.

THE late Sir Thomas Elder has bequeathed 155,000*l.* for public objects in Adelaide, including 65,000*l.* for the university, 25,000*l.* for a picture gallery and 25,000*l.* for workmen's houses on the lines of the Peabody Trust.

ADDINGTON PARK, one of the residences of the Archbishop of Canterbury, is to be sold. Part of the purchase-money is to be used for building a house for the Primate in Canterbury.

THE next ordinary general meeting of the Surveyors' Institution will be held on Monday, March 22, 1897, when a paper will be read by Mr. C. H. Hooper (Fellow), entitled "Fruit Growing as an Auxiliary to Agriculture."

THE foreman and ganger employed at the Coldrenick Viaduct on the 9th ult., when a platform collapsed and twelve men lost their lives, were charged on the 16th inst. at the Liskeard Police Court with criminal negligence. After hearing evidence during several hours the magistrates dismissed the case.

THE awards of Mr. W. Ambrose, Q.C., M.P., the arbitrator appointed by the Local Government Board to hear claims amounting to 17,619*l.* by property owners and tenants against the Leigh District Council, as compensation for property sought

to be acquired for public improvements, has been received. The total amount offered by the Council was 5,876*l.*, and the total amount of the awards is 6,797*l.*, or about 15 per cent. more.

THE Harbour Commissioners have had under consideration a report by the works committee in regard to the condition and repair of the Aberdeen graving dock, which was opened in July 1885, at a cost of 54,321*l.* The harbour engineer recently reported that the condition of the dock and return walls was such as to call for immediate treatment, and that no method of repair would be of permanent avail which did not provide for their entire reconstruction. The committee, therefore, recommended that the dock should be reconstructed on its present site and lengthened, deepened and widened at an estimated cost of 118,600*l.* The committee also recommended that the work should be executed in granite masonry and brickwork, Portland cement concrete being only used in situations where it would not enter into the structural features of the work, and where it would be entirely protected from sea water. A long discussion took place, there being great diversity of opinion as to the advisability of the Board undertaking so large a work in the meantime, and in the end it was resolved by nineteen to ten to refer the whole matter to a consulting engineer for a report. The minority were in favour of the committee's recommendation being adopted. Mr. Dees, Glasgow, and Mr. Wake, Sunderland, were suggested as consulting engineers, but it was agreed to leave the matter in the hands of the works committee.

THROUGH passenger traffic was opened on the 8th inst. between Chesterfield and Lincoln by the Lancashire, Derbyshire and East Coast Railway, which, besides relying on passenger traffic, is likely to become a great coal-carrying company, as it is opening out a new field of colliery enterprise in the district commonly called "The Dukeries," extending to the east over nearly 300 square miles, practically virgin soil. The first length of line, between Lincoln and Edwinstowe, was opened for traffic last December, and on the 8th inst. the section between Chesterfield and Edwinstowe was opened, including also branch connections from Langwith to Clowne. These portions of the railway, representing a length of 30 miles, have been constructed through one of the roughest and most difficult engineering parts of England, running right across the grain of the country, requiring heavy embankments and excessively deep cuttings. A tunnel at Bolsover, 1½ mile long, runs through coal measures, and a viaduct at Chesterfield crosses in one span the Manchester, Sheffield and Lincolnshire Railway, the Midland Railway and the Derby road. The station at

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Chesterfield is designed on a large scale to accommodate very heavy goods traffic. A Bill is now in Parliament for an extension of the line from Lincoln to the east coast at Sutton-on-Sea, where a deep-sea harbour is to be constructed to enable coal to be carried to London and abroad by sea. Mr. Elliott Cooper is the engineer for the whole section, and Messrs. Pearson & Son are the contractors for the line between Chesterfield and Warsop.

## BUILDING AND BUILDERS.

THE Aberdeen Parish Council are about to erect new offices in Union Terrace, which will cost about 6,000*l.* The price of the site was 3,700*l.*

THE Salford School Board are about to erect a school for 1,200 children in Langworthy Road.

BATHS are to be erected in Chester on the south side of Union Street.

THE Prince of Wales's Hotel, on the borders of the Lower Lake, Killarney, has been commenced. Messrs. Waring & Sons, Limited, will carry out the decorations and supply the furniture.

A MARKET HALL is to be erected in Ripon as part of the memorials of the Jubilee celebration. The Marquis of Ripon has offered a site, containing 1,700 square yards, for 2,500*l.*

THE barracks at Winchester are to be rebuilt at a cost of 72,000*l.* The style of the palace, which was copied from that of Versailles, is to be preserved as far as possible, and the adjacent old county hall is not to be interfered with.

THE site for the Grand Central Hotel in front of the terminus in Marylebone Road, of the Manchester, Sheffield, and Lincolnshire Railway extension to London, is now being cleared, and building operations will be forthwith commenced. The new hotel will, it is said, be on the same scale of magnitude as the Midland Hotel in Euston Road.

THE Bill promoted by the Manchester Ship Canal Company will pass as an unopposed measure through the House of Lords, no petitions having been deposited against it within the time allowed by the Standing Orders. It empowers the company to grant leases of land "for the erection of warehouses, transit sheds and other buildings calculated to promote or facilitate the business of the company."

THE Jewish community in London propose to celebrate the sixtieth year of the Queen's reign by erecting and endowing a home and hospital for Jewish incurables at Tottenham. A site of close upon four acres has been acquired, and accommodation will be provided for fifty patients. The scheme is expected to involve an outlay of 20,000*l.*

COWPER Church, East Dereham, which is built on the site of the poet's house where he spent his closing years, is to be completed by the erection of a clock-tower at a cost of 500*l.* In the vestry is preserved the woodwork of the bedroom in which Cowper died, the door being in actual use, and in front of the church stands a polished granite monument to the poet's memory.

At a public meeting held on the 8th inst., it was decided to carry out the plans for the full scheme of the renovation of the parish church, Kingswood, Bristol, prepared by Mr. E. H. Lingen Barker, of London and Hereford. The scheme embraces practically new nave, aisles, chancel, organ chamber and two porches and new floors and fittings. The floor of the western tower will be utilised as a choir vestry. The accommodation is for 675 worshippers.

## THE HIGHGATE WOODS.

FOR some time past, says the *Times*, the public have been in possession of an offer of great importance to London. The Ecclesiastical Commissioners are the owners, in right of the see of London, of a large estate at Highgate. It is unnecessary to say that the land lies high, and has many steep slopes and breezy hilltops. Here and there are old woods, chiefly of oak, with an undergrowth of hazel and willow; they are said to be remnants of the old Forest of Middlesex, in which the Corporation of London had a right of hunting by Royal charter. Recently they have been managed as copse-lands, the underwood being cut periodically, and, if not marked by the peculiar diversity of an open forest, they are still charming bits of woodland, bringing the country to the threshold of London. Two of these woods, Gravel Pit Wood and Churchyard Bottom Wood, lie together, separated only by a high road. Gravel Pit Wood was some years ago made over as a free gift by the Commissioners to the Corporation of London; it is now dedicated to the public and managed by the Corporation as an open space. It was understood at the time this handsome present was made that Churchyard

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Bottom Wood should, if possible, be purchased for a similar purpose, and the Commissioners, after consideration, fixed its price at 25,000/. The wood contains 52 acres, and the price thus represents less than 500/. an acre. Any one acquainted with Highgate and aware of the rapidity with which new roads are being laid out and new houses springing up in that neighbourhood will be of opinion that the sum asked is a moderate one, probably much less than the Commissioners would realise were they to throw the land into the market. It is certain that far higher sums have been paid for other open spaces acquired for the public in recent years—for Parliament Hill and the adjacent fields, for example, or for the Hilly Fields at Brockley.

Circumstances have led to some delay in meeting the Commissioners' offer. But within the last six months a vigorous effort to raise the necessary money has been set on foot in the locality. Highgate, few people perhaps know, is not a parish in itself, and lies for the most part outside the county of London in the parish of Hornsey. The Hampstead and Highgate hills have always formed a species of barrier on the north of London, and perhaps it was on this account that, when the boundaries of the Metropolis were defined in 1855, Hornsey was left outside; doubtless, too, in those days it was a purely rural district. Part of the parish is, we believe, within the four-mile radius, while London is rapidly spreading round it and over it. The population, which in 1851 did not reach 2,000, is now over 50,000. This populous and rapidly increasing district is under the jurisdiction of an urban district council, and that body has voted 10,000/. towards the sum required by the Ecclesiastical Commissioners, and has expressed its willingness to accept and take charge of the wood. The example thus wisely set has been emulated by a local committee, which, under the guidance of Mr. Cory Wright, has succeeded in raising between 2,000/. and 3,000/. by local subscriptions, Mr. Cory Wright himself being a munificent donor. There remains some 12,000/. to be made up. To secure this sum a joint committee has been formed of the rural open-space societies and the local organisation, and appeals have been made to the County Councils of London and Middlesex, the vestry of Islington, and other bodies and persons. Were the wood inside the county of London, there cannot be a doubt that the comparatively small sum required would be forthcoming at once. The fact that Parliament has drawn the boundary of the county just inside the wood, though it raises some technical questions which may render it necessary to invoke the aid of the Legislature, does not affect the real value of the wood to London.

It is nearer the centre of the Metropolis than Hammersmith or Woolwich, and it will serve a district peculiarly in want of breathing-ground. The area of open space in proportion to population is far smaller in the east than in the west of London. The great district which lies north and north-west of the City—Dalston, Barnsbury, Canonbury, Highbury, Islington—is thickly populated and possesses no large open spaces such as the Royal parks. Clissold Park, Stoke Newington—acquired about ten years ago by the aid of the funds of the City parochial charities—and Finsbury Park are the only open spaces worth mentioning in this wide district, and taken together they are of no great extent. The district is, however, traversed by lines of railway which run from the very centre of London—Broad Street, Aldersgate, Moorgate—to a station (Highgate) within a stone's throw of Gravel Pit and Churchyard Bottom Woods. Thus, if the latter wood be saved, an area of 120 acres of woodland will be made accessible to one of the most crowded quarters of London, and on the very summit of the Highgate hills the capital will possess an open space combining the attractions of tree and bush, thicket and glade, with those of fresh air and a wide outlook. The offer of the Ecclesiastical Commissioners remains open till the end of June; it is to be hoped that before then the necessary funds may be secured and arrangements made which will put the wood beyond danger.

### SOOT IN CHIMNEYS.

ON the 6th inst., at the Westminster police court, Mr. Henry Cunynghame, legal Assistant Under-Secretary at the Home Office, appeared as the occupier of 36 Eaton Place, S.W., to answer a summons by the London County Council, under the Metropolitan Fire Brigade Act, the chimney of the house having been on fire on January 24 last. Mr. Sherwin White, who conducted the case on behalf of the London County Council, called a fireman to show that a somewhat serious fire was discovered in the chimney. The man was engaged three hours in putting out the burning mass of soot. Mr. Cunynghame said he would like to suggest to the fire brigade that, if they would use carbonic acid instead of water in putting out these chimney fires, they would find that not only was it more effective, but that a great deal of damage would be prevented. He understood that when carbonic acid was used within the confined space of a chimney it put out a fire there immediately. Even



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ordinary washing soda had been known to prove equally efficacious, and he believed that if the authorities made a charge for the use of these means of extinction householders would willingly pay. As a matter of fact, the chimney of his house had made him responsible for a bill for 27*l.*, considerable damage being done to the wall owing to the bad practice of pouring water down the chimney. Happily, the insurance company came forward and settled that matter. In answer to Mr. White, the fireman said the chimney was very foul, and his opinion was that the cracking of the wall was due to the overheating of the soot in the chimney, and not to the action of the water. If carbonic acid had been used, half a ton would have been required before it would have reached the fire in question. The chimney was a very large one. Mr. Marsham observed that he had never before heard of a chimney fire being put out by carbonic acid. Mr. Reed, the builder and master sweep called in by Mr. Cunynghame to execute the necessary repairs after the fire, said many instances had come to his knowledge where the free use of water in cases of this sort had proved dangerous. He had found ordinary soda mixed with warm water, and poured out with a cup, prove very efficacious. The chimney in question was a peculiar one; there were about eight bends, and these of course readily lent themselves to the accumulation of soot. Mr. Marsham expressed the belief that the County Council would not now sanction the construction of such faulty chimneys, and imposed a fine of 2*s.* 6*d.* and 2*s.* costs.

### THE TRAFFORD PARK ESTATE.

RAPID progress is now being made, says the *Manchester Guardian*, in the development of the Trafford Park Estate, and details of the scheme for laying out the 1,183 acres of which the estate consists will shortly be forthcoming. The land is mainly to be made available for commercial purposes, taking advantage of its position—bounded for three miles or more on one side by the Ship Canal and on others by the Bridgewater Canal. From below the Manchester docks to the Barton aqueduct the Ship Canal has an extra width of 50 feet, which will enable vessels of large tonnage, without interfering with the ordinary navigation, to lie alongside wharves which the owners of the estate are empowered to construct upon their land abutting on the canal. Under the scheme as it stands, about 100 acres are being reserved for dockside purposes. An im-

portant feature in the development is the proposed construction of lines of railway which will belong to the estate, to connect with the Manchester dock railways, and through them with the whole railway system of the district. One portion of the estates railway is to be worked as a tram line, to convey passengers through the park between Old Trafford and Barton, and it may be of interest to mention that it is intended to use trams propelled by gas-power. The line will be, however, of ordinary railway gauge, and adapted also to the conveyance of merchandise to and from the docks and the various works upon the estate. Power will be sought, probably during next month, for the construction of the railway under the Light Railways Act. It is to run from Chorlton-cum-Hardy to Barton, being connected up at the former place with the systems of the Midland and the Manchester, Sheffield and Lincolnshire Railway Companies. If the Midland Railway Company should obtain the powers they are seeking in Parliament to construct a line between New Mills and Chorlton—which will have the effect of greatly shortening the route—there will be a straight approach by the main line from Derbyshire right on to Barton. Eventually, no doubt, the railway will cross the canal where the land is high, just above the Barton Bridge, on to the Eccles side, and in this way join the London and North-Western and the Lancashire and Yorkshire Companies' lines. As the whole estate is practically level, it is proposed not only to give railway communication to all parts of the land sold for manufacturing purposes, but also to make lay-byes and basins connecting with the Bridgewater canal. The southern part of the estate is triangular, as the Bridgewater Canal from Manchester on the one hand, and from the Leigh and Worsley direction on the other, makes an angle at Water Meetings. By the projected canal the angle will be cut off, and the estate thus further opened up. The other features contemplated include a coal barge tip, the uses of which seem likely to be appreciated. The space set apart for ironworks, seed-crushing mills, cotton mills, malting houses, machinery works, merchants' dépôts and other purposes of the kind extends over about 750 acres. We understand that undertakings are already in progress which will require sites for purposes such as have been indicated. Negotiations are also in progress, it appears, for the erection by corn merchants, acting in conjunction with the owners of the estate, of a grain silo on the American principle, to be situated near Trafford wharf, abutting on the Manchester docks. The estate is not, however, to be devoted wholly to commercial uses. A

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central space of about 200 acres is being reserved for a race-course or public park, though we are not aware that any project is on foot to acquire the land at present for either purpose. It is perhaps some recommendation of this portion of the estate as a racecourse that it would afford a straight mile. As for the hall and the adjoining buildings, they are to be converted into a first-class hotel, the gardens and a portion of the park being reserved for golf links and a recreation ground.

### KILLALOE SLATES.

At a meeting of the Killaloe Slate Company, which was held on the 11th inst., Mr. S. H. Bolton, builder, the chairman, in declaring a dividend of 10 per cent. per annum, said that heretofore there seemed to be a great difficulty in inducing Irishmen to use Irish material; but he was glad to see they were getting over that, and that Irishmen generally were getting more patriotic, or a little more keen in promoting the material welfare of their country. The architects, in whom had lain the principal difficulty as to the selection of Killaloe slates, were finding out now that it was advantageous for the proprietors, as well as for the public generally, to use Killaloe slates, because the money expended on them more or less came back to everybody in the country, and in that way anything that was manufactured and used in Ireland was of advantage to the whole country. Irish architects appeared latterly to appreciate that fact, and the company had some very good friends among them who always specified their slates. Unfortunately, nowadays there was a feeling in favour of foreign articles of every sort. But the Killaloe slate, he was glad to say, was holding its own. The difficulty was to turn out slates sufficiently rapidly, for, as the report stated, the demand was almost in excess of the supply.

### NOTTINGHAM GENERAL HOSPITAL.

THE following report of the committee appointed to take into consideration the desirability of extending the Nottingham General Hospital was read and adopted at a special meeting on the 10th inst. :—

The main block of the hospital was built in 1782, and contained about sixty beds, the population of the town and county at that time being about 100,000. In 1854 the old building was

raised a storey, and in 1878 the new surgical wing, adjoining Park Row, was added, increasing the beds, with temporary isolation hospital, to 175, which is their present number. The population of the town and county is now estimated at about 500,000. The hospital is always practically full, and much delay frequently and necessarily occurs in the admission of patients who require treatment. The number of patients which have at some time in each month of 1896 been waiting for admission has been as follows:—January 46, February 46, March 42, April 46, May 47, June 72, July 74, August 87, September 86, October 54, November 39, December 35. Should this want of accommodation be allowed to continue, in the event of any serious railway or other accident great additional inconvenience and suffering would ensue. Your committee, after careful thought and consultation with the medical committee, are of opinion that an addition of at least fifty beds is urgently required. The wards in the main block of the hospital, which are now 115 years old, have no through ventilation, being on two sides of a central corridor. The plan almost universally adopted in modern hospitals of having the patients in isolated wards, with windows on both sides, undoubtedly conduces very much to their comfort and recovery, and your committee therefore think it very desirable that all the wards of the hospital should, if possible, be arranged on that principle. At the outset your committee considered the matter from two points of view—one the demolition of the old building and the erection of an entirely new hospital, and the other the remodelling of the old building and, if possible, its adaptation to modern requirements. Your committee have had the valuable advice of Sir Douglas Galton (whose honorary services they wish gratefully to acknowledge) and of an architect (Mr. Aston Webb), as well as an opinion on the present condition of the building from a builder (Mr. Woodsend). Their reports may be seen at the hospital. The erection of entirely new buildings, with the exception of the existing accident wards on Park Row, would no doubt be most completely satisfactory, but if funds are not forthcoming for that, then the scheme which seems to your committee likely to prove the most thoroughly satisfactory would be to erect new wings of the most approved construction, using the present building for administrative and other purposes. At present a large number of the nurses sleep in small houses, which are most unsuitable quarters for them, and the sleeping accommodation for the staff generally in the hospital is very unsatisfactory and inadequate. Plans carrying out this idea have

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been made by Sir Douglas Galton and Mr. Aston Webb, and may be seen at the hospital. If a plan on this general principle were adopted, nearly all the 225 beds would be in buildings of modern construction, there would be other beds available for emergencies, and the staff, nurses and servants would have most excellent accommodation. In addition to this, a proposed new entrance would make access to the hospital far more convenient than it now is, especially for badly injured patients, the out-patient department would be reconstructed, the laundry would be placed in a situation where it would be capable of doing the work for a larger number of patients, the whole place would be most airy and pleasant; and, standing, as the new wards would, on a site probably unequalled in England for a hospital, would be a noble ornament to the county and the town. To fully and satisfactorily complete the scheme with all necessary accessories your committee think that 50,000*l.* should be raised. Your committee do not, however, recommend any particular scheme for final adoption, as it would probably be more satisfactory in a matter of such importance if a competition from a limited number of architects were invited before a final decision on the suggested scheme is taken. They, however, are confident that they have sufficient information to justify the Monthly Board making an appeal to the governors and the general public for the necessary funds to enable the Board to make the hospital worthy of the county and the town.

### THE DEVELOPMENT OF ILKLEY.

WHARFEDALE, says the *Leeds Mercury*, has the proud distinction of being the most charming of Yorkshire's many valleys. Tens of thousands of the toiling masses huddled together in the busy, but unlovely, commercial centres of the West Riding, of East Lancashire and of districts even further afield, have many a time and oft sought health and invigoration within the confines of this magnificent watershed. The tourist, the artist, the valetudinarian—all are attracted to this vale, upon which nature has bestowed so many of her most cherished gifts. Ilkley is the Queen of the Dale. The town, or, as some still prefer to call it, the village, has shared to the full in the popularity enjoyed by the locality in which it is so happily and so picturesquely situated. Within the lifetime of the present generation the place has undergone amazing development, but one is probably justified in declaring that even now Ilkley is

comparatively in its infancy. As a sanatorium the town long ago achieved a world-wide reputation, its claims to be regarded as one of the most delightful of residential retreats have only been recognised within recent years. The recognition is however, complete. One after another, in rapid succession, the commercial and professional magnates of Leeds, Bradford and other towns have built themselves handsome villas on the slopes of the bracing moors, and, to quote the familiar phrase of the pantomime manager, "the cry is, still they come." There is a great future in store for Ilkley.

Now for a few facts concerning this progressive community. The census return compiled in 1891 gives the population at 5,767. At the beginning of the present year it was estimated that the inhabitants numbered 7,000. These figures, of course, take no account of the visitors who annually arrive in the town to stay for a longer or shorter period, and it is doubtless safe to calculate that in the height of the season the normal population is about doubled. But perhaps a truer index of the advance which the town has made within the last ten years or so is the increase of the rateable value of the property within its boundaries. In 1887 the assessment was 29,225*l.*; it is now 40,750*l.* Thus it will be seen that the rateable value has been augmented by an average of rather more than 1,000*l.* a year—an eminently satisfactory state of affairs. For the benefit of those curious about such matters, it may be mentioned that the general district rate is now 3*s.* 6*d.* in the pound, and the poor rate 1*s.* 6*d.*

Ilkley is governed by men of foresight and enterprise. The town can give "points" to many municipalities. For example, in 1892 the then Local Board promoted a Bill in Parliament for the compulsory acquisition of the undertaking of the Ilkley Gas Company, and were successful in carrying the Bill through the House of Commons. The Gas Company appealed to the House of Lords, and while the appeal was pending negotiations were concluded for the sale of the undertaking to the Local Board for the sum of 55,000*l.* The works were taken over on January 1, 1893, and have since proved prosperous. The Board also succeeded in 1893 in obtaining the assent of Parliament to a private Bill which contained provisions of no little importance. Under authority then secured, the waterworks are at this moment being extended. The expenditure entailed can be met under special powers to borrow 20,000*l.* Then the Legislature granted the local authorities permission to acquire a site for, and to erect, a town hall and public offices. A suitable site was recently secured for 6,270*l.*, but no further steps have been taken

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with regard to the scheme, there being a substantial body of opposition to it in the town. Power conferred on the Board to close private slaughter-houses has been enforced since February of last year. Public bands may also be engaged at the expense of the ratepayers, but so far no advantage has been taken of this license. This is, of course, a matter about which the inhabitants must be presumed to know best, but they may be reminded that Harrogate is a powerful rival of theirs, and that there a good deal of importance is attached to music in public places. The town band has become quite an institution in Harrogate, and a similar organisation in Ilkley would be thoroughly appreciated by the thousands of visitors who flock thither during the summer months. While on this topic, one might perhaps venture to ask whether the good people of Ilkley have ever taken into consideration the desirability of providing for the entertainment of the "strangers within their gates" who annually bring a fair amount of grist to the mill. The complaint is often made that there is "nothing to do" when the weather is bad. And it can rain at Ilkley.

Reference has been made to the waterworks. The water supply is derived from the adjoining moorland, and is conveyed, practically speaking, direct from the springs to the consumer, the only means of storage being three small reservoirs, with a total capacity of 275,000 gallons. The local authority are at present impounding more springs, and are extending their waterworks system westward. Seeing, however, that the springs already impounded yield 300,000 gallons per day, or 30 gallons per head for a population of 10,000, the extension is rather to meet the needs of the future than of the present. Consequent on the growth of the eastern, or Ben Rhydding, portion of the town, it has been found necessary to devise for that district a separate scheme of sewerage and sewage disposal. Early in 1894 Messrs. Waugh & Mallinson, engineers, were instructed to prepare plans and estimates, but, owing to strong opposition from local landowners interested, progress has been slow, and the works have not, as a matter of fact, yet been commenced, nor have the Local Government Board agreed to the scheme in its entirety, although sanction is now daily expected. The Council have also a proposal before them to extend and enlarge their principal sewage disposal works.

The purchase of Ilkley Moor and the manorial rights was completed on June 29, 1893, at a cost of 13,500*l.*, for which amount the Local Government Board sanctioned a loan, repayable in fifty years. The purchase was brought about by

a threatened enclosure of the moor, and the local authority seeing, with commendable promptitude, that such a course would ruin the future prospects of Ilkley, at once took the matter in hand, and secured the freedom of the moor to the public for ever. The moor is 2,000 acres in extent, and forms, as every one knows, one of the finest "breathing spaces" in the West Riding.

### PATENTS.

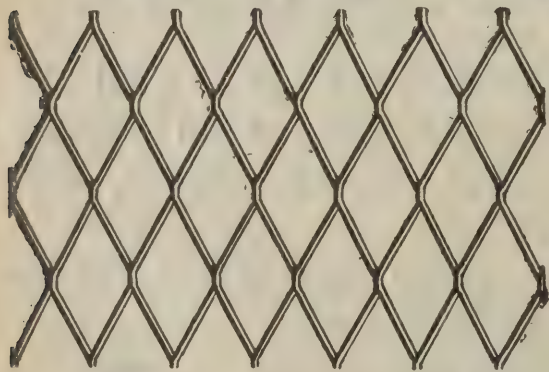
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

- 5439. Walter Scott Wilkinson, for "Improvements in the manufacture of paving blocks, tiles and the like."
- 5531. Christian Albert Jensen, for "Improvements in or connected with earth closets and the like."
- 5532. David Steel Wallace, for "Improvements in water-closets."
- 5543. James Edward Williamson, for "A new or improved sash-fastener."
- 5547. Matthew Abbott, for "A new or improved fastener for windows."
- 5575. Robert Balaam, for "Improvements in bricks."
- 5594. William Leatherby Roughdown, for "An improved shifter and fastener for movable seats and tailboards of carts and such like."
- 5598. Albert Roslington Buckton, for "Tilette (a substitute for earthenware tiles)."
- 5692. Arthur Wakefield, for "Improvements in sanitary and other pipes."
- 5947. Enoch Evans, for "Improvements in or additions to sink and kindred sanitary pipes."

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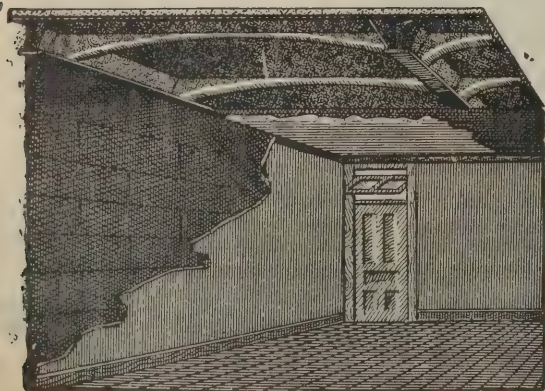
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## CONTRACTS OPEN.

**ABERDARE.**—March 31.—For supplying and erecting lattice girder footbridge. Mr. Wm. Fox, 5 Victoria Street, Westminster, S.W.

**ABERDEEN.**—April 1.—For constructing concrete reservoir and laying cast-iron pipes. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

**ABERTILLERY.**—March 31.—For building workmen's institute, gymnasium and swimming-bath. Mr. F. R. Bates, architect, 4 Commercial Street, Newport.

**ACCRINGTON.**—April 3.—For alterations to floor and ceiling and supplying cases for museum. Mr. W. J. Newton, Town Hall, Accrington.

**AISKEW.**—For building three cottages. Mr. Robt. Imeson, Sutton Grange, Masham.

**ALDERBURY.**—For building bungalow. Mr. F. Bath, architect, Crown Chambers, Salisbury.

**ALFORD.**—March 27.—For erection of an epidemic hospital. Messrs. James Duncan & Son, architects, Turriff.

**ALNWICK.**—For building villa. Mr. Hope, architect, 40 Westgate Road, Newcastle.

**ASHTON-UNDER-LYNE.**—April 14.—For constructing embankment, &c., for formation of reservoir. Messrs. G. H. Hill & Sons, 3 Victoria Street, Westminster.

**AYLESBURY.**—April 1.—For making roads. Mr. J. H. Bradford, 2 Rickford's Hill, Aylesbury.

**BALLINAMALLARD.**—April 3.—For building school. Rev. George M'Meel, Ballinamallard, Ireland.

**BARDON.**—April 2.—For main drainage works. Mr. J. B. Everard, 6 Millstone Lane, Leicester.

**BARNLEY.**—March 31.—For building house. Messrs. Wade & Turner, architects, 10 Pitt Street, Barnsley.

**BATLEY.**—April 5.—For making-up roads. Mr. O. J. Kirby, Market Place, Batley.

**BECKENHAM.**—March 29.—For supply of broken granite. Mr. John A. Angel, Urban District Council Offices, Beckenham.

**BELPER.**—March 31.—For erecting iron roofs, columns, gutters, &c. Mr. Maurice Hunter, Bridge Street, Belper.

**BIRKENHEAD.**—April 7.—For sinking bore-hole. Mr. George Miller, 9 Hamilton Square, Birkenhead.

**BIRKENHEAD.**—March 31.—For sewerage and making-up roads. Mr. C. Brownridge, Town Hall, Birkenhead.

**BISHOP AUCKLAND.**—April 1.—For erecting movable partitions in school. Mr. S. Adams, School Board Offices, Tudhoe, Bishop Auckland.

**BLAYDON-ON-TYNE.**—March 31.—For flagging and paving streets. Mr. W. H. Stephenson, Urban District Council Offices, Tyne Street, Blaydon.

**BRADFORD.**—April 5.—For partly rebuilding two warehouses. Messrs. Milnes & France, architects, Bradford.

**BRANDON.**—April 5.—For alterations and additions to Board schools. Messrs. E. Boardman & Son, Queen Street, Norwich.

**BRIDLINGTON QUAY.**—April 1.—For building warehouse and coach-house. Mr. Samuel Dyer, architect, Bridlington Quay.

**BRIGHOUSE.**—April 1.—For building three additional storeys at Clifton Mill. Mr. J. F. Walsh, architect, Lancashire and Yorkshire Bank Chambers, Halifax.

**BRISTOL.**—April 5.—For rebuilding warehouse and factory. Mr. Henry Williams, architect, 24 Clare Street, Bristol.

**BRISTOL.**—April 7.—For erecting condensing plant for the electrical committee. Mr. H. Faraday Proctor, Temple Back, Bristol.

**BRIXTON.**—April 1.—For repairing and painting Tate Central Library. Mr. H. J. Smith, Vestry Hall, Kennington Road, S.E.

**BUCKNALL.**—April 1.—For building hospital. Mr. Elijah Jones, architect, Albion Street, Hanley.

**BURNLEY.**—March 29.—For constructing iron pipe sewer. Mr. G. H. Pickles, borough surveyor, Burnley.

**BUSHMILLS.**—April 10.—For enlarging church. Mr. David Douglas, Bushmills, Ireland.

**CADOXTON-BARRY.**—For building hotel and stables. Mr. H. T. Thornley, architect, 100 St. Mary Street, Cardiff.

**CARK-IN-CARTMEL.**—March 30.—For building church. Messrs. Austin & Paley, architects, Lancaster.

**CARDIFF.**—For street and sewerage works. Messrs. Jones, Richards & Budgen, 14 Western Mail Chambers, Cardiff.

**CASTLEFORD.**—March 31.—For building schools. Mr. A. Hartley, architect, Carlton Chambers, Castleford.

**CATFORD.**—For building eight houses. Messrs. Philipps & Norfolk, architects, Catford Bridge.

**CHATHAM.**—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

**CHATHAM.**—March 27.—For making roads and drainage works. Mr. J. W. Nash, High Street, Medway Terrace, Rochester.

**CLAYTON-LE-MOORS.**—March 27.—For supplying road materials. Mr. A. Dodgson, surveyor, Clayton-le-Moors.

**CLEISH.**—March 27.—For alterations and additions to church. Messrs. Hardy & Wight, architects, 74 George Street, Edinburgh.

**COCKERMOUTH.**—April 3.—For repairing roads. Mr. Wilson, surveyor, Cockermouth.

**COCKFIELD.**—March 27.—For additions to schools. Mr. Weedop, National School, Cockfield, Durham.

**CONSETT.**—March 30.—For building eight dwelling-houses. The Consett Industrial and Provident Society, Limited, Gibson Street, Consett, Durham.

**CORK.**—March 29.—For supplying and delivering cast-iron pipes and special castings. Mr. H. A. Cutler, Municipal Buildings, Cork.

**CORK.**—April 3.—For alterations and additions to warehouse. Mr. Robert Walker, South Mall, Cork.

**DOVER.**—March 30.—For building car-shed. Mr. H. E. Stilgoe, Town Hall, Dover.

**DOVERHAY.**—April 3.—For laying drains, &c. Messrs. Ponsford, Joyce & Davis, 24 The Avenue, Minehead.

**DRIFHLINGTON.**—March 31.—For building schools. Mr. W. Hanstock, architect, Branch Road, Batley.

**DULLERTON.**—March 27.—For building gate lodge. Mr. W. E. Pinkerton, architect, 8 Diamond, Derry.

**EARLSHEATON.**—March 31.—For building retaining wall. Mr. H. Scott, surveyor, Town Street, Earlsheaton, York.

**EASINGTON.**—April 7.—For supplying and fixing hot-water heating apparatus. Mr. G. Phalp, surveyor, Haswell *viâ* Sunderland.

**EAST SHEEN.**—For laying roads and sewers. Mr. F. H. Harvey, 183 Lavender Hill, S.W.

**EDINBURGH.**—April 3.—For constructing reservoir. Mr. James Wilson, 72A George Street, Edinburgh.

**EPSOM.**—March 30.—For building laundry and engine-house. Mr. H. D. Searles Wood, architect, 157 Wool Exchange, London.

**FARNHAM.**—March 31.—For alterations to workhouse. Mr. S. Stapley, architect, West Street, Farnham.

**FLEET.**—March 27.—For restoration of roof of nave and north and south aisle roofs of Fleet Church. Mr. W. M. Fawcett, architect, 1 Silver Street, Cambridge.



FOCHRIW.—March 31.—For building dwelling-house. Mr. Lewis Evans, Penybank, Fochriw, Wales.

GLOUCESTER.—March 27.—For laying sewers. Mr. J. F. Trew, County Chambers, Gloucester.

GRADE.—April 3.—For building cattle and root-house. Mr. W. Rowe, St. Ruan Farm, Grade, Cornwall.

GREENOCK.—April 12.—For constructing outfall sewer. Town Clerk, Municipal Buildings, Greenock.

GREENWICH.—April 3.—For supplying porcelain baths. Mr. A. Budds, Public Baths, Greenwich, S.E.

GRUNDISBURGH.—For rebenching chapel. Pastor H. D. Tooke, Grundisburgh, Suffolk.

GUILDFORD.—April 5.—For supplying and fixing turbine plant and power pump. Mr. C. H. Adams, Water Office, Guildford.

HALIFAX.—April 3.—For building engine-house. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

HARROGATE.—March 31.—For constructing pipe sewers. Messrs. Martin & Fenwick, 1 Park Place, Leeds.

HAVERFORDWEST.—March 31.—For building classroom. Mr. A. H. Thomas, architect, Haverfordwest.

HEADINGLEY.—For building billiard-room. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

HEBDEN BRIDGE.—April 5.—For building Catholic institute, assembly-hall, &c. Mr. W. Wrigley, architect, Crossley Terrace, Hebdens Bridge.

HEYBRIDGE BASIN.—April 6.—For building two pairs of cottages. Mr. P. M. Beaumont, Maldon, Essex.

HORNSEY.—March 28.—For making-up and sewerage roads. Mr. E. J. Lovegrove, Southwood Lane, Highgate, N.

HORNSEY.—March 29.—For constructing stoneware pipe sewers. Mr. E. J. Lovegrove, Southwood Lane, Highgate, N.

HOUNSLOW.—April 5.—For making-up and sewerage roads. Mr. W. A. Davies, Town Hall, Hounslow.

HULL.—March 31.—For building junior department for school and supplying furniture for same. Mr. W. Botterill, architect, 23 Parliament Street, Hull.

IPSWICH.—April 13.—For alterations and additions to Tower House, for the School Board. Mr. J. S. Corder, architect, Tower Street, Ipswich.

IRELAND.—March 27.—For building residence at Kinitty. Mr. James Kennedy, Parsonstown, Ireland.

KILBURN.—April 1.—For building greenhouse. Mr. Henry Cecil, Vestry Hall, Harrow Road, W.

KING'S LYNN.—April 5.—For constructing covered service reservoir. Mr. E. J. Silcock, borough engineer, King's Lynn.

KINGSTON-UPON-THAMES.—March 31.—For making roads. Mr. H. A. Winsor, Clattern House, Kingston-upon-Thames.

KNARESBOROUGH.—For alterations and additions to infirmary, and for road-making and drainage. Mr. A. A. Gibson, architect, 8 Cambridge Crescent, Harrogate.

KNOWLTON.—March 27.—For rebuilding hop oast. Mr. W. J. Jennings, architect, St. Margaret's Street, Canterbury.

LAUNCESTON.—March 31.—For building parsonage. Mr. Otho B. Peter, architect, Launceston.

LEADVILLE.—For building houses. Mr. W. Dixon, architect, St. John Street, Newcastle-on-Tyne.

LEEDS.—March 31.—For alterations to hotel. Mr. Thomas Winn, architect, 90 Albion Street, Leeds.

LEEDS.—March 31.—For erecting stone abutments and wing walls for steel bridge. City Engineer, Leeds.

LEEDS.—March 31.—For building steel girder bridge. City Engineer, Town Hall, Leeds.

LEIGH.—April 7.—For supplying and erecting boiler engine and laundry plant. Messrs. Banks, Fairclough & Stephen, architects, Leigh, Lancs.

LERWICK.—April 14.—For constructing waterworks. Mr. A. Sanderson, 72A George Street, Edinburgh.

LLANHILLETH.—April 6.—For building police-station. Mr. William Tanner, county surveyor, Llanhilleth.

LLANWONNO.—April 15.—For rebuilding church. Mr. E. M. Bruce Vivian, architect, Cardiff.

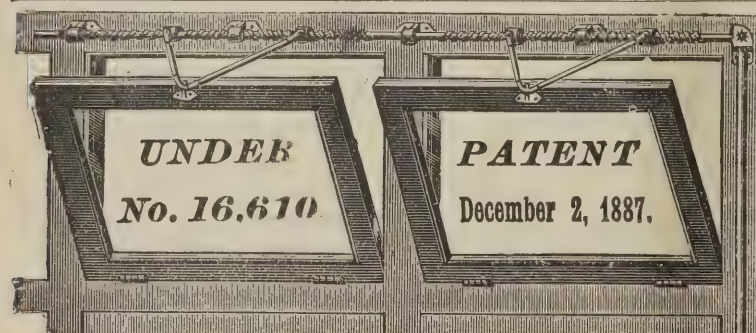
LONDON.—March 31.—For underpinning isolation ward. Metropolitan Asylums Board, Norfolk House, Norfolk Street, W.C.

LONDON.—April 15.—For building casual wards, Harrow Road. Mr. Henry F. Aveling, 289 Harrow Road, W.

MANSFIELD.—April 6.—For making-up streets. Mr. Frank Vallance, Mansfield, Notts.

MANSFIELD.—For building three shops. Mr. A. J. Cursham, solicitor, Mansfield.

MASBOROUGH.—April 2.—For building twenty houses. Mr. J. Platts, architect, High Street, Rotherham.



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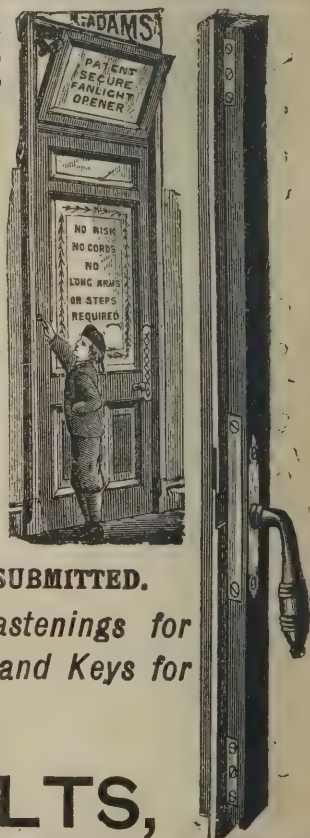
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MICKLETON.—March 26.—For rebuilding chapel. Rev. J. Forster, The Manse, Middleton-in-Teesdale, via Darlington.

MIDDLESBROUGH.—March 31.—For building twenty-four houses. Messrs. R. Lofthouse & Sons, architects, Middlesbrough.

MIDDLESBROUGH.—April 5.—For building six houses. Messrs. R. Lofthouse & Sons, architects, Middlesbrough.

MILNROW.—March 31.—For sewage disposal works. Mr. James Diggle, 29 Alexandra Street, Heywood, Lancs.

MODBURY.—March 31.—For building tank and making drains, &c., at Board school. Mr. John W. Harris, School Board Offices, Modbury, Devon.

MONMOUTH.—April 12.—For building engine and boiler houses, pump chamber, &c. Messrs. Bramwell & Harris, 5 Great George Street, Westminster, S.W.

MONTGOMERY.—March 31.—For erection of the Newtown county intermediate school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

MORLEY.—April 2.—For building eight houses. Mr. P. Buckley, Bruntcliffe, near Leeds.

MOUNTAIN ASH.—April 12.—For building workmen's hall and institute. Alderman William Jones, Oakwood, Aberfrwd Road, Mountain Ash.

NANTYMOEL.—March 29.—For building ten houses. Mr. John Owen, Ocean Colliery, Nantymoel, Wales.

NEWQUAY.—April 30.—For building hotel. Mr. Silvanus Trevail, architect, Truro.

NEWTOWN.—March 31.—For building school. Mr. H. Teather, architect, Andrew's Buildings, Queen Street, Cardiff.

NUNEATON.—April 5.—For constructing sewers. Mr. J. S. Pickering, Council Offices, Nuneaton.

OBAN.—April 15.—For municipal buildings. Mr. Alexander Shairp, architect, Oban.

OLD HILL.—April 2.—For building school. Rev. H. G. Button, Old Hill, Staffs.

OVENDEN.—April 2.—For building six stables. Mr. E. C. Morley, architect, Fountain Street, Halifax.

OVINGHAM-ON-TYNE.—March 31.—For building stone house. Mr. G. N. Lumley, Ovington.

PAISLEY.—March 27.—For building drill-hall. Mr. T. G. Abercrombie, architect, 13 Gilmour Street, Paisley.

PENZANCE.—April 8.—For building shed at the pig market. Borough surveyor, Public Buildings, Penzance.

PENZANCE.—April 8.—For concreting floor of Sheep. Market. Mr. T. H. Cornish, Public Buildings, Penzance.

PONTNEWYDD.—March 31.—For building three cottages. Mr. John Wakely, 3 Mount Pleasant, Upper Pontnewydd, near Newport.

PONTYPRIDD.—April 3.—For erection of school to accommodate 320 boys, 320 girls and 485 infants in the Llan Wood. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

RAWTENSTALL.—April 2.—For building villa residence. Mr. F. J. Hobson, architect, Victoria Buildings, Rawtenstall.

RAWTENSTALL.—For building cottages and shops. Mr. A. Adcock, 24 Whitehead Street, Springside, Rawtenstall.

REDRUTH.—April 14.—For building infirmary. Mr. Sampson Hill, architect, Redruth.

REDRUTH.—April 24.—For erecting winding engine at the Basset Mines. Mr. Nicholas Trestrail, Redruth.

RUGBY.—April 8.—For constructing main outfall sewer. Mr. D. G. Macdonald, surveyor, Rugby.

RUGELEY.—For alterations and additions to infant schools. Mr. W. E. Rogers, National Schools, Rugeley.

SALFORD.—March 31.—For building shed and boundary wall. Mr. S. Brown, Town Hall, Salford.

SANDBACH.—April 2.—For building shop. Mr. Alfred Price, architect, Elworth, Sandbach.

SELBY.—March 31.—For building engine-shed, coaling stage, &c. Mr. Wm. Bell, North-Eastern Railway Company, York.

SHEFFIELD.—March 31.—For erection of public baths at the corner of Sutherland Road. Mr. Charles F. Wike, city surveyor, Town Hall, Sheffield.

SHEFFIELD.—March 27.—For erection of drapery establishment covering about three-quarters of an acre. Messrs. Flockton, Gibbs & Flockton, architects, 15 St. James Row, Sheffield.

SHEFFIELD.—April 3.—For erection of roof, principals, slate laths, and cast-iron guttering for retort-house at Grimesthorpe Station. Mr. Hanbury Thomas, Commercial Street, Sheffield.

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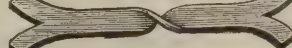
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**SOUTHAM.**—April 3.—For rebuilding schoolroom and renovating church. Mr. A. J. Sinnett, London House, Southam, Warwickshire.

**SOUTHAMPTON.**—April 13.—For constructing brick and concrete and stoneware pipe sewers. Mr. W. B. G. Bennett, Municipal Offices, Southampton.

**SOUTH MOOR.**—April 3.—For building twelve cottages. Mr. J. Errington, Ox Inn, Oxhill, Durham.

**SPITAL.**—March 31.—For building fifteen houses. Mr. John L. Miller, architect, 39 Hide Hill, Berwick-on-Tweed.

**STOKE GABRIEL.**—For building house and stable. Mr. W. T. Allen, architect, Kingswear, Devon.

**STREATHAM.**—For laying road and sewer. Mr. F. H. Harvey, 183 Lavender Hill, S.W.

**STRONTHIAN.**—March 31.—For building cottage. Mr. Alex. Shairp, architect, Oban.

**SUNBURY-ON-THAMES.**—April 1.—For sewerage works. Mr. John Anstie, 17 Victoria Street, Westminster, S.W.

**TOTTENHAM.**—March 31.—For alterations and additions to public-house. Mr. V. P. Rawlings, architect, 19 Willoughby Road, Tottenham, N.

**TUDHOE.**—April 1.—For erecting movable partitions in schools. Mr. Sam Adams, School Board Offices, Bishop Auckland.

**TUNBRIDGE WELLS.**—March 30.—For laying stoneware pipe sewers. Mr. W. Harmer, 137 London Road, Southborough.

**UPPERMILL.**—March 27.—For masonry required in rebuilding bridge. Mr. Rowbotham, Urban District Council Offices, Uppermill.

**WAKEFIELD.**—April 5.—For building electric-lighting sub-station. Mr. R. Porter, Town Hall, Wakefield.

**WALSALL.**—April 3.—For building house, workshops and offices. Mr. J. R. Cooper, Borough Offices, Walsall.

**WALSALL.**—March 30.—For making road. Mr. J. R. Cooper, Borough Offices, Walsall.

**WALWORTH.**—April 6.—For building postmen's office. Mr. H. Tanner, 15 Whitehall Place, S.W.

**WEST HAM.**—April 13.—For building sewage pumping engine, boiler and electric lighting houses. Mr. F. E. Hilleary, Town Hall, West Ham, E.

**WEST HARTLEPOOL.**—April 2.—For building post office. Secretary, H.M. Office of Works, 12 Whitehall Place, London, S.W.

**WESTMINSTER.**—April 2.—For building doctor's-room and for asphalt paving for the Guardians of Westminster Union. Messrs. J. Waldram & Son, 17 Buckingham Street, W.C.

**WHIFFIELD BRIDGE.**—March 31.—For masonry, &c., in widening bridge. County Surveyor, Moot Hall, Newcastle.

**WINDSOR.**—April 6.—For making-up roads. Borough Surveyor, Helena Road, Windsor.

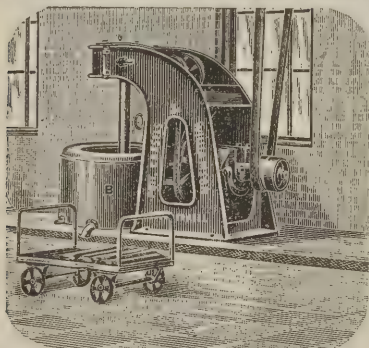
**WOKING.**—April 22.—For constructing cast-iron, concrete and stoneware sewers. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, S.W.

**WRANGLE.**—March 26.—For building school. Mr. Alfred Rose, Wrangle Hall, Boston

### CITY LUNATIC ASYLUM.

THE visiting committee of the City of London Lunatic Asylum, which is situated at Dartford, in Kent, have submitted to the Corporation of London plans for improvements in the asylum necessitated by the requirements of the Commissioners of Lunacy. The asylum was opened in 1860, having then cost 68,105*l*. A wing for 70 additional female patients was provided in 1874 at a cost of 9,000*l*, and a wing for 35 extra male patients in 1885 at an expense of 5,100*l*. In 1878 a detached cottage hospital was built at a cost of 5,100*l*. Later on the estate of the asylum was extended by the acquisition of additional land costing 8,000*l*. Though these additions have been made, no improvement of an important nature has been carried out since the asylum was erected, and so far as it affords facilities for the treatment of patients, it stands in a very little advanced position now than then. During the last fifteen years vast strides have been made in the system of the housing and curative treatment of the insane, and recently local authorities throughout the kingdom have been spending large sums in making better provision for them. As a result the committee's attention had been forcibly drawn by the Lunacy Commissioners to the inadequacy of the present buildings. They now recommend certain improvements at a cost of 46,770*l*, of which 16,225*l*. is for a new laundry, 16,300*l*. for infirmaries, 3,075*l*. for baths, 8,700*l*. for a new chapel and recreation room, beside other items. It is not intended to proceed with the whole of the works at once, but to distribute the expenditure over a period of three to five years, the Corporation granting the funds.

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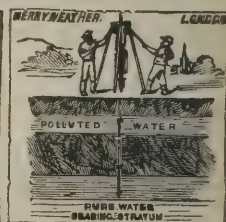
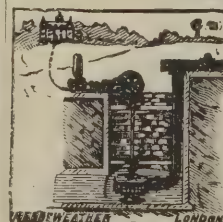
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## TENDERS.

### ABERDEEN.

For mason, carpenter, slater, plumber and plasterer's work to isolation hospital at Aboyne.

#### Accepted tenders.

J. Burges & Son, Aboyne, mason	£671 19 0
J. Innes, Torphins, carpenter	316 10 0
R. Wright & Son, Aboyne, slater	103 0 0
Thom & Strachan, plumber	137 10 0
Scott & Sellar, Aberdeen, plasterer	100 16 6

### ALLERTON.

For erecting villa residence, with stabling, coach-house, &c., Pearson Lane, Allerton. Messrs. FAIRBANK & WALL, architects, Craven Bank Chambers, Bradford, and Otley.

#### Accepted tenders.

T. Haigh, mason	£1,175 0 0
W. G. Bogg, joiner	468 0 0
T. & K. Pratt, plumber	258 0 0
J. Throp, plasterer	149 0 0
J. Smithies, slater	98 10 0
S. Cockcroft, painter	35 0 0

### AMMANFORD.

For building a house for Dr. Arthur Hughes. Mr. DAVID JENKINS, architect, Llandilo.

Jones & Davies	£1,180 0 0
D. Jenkins	1,150 0 0
JONES BROS., Tyrdail, Ammanford (accepted)	862 0 0
Lewis Davies	791 0 0

### ASCOT.

For erection of Linslade Rural District Isolation Hospital.

Grist & Co., Limited, Aylesbury	£3,488 0 0
C. Hart, Leighton Buzzard	3,120 0 0
Tutt Bros., Leighton Buzzard	3,115 0 0
H. Fincher, Tring	3,100 0 0
Garside & Son, Leighton Buzzard	3,060 0 0
A. E. Dawson, Leighton Buzzard	3,052 0 0
D. Cook & Sons, Leighton Buzzard	2,948 0 0
Webster & Cannon, Aylesbury	2,900 0 0
Edwards & Sons, Egginton	2,899 0 0
THOMAS YIRRELL, Leighton Buzzard (accepted)	2,895 0 0

### ASHTON-UNDER-LYNE.

For erecting Waterloo and Taunton Liberal Club. Mr. J. H. BURTON, architect, 2 Guide Lane, Hooley Hill.

#### General trades.

J. W. Williamson	£953 15 0
T. Dean	946 0 0
E. Marshall	936 10 0
C. Keswick	917 15 0
Fitton & Bowness	915 0 0
E. Kirby	893 10 0
J. Robinson	885 15 0
J. GIBSON & SON, Dukinfield (accepted)	870 0 0

#### Plumbing and glazing.

G. H. Coop	48 10 0
G. Burrows & Co.	48 0 0
A. Heald	47 10 0
P. Wills	45 0 0
A. C. HOBSON (accepted)	40 18 0

### BANGOR.

For alterations to The Alma Vaults, High Street, for Messrs. Greenall, Whitley & Co., Limited, Warrington. Mr. RICHARD HALL, architect, Bangor, N. Wales.

O. Morris	£799 0 0
J. & R. Williams	745 0 0
Jones & Williams	690 0 0
W. JONES, Bangor (accepted)	668 10 0

### BRADFORD.

For works required in erecting nurses' home, for the Board of Management of the Bradford Infirmary. Messrs. MILNES & FRANCE, architects, Bradford.

#### Accepted tenders.

W. Ives & Co., mason and joiner.
J. Smithies & Son, slater.
Stead & Hutton, plumber.
B. Dixon & Co., plasterer.
S. Lupton & Son, painter.

### BRECON.

For erecting cattle stalls and works in connection therewith within the cattle markets, for the Council. Mr. RHYS DAVIES, borough surveyor.

F. Phillips	£598 13 0
WILLIAMS & COPPAGE, Brecon (accepted)	598 10 7

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**BUCKFASTLEIGH.**

For erection of Y.M.C.A. premises and masonic hall. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, Torquay, Paignton and Teignmouth. Quantities by Mr. VINCENT CATTERMOLLE BROWN, Paignton.

R. Tozer & Son	£1,086	0	0
E. Pike	997	17	6
S. Blatchford	898	14	0
A. Wakeham	873	5	6
G. ARSCOTT, Buckfastleigh (accepted) *	827	9	4
Jackson & Son	813	10	0
G. Arscott	811	15	0

\* Revised tender.

**BUCKNALL.**

For provision and laying of pipe sewers, the laying of iron mains, construction of manholes and lampholes, &c., for the Stoke Rural District Council. Mr. LARNER SUDGEN, engineer, Miles Bank Chambers, Hanley (and at Leek). Quantities by the engineer.

	A.	B.
W. Johnson	£7,012 5 9	£5,743 15 6
S. Warburton	6,303 14 8	5,630 19 8
Joseph Young	4,645 0 0	4,610 0 0
C. Cornes	4,500 0 0	4,050 0 0
Thomas Grace	4,428 0 0	3,840 0 0
F. Barke	4,118 0 0	3,427 2 6
Smith & Taylor	4,052 0 0	3,376 0 0
W. Moss & SON, Loughborough (accepted)	3,970 0 0	3,252 12 0
A. Doulton's joints.		B. Clayed joints.

**CAMBRIDGE.**

For erecting ten new sleeping cells, with corridor, drying shed, &c., at the workhouse, Mill Road, for the Guardians. F. THODAY & CO., LIMITED, 104 Hills Road, Cambridge (accepted) . . . £285 0 0

**CORK.**

For building a sand quay at Glengarriffe, in the barony of Bere, for the grand jury of County Cork.

R. W. Johnson *	£527	0	0
J. Donovan	298	0	0
R. KELLY, Bantry (accepted)	290	0	0

\* This tender exceeded amount allowed.

**CREWE.**

For sewerage, forming, &c., Hungerford Avenue, for the Crewe Town Council. Mr. GEORGE EATON SHORE, borough surveyor.

T. Rowlands	£1,505	12	0
J. Ford	907	5	6
J. Johnson	626	17	5
F. Lunt	572	17	5
F. T. BENNIE, Warrington (accepted)	561	4	0

**DUNSTABLE.**

For repairs and alterations at the Town Hall, for the Town Council.

F. F. WHITE (accepted)	£164	13	6
A. W. Nash	137	0	0

**CROYDON.**

For erection of superstructure of block of five business premises, George Street, for Mr. F. R. Docking. Mr. A. BROAD, architect, 3 High Street, Croydon. Quantities by the architect.

Edwards & Medway	£5,900	0	0
A. Hood	5,669	0	0
Chessum & Son	5,659	0	0
E. J. Saunders	5,650	0	0
E. P. Bulled & Co.	5,628	0	0
S. Hart	5,600	0	0
W. Smith & Son	5,545	0	0
A. Bullock	5,540	0	0
J. Horrocks	5,495	0	0
S. Page	5,475	0	0
W. H. Lorden & Son	5,383	0	0
D. W. BARKER (accepted)	5,345	0	0

**GLANAMMAN.**

For building manager's house, for the Raven Tinplate Company. Mr. DAVID JENKINS, architect, Llandilo.

LEWIS DAVIES, Penygroes, Llandeibie (accepted) *	£532	0	0
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\* Lowest of three tenders.

**GLASS HOUGHTON.**

For works required in erecting Board schools at Cutsyke, for the Glass Houghton School Board. Mr. GEORGE F. PENNINGTON, M.S.A., architect, Bridge Street, Castleford.

JACKSON BROS., Goole (accepted)	£2,548	0	0
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For erecting additional coal-bunkers at Creek Bridge Wharf, for Messrs. William Dowell & Co. Mr. B. W. ADKIN, architect, 14 Queen Street, Cheapside, and 493 New Cross Road, Deptford. Quantities by architect.

		A
Chafen & Newman . . . . .	£5,994 0 0	£190 0 0
J. Mowlem & Co. . . . .	4,899 0 0	114 0 0
T. Dowdra & Son . . . . .	4,005 0 0	150 0 0
Clarke & Bracey . . . . .	3,988 0 0	118 0 0
T. Gregory & Co. . . . .	3,986 0 0	104 0 0
Kirk & Randall . . . . .	3,966 0 0	112 0 0
Holloway Bros. . . . .	3,780 0 0	120 0 0
Harris & Wardrop . . . . .	3,517 0 0	96 0 0
F. & F. H. Higgs, Loughborough Junction (accepted) . . . . .	3,390 0 0	100 0 0

A. Deductions if flat-bottomed bunkers.

HANLEY.

For following private street improvement work:—Hawkesmore Street, Harding Road, Shirley Road, Back Selwyn Street, Back Dresden Street, Back Waterloo Street. Mr. JOSEPH LOBLEY, borough surveyor.

*Hawkesmore Street, Harding Road, Shirley Road.*

T. Rowland . . . . .	£1,257 1 3
Brown & Blurton . . . . .	439 15 11
G. Wild . . . . .	357 16 2
W. Williams . . . . .	342 17 4
F. BARKE, Stoke-on-Trent (accepted) . . . . .	304 7 6

*Back Selwyn Street.*

C. Cornes . . . . .	103 0 0
Brown & Blurton . . . . .	82 4 0
J. Hopwood . . . . .	80 19 4
J. WILLIAMSON & SON, Macclesfield (accepted) . . . . .	75 17 0

*Back Dresden Street, Back Waterloo Street.*

Brown & Blurton . . . . .	168 4 0
J. Williamson & Son . . . . .	153 3 0
J. HOPWOOD, Hanley (accepted) . . . . .	149 6 1

HENDON.

For alterations to stables, Belle Vue Road, Hendon, Middlesex. Mr. GEORGE HORNBLLOWER, architect, 20 Fitzroy Street, W.

W. TOUT, Hendon (accepted) . . . . .	£382 0 0
--------------------------------------	----------

HARWICH.

For building a concrete reservoir and providing and laying 700 yards of 9-inch stoneware pipes, with manholes, &c. Mr. HY. DITCHAM, borough surveyor.

Pedrette & Co. . . . .	£663 0 0
Smith, Beaumont & Dawson . . . . .	605 0 0
Moran & Son . . . . .	585 0 0
McKenzie & Son, Clacton-on-Sea* . . . . .	525 15 0

\* Recommended for acceptance.

IVEGILL.

For works in building a farmhouse at Colt Close, Ivegill, Penrith, for Mr. J. W. Nelson. Messrs. GEORGE WATSON & SON, F.I.A.S., architects, 3 St. Andrew's Place, Penrith.

*Accepted tenders.*

T. Lowthian, mason . . . . .	£575 0 0
Richardson & Son, joiner . . . . .	315 0 0
J. Jackson, plumber . . . . .	121 9 11
J. Bailey, slater . . . . .	72 6 0

KINGSBURY.

For fences, gates and retaining-wall, Fairfields, Kingsbury, Middlesex. Mr. GEORGE HORNBLLOWER, architect, London.

T. TURNER, LIMITED (accepted) . . . . .	£203 8 0
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KEIGHLEY.

For paving, flagging, kerbing, sewerage and making good Parson and Nile Streets, for the Corporation. Mr. W. H. HOPKINSON, borough engineer.

*Accepted tenders.*

W. Baker, Gladstone Street, Parson Street, £689 9s. 2d. ; Nile Street, £91 6s. 10d.
---

LANCHESTER.

For the following works, for the Lanchester Rural District Council, viz. (1) about 630 yards of pipe sewers at Cornsay Colliery; (2) about 270 yards of pipe sewers at Cowsley Cottages, near Cornsay. Mr. J. E. PARKER, surveyor, Lanchester.

*Accepted tenders.*

S. Walker, Cockfield . . . . .	£336 12 0
D. Champney, Lanchester . . . . .	82 12 9

# TO PREVENT CISTERNS AND PIPES FREEZING.

## THE UNIVERSAL LAGGING COMPANY, LIMITED,

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(For Review, see *Engineering*, March 19.)

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## LINGFIELD.

For alterations and additions to Ford Manor, Lingfield, Surrey for Mr. R. Spender-Clay. Mr. A. WILLIAM WEST, architect, 44B Maddox Street, London, W.

A. Bush, London	£3,279	0	0
Patman & Fotheringham, London	3,273	0	0
J. LONGLEY & Co., Crawley (accepted)	2,789	0	0

## LONDON.

For constructing new sewers and underpinning and repairing existing sewers, and other works in connection therewith, for the St. Giles's District Board of Works. Mr. GEORGE WALLACE, engineer.

E. Parry	£2,057	0	0
Pedrette & Co.	1,990	0	0
W. Neave & Son	1,937	0	0
T. Adams	1,905	0	0
C. W. KILLINGBACK & Co., Camden Town (accepted)	1,897	0	0

For alterations and additions to 2 Devonshire Terrace, Portland Place, W. Mr. GEORGE HORNBLLOWER, architect, 20 Fitzroy Street, W.

W. TOUT, Hendon (accepted)	£1,326	0	0
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## LONDON SCHOOL BOARD.

For erecting new schools, &c., Windsor Road.					A		
W. C. Tyrie	£30,093	3	2	£286	13	0	
J. Longley & Co.	25,366	0	0	410	0	0	
J. Allen & Sons	25,338	0	0	410	0	0	
R. A. Yerbury & Sons	25,153	0	0	391	0	0	
D. Charteris	24,450	0	0	425	0	0	
Killby & Gayford	24,446	0	0	410	0	0	
J. Grover & Son	24,312	0	0	391	0	0	
W. Shurmur	24,290	0	0	390	0	0	
W. Gregar & Son	24,150	0	0	340	0	0	
E. Lawrance & Sons	24,093	0	0	390	0	0	
G. S. S. Williams & Son	24,040	0	0	415	0	0	
W. M. Dabbs	23,980	0	0	385	0	0	
Treasure & Son	23,795	0	0	394	0	0	
C. Cox	23,561	0	0	390	0	0	
J. & M. Patrick*	23,337	0	0	260	0	0	

A. Extra for brickwork in cement.

\* Recommended for acceptance.

## LONDON SCHOOL BOARD—continued.

For erecting cookery and laundry centres and science-room, &c., Millfields Road.

			A.
Dove Bros. . . . .	£3,100	0 0	£35 0 0
J. Grover & Son . . . .	3,081	0 0	33 0 0
T. Boyce . . . . .	2,784	0 0	85 0 0
E. Lawrance & Sons . . .	2,772	0 0	30 0 0
W. Shurmur . . . . .	2,709	0 0	72 0 0
G. S. S. Williams & Son . .	2,668	0 0	41 0 0
J. & M. Patrick . . . . .	2,569	0 0	27 0 0
C. Cox * . . . .	2,469	0 0	27 0 0

A. Extra for brickwork in cement.

For erecting junior mixed school, &c., Highway.

er erecting junior mixed school, &c., Highway.				A.			
J. Allen & Sons	£8,005	0	0	£150	0	0	
W. Gregar & Son	7,956	0	0	130	0	0	
Dove Bros.	7,670	0	0	150	0	0	
Killby & Gayford	7,596	0	0	149	0	0	
G. Munday & Sons	7,560	0	0	145	0	0	
G. S. S. Williams & Son	7,300	0	0	114	0	0	
J. & M. Patrick	7,284	0	0	73	0	0	
W. Shurmur	7,257	0	0	119	0	0	
Treasure & Son	7,166	0	0	110	0	0	
E. Lawrance & Sons	7,111	0	0	110	0	0	
C. Cox	7,026	0	0	110	0	0	
Stimpson & Co.*	6,980	0	0	146	0	0	

A. Extra for brickwork in cement.

For refitting closets and offices, Glengall Road.

G. Parker	£1,856	0	0
W. Downs	1,855	0	0
Dove Bros.	1,825	0	0
E. Triggs	1,729	0	0
J. & C. Bowyer	1,728	0	0
J. Willmott & Sons	1,720	0	0
E. Lawrance & Sons	1,690	0	0
J. T. Robey	1,650	0	0
J. Shillitoe & Son	1,650	0	0
G. Munday & Sons*	1,581	0	0

\* Recommended for acceptance.

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DISTEMPER  
PAINT

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ASYLUMS, CHURCHES,  
HOSPITALS, PRISONS, ETC.

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Fire Stations, &c., and used by the Corporation of the City  
of London and other large public bodies at home & abroad.

For further Particulars and Prices write to  
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NEW CROSS, LONDON S.E.



LONDON SCHOOL BOARD—continued.

For facing-up flank walls and providing buttresses, w.c.'s, &c., Haggerston Road.			
R. E. Clarke	£663	0	0
W. Irwin	632	0	0
W. Gregar & Son	572	0	0
F. Britton	510	0	0
McCormick & Sons	460	0	0
J. Kiddle & Son	458	10	0
J. T. Robey	457	0	0
Staines & Son*	449	0	0

For rebuilding offices, &c., Southampton Street.

Lathey Bros.	£919	0	0
J. Garrett & Son	898	0	0
G. Parker	893	0	0
Johnson & Co.	883	0	0
W. V. Goad	864	0	0
Holliday & Greenwood	861	0	0
W. & H. Castle*	790	0	0

For Interior painting, Wolverley Street.

Johnson & Co.	£481	10	0
Marchant & Hirst	416	0	0
T. Nicholson	410	0	0
W. Shurmur	396	0	0
J. T. Robey	342	0	0
A. W. Derby	326	0	0
J. Kybett	311	0	0
S. H. Corfield	305	0	0
G. BARKER (accepted)	283	0	0

For interior painting, Winstanley Road.

R. E. Williams & Sons	£360	0	0
Rice & Son	351	0	0
Lathey Bros.	339	0	0
E. B. Tucker	338	10	0
B. E. Nightingale	327	0	0
J. Garrett & Son	313	0	0
Maxwell Bros., Limited	303	0	0
G. Foxley	284	10	0
E. Flood	269	9	0
E. TRIGGS (accepted)	247	0	0

\* Recommended for acceptance.

LONDON SCHOOL BOARD—continued.

For exterior painting and interior cleaning, Chatham Gardens.			
F. Britton	£439	17	6
W. Shurmur	297	0	0
McCormick & Sons	271	0	0
W. Lawrence	251	9	0
W. Silk & Son	248	10	0
J. T. Robey	240	0	0
S. H. Corfield	224	0	0
G. BARKER (accepted)	219	10	0

For providing and fixing complete low-pressure hot-water apparatus and Trentham boiler, Sigdon Road.

J. C. & J. S. Ellis, Limited	£675	0	0
H. C. Price Lea & Co.	655	0	0
Maguire & Gatchell, Limited	647	5	0
G. Davis	576	0	0
Strode & Co.	498	0	0
Richardson & Co.	468	15	0
J. F. Clarke & Sons*	460	0	0

For cleaning windows, &c., book and furniture stores, Clerkenwell.

Anchor Window Cleaning Company.	£7	7	0
Great International Window Cleaning Company	3	7	6
PREMIER PATENT P.P. WINDOW CLEANING COMPANY (accepted)	3	2	6

For trolleys.

	4 ft. 6 in. by 2 ft. 5 in.	4 ft. by 2 ft.
Illingworth, Ingham & Co., each	£7 10 0	£7 10 0
Wake & Dean	6 10 0	6 2 0
T. Cruwys	6 0 0	5 10 0
H. Bouneau	5 18 0	5 16 6
H. Addison & Co.	5 5 0	5 0 0
G. M. Hammer & Co.*	5 0 0	4 17 0

For rack cupboards.

Rice & Son	each	£4 19 0
Illingworth, Ingham & Co.		4 17 6
H. Bouneau		4 9 0
J. Garvie & Sons		4 8 9
G. M. Hammer & Co.		4 7 6
H. Addison & Co.*		4 5 0

\* Recommended for acceptance.

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For UNDER SLATES, TILES, OR METAL.

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FOR  
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LANTERN LIGHTS.

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FOR NEW  
CATALOGUE  
THE  
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BRAINTREE,  
ESSEX.

**SASHES**  
WROUGHT  
IRON & STEEL.

**DOORS**  
WAREHOUSE  
AND  
PARTY WALL.



## LONDON SCHOOL BOARD—continued.

For gas coppers.					
H. S. Timpson	each	£1	10	6	
J. C. & J. S. Ellis, Limited			1	7	0
Rowson, Drew & Co.			1	3	6
Smallbone & Sutton			1	1	0
O'Brien, Thomas & Co.			0	19	3
R. H. & J. Pearson, Limited*			0	19	0
For screens for ironing stoves.					
O'Brien, Thomas & Co.	each	£0	17	2	
H. S. Timpson			0	15	6
R. H. & J. Pearson, Limited			0	10	6
H. & C. Davis & Co.			0	7	3
J. C. & J. S. Ellis, Limited*			0	7	0

\* Recommended for acceptance.

## MIDDLESBROUGH.

For alterations and new mahogany shop fronts to premises in Newport Road, for Mr. R. Wiggen. Mr. WALTER G. ROBERTS, architect, Albert Road, Middlesbrough.

## Accepted tenders.

W. Dale, joiner	£101	10	0
D. Doughty, brickwork, &c.	98	18	0
Walton & Gorthwaite, plumbing, glazing and gasfitting	64	0	0

Note.—Exclusive of painting.

For erecting a block of buildings in Newport Road, for Messrs. J. & T. Sawyer. Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.

## Accepted tenders.

Perks & Son, brickwork, &c., and joiner	£1,530	0	0
J. Harrison, slating	153	15	0
Walton & Gorthwaite, plumbing, glazing and gasfitting	143	0	0
F. Tomlinson, plastering	113	6	6

Note.—Exclusive of painting.

## OXFORD.

For alterations and additions to the Welsh Pony Public House, Gloucester Green. Mr. WILLIAM DREW, architect, Swindon.

WARD BROS., Oxford (accepted) £208 0 0

## MITCHAM.

For erecting new laundry buildings, for the Guardians of the Holborn Union.					
Willmott & Son	£6,894	0	0		
W. Wallis	6,515	19	6		
F. T. Chinchin	6,249	0	0		
Bulled & Co.	6,195	0	0		
H. Wall & Co.	6,193	0	0		
W. Reason	6,137	0	0		
Gregory & Co.	5,655	0	0		
LORDEN & Co., Upper Tooting (accepted)	5,418	0	0		

## OLD CHARLTON.

For constructing about 955 feet run of 9-inch pipe sewer in Church Lane, Charlton, for the Lee Board of Works.					
Thomas & Edge	£417	0	0		
W. Mills	407	15	0		
W. G. Dodd	395	0	0		
W. H. Wheeler	322	0	0		
J. F. GLOAG, Edward Street, New Cross (accepted)	259	8	7		
D. Brewer	196	0	0		
Surveyor's estimate	296	0	0		

## PAISLEY.

For erecting a fire-engine station, Johnston Street, for the Commissioners. Mr. W. MONCUR, surveyor.					
Morrison & Muir, Glasgow, masonry	£4,067	3	5		
A. McNaughton, wright	1,691	2	0		
Hanna, Donald & Wilson, iron and steel	648	10	9		
Barr & Proven, plumbing	323	7	2		
W. Speirs, plastering	249	6	0		
J. Jeffrey & Co., slating	206	0	8		
J. Kilpatrick & Son, gasfitting	76	16	4		

## SHILLINGTON.

For building new schoolroom and offices, and for cleaning, painting and decorating the Wesleyan Chapel at Shillington.

## Schoolroom.

J. Ruffell	£389	5	0
J. KING, Shillington, near Hitchin (accepted)	300	0	0
Wilson & Son	295	16	0

## Chapel Painting, &amp;c.

Morris & Son	105	10	6
J. Ruffell	89	10	0
Wilson & Son	55	10	0
J. KING (accepted)	49	10	0

## ETCHINGS! ETCHINGS! ETCHINGS.

Messrs. KING & CO., Fine Art Publishers, 13 BROWNLOW ST., HIGH HOLBORN, LONDON, W.C. Beg to announce that they are now offering their Stock of Etchings at about ONE-SIXTH OF THE ORIGINAL PUBLISHED PRICE. "PORTHOS" (The Three Musketeers), by Meissonier, Remarque Artist's Proof Etching, on White Satin, by the eminent etcher, Felix Oudart, "A Perfect Gem." Published at Six Guineas. Price, One Guinea. Being Sole Proprietors of the Copyright, not obtainable elsewhere.

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EASY TERMS—12 MONTHLY PAYMENTS.

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Flooring.  
REGD. No. 60,808.

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SPECIALTY—  
"Baltic"  
Redwood.

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Sanitary Exhibi-  
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CHARLES CHAPMAN &amp; SONS,

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Improved Steam Earth-boring Machinery for  
Wells up to 48 inches diameter, to any required  
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Manufacturer and Erector of Improved

REGISTERED  
LIGHTNING  
CONDUCTORS,  
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And LONDON.

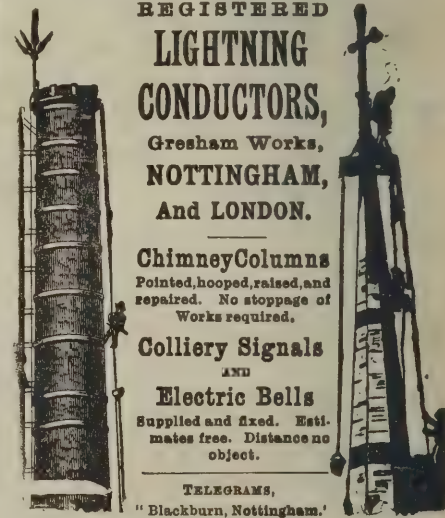
Chimney Columns  
Pointed, hooped, raised, and  
repaired. No stoppage of  
Works required.

Colliery Signals  
AND

Electric Bells  
Supplied and fixed. Esti-  
mates free. Distance no  
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ALABASTER

SAMPLES FREE.

BLOCKS.

Stone and Wood Work. 87 King Street, Derby.



STONESFIELD.

For execution of waterworks, for the Parish Council.

Wastie Bros.	£225	0	0
Turner & Sons	198	0	0
W. Richings	180	0	0
Rowell & Sons	165	0	0
W. H. BAUGHAN, Charlbury (accepted)	165	0	0

SURBITON.

For erection of a detached residence in Lovelace Gardens, exclusive of internal decorations. Plans, &c., by Mr. R. L'NO PEARCE, 100C Queen Victoria Street, E.C., and at Surbiton.

GEORGE BURRAGE, Sutton (accepted)	£1,192	0	0
No other tenders.			

SWINDON.

For erecting new premises in Fleet Street, New Swindon, for the North Wilts Conservative and Liberal Unionist Club. Mr. WILLIAM DREW, M.S.A., architect, 22 Victoria Street, Swindon.

Benfield & Loxley	£3,133	0	0
Flewelling & Huckson	3,080	0	0
T. Barrett	2,888	0	0
T. Colborne & Son	2,867	5	0
W. Jones	2,850	0	0
C. WILLIAMS, New Swindon (accepted)	2,627	0	0

For building smallpox hospital and caretaker's house at Gorse Hill, for the Swindon and District Hospital Board. Mr. WILLIAM DREW, M.S.A., architect, 22 Victoria Street, Swindon.

J. Hatherley	£1,053	0	0
T. Barrett	910	0	0
J. Williams	882	0	0
FLEWELLING & HUCKSON, Swindon and Wootton Bassett (accepted)	852	15	0
A. J. Colborne	769	15	6

Extra for Broseley Tiles.

J. Hatherley	33	0	0
T. Barrett	12	10	0
J. Williams	10	5	0
A. J. Colborne	7	10	6
Flewelling & Huckson	6	0	0

WEST STANLEY.

For enlarging West Stanley Schools, Durham, for the Tanfield School Board. Messrs. DAVIDSON & BENDLE, architects, 33 Grainger Street, West Newcastle.

W. Lodge	£3,759	8	0
Turner Bros.	3,642	1	0
A. & R. Davis	3,549	15	0
Reay & Son	3,419	8	4
T. Robinson	3,398	0	0
T. Mordue	3,323	8	0
A. Routledge	3,312	0	0
G. T. MANNERS, Durham (accepted)	3,295	0	0

WESTON-SUPER-MARE.

For low-pressure hot-water apparatus for the new offices of the Weston-super-Mare Urban District Council. Messrs. PRICE & WOOLER and S. J. WILDE, architects, Weston super-Mare.

Leaver & Fox	£375	0	0
Sydenham & Son	300	0	0
T. P. Curtis	289	5	0
Algar & Son	289	0	0
Williams & Son	274	18	0
H. Dyer	260	0	0
BRYANT & SONS, Weston-super-Mare (accepted)	255	14	9

Received too late for Classification.

COLCHESTER.

For erection of a pair of semi-detached villas. Mr. J. W. START, architect, Colchester and Harwich. Quantities by architect.

Cook	£1,634	0	0
West	1,514	0	0
Girling & Coe	1,495	0	0
Saunders	1,483	0	0
Dupont	1,479	0	0
Chambers	1,465	0	0
Beaumont	1,395	0	0
Appleton & Smith	1,356	0	0

Amended Tenders

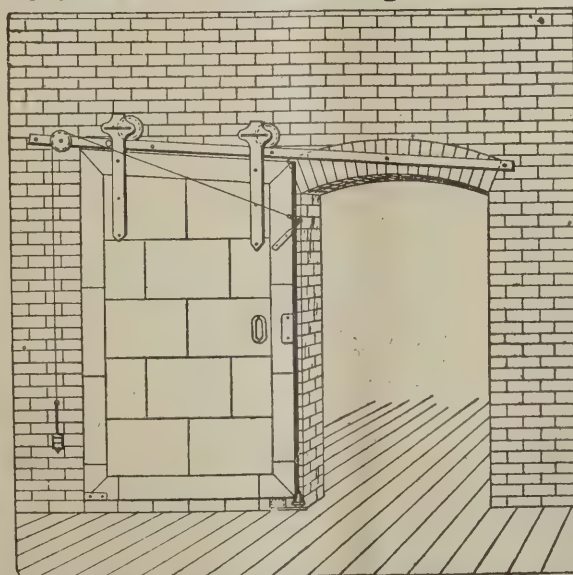
Dupont	1,319	0	0
Chambers	1,298	0	0
Appleton & Smith	1,232	0	0
BEAUMONT, Colchester (accepted)	1,215	0	0

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## A STEEL SHEATHED WOODEN DOOR WHICH IS FIREPROOF.

ACCEPTED & RECOMMENDED by ALL INSURANCE CO.'S

WILL NOT BUCKLE  
OR WARP LIKE  
THE ORDINARY IRON  
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CAN BE FITTED  
WITH AUTOMATIC  
SELF-CLOSING  
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FIRE AT THE WORKS OF THE ANAGLYPTA CO., DARWEN, LANCASHIRE.

The door we fitted in these works, although subjected to a heat intense enough to melt brass taps and fittings near it, withstood the heat perfectly, and can now be inspected at our works in Manchester, fit for duty. The metal sheets have expanded without becoming detached, whilst the wood is simply charred to a depth of about  $\frac{1}{4}$  of an inch.

FULL PARTICULARS AND ESTIMATES FREE FROM

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## ILLUSTRATIONS.

SALISBURY CATHEDRAL—CHOIR AND NAVE, LOOKING WEST.

BANQUETING HALL, STAFFORD HOUSE, ST. JAMES'S.

ST. PAUL PREACHING AT EPHEBUS.

(See article, p. 200.)

## THE BUILDING TRADES EXHIBITION AT THE AGRICULTURAL HALL.

THE exhibition, which was duly opened on Saturday last by the Lord Mayor, who, accompanied by the Lady Mayoress, assiduously visited every exhibit, with many of which he showed himself much interested and pleased, and consented to be photographed as the centre of more than one group, and generally gave the "show" a good "send off," has now nearly run its allotted course, and exhibitors are unanimous in expressing the opinion that it is the best Building Trades Exhibition which has ever been held. Almost every one has booked some good orders, while the inquiries which "may lead to business" are simply innumerable. We continue the description of the principal exhibits which we commenced last week.

*Waller's Grip-fast Tile Company.*

At the stand of Waller's Grip-fast Tile Company a very pretty building has been erected, which shows to great advantage this new patent tile which has been invented by Mr. W. A. C. Waller. These cement-tiles are very largely used upon the Continent, and there is no reason why they should not be just as extensively adopted in this country. One of the great advantages of the use of Waller's patent tile is that in consequence of the shapes in which they are made they are so fixed that they completely lock into one another, they can be made in any colour, and in consequence a very pleasing effect is easily obtainable. The company are supplying at the present time nine varieties of shape. Undoubtedly the most important feature of Waller's tile is that owing to this arrangement, by which each tile is locked to its neighbour, it is simply impossible for rain or snow, however severe, to penetrate. Works have been taken at Erith, Kent, and the company are now prepared to supply the building trades without delay. We shall shortly

give some illustrations showing the various patterns to those of our readers who may not have been able to visit the exhibit at the Agricultural Hall. On Saturday last when the Lord Mayor and Council opened the exhibition they were photographed at this stand, and the effect is exceedingly good, for not only were excellent likenesses obtained, but the roofing is seen to be very excellent from an architectural point of view.

*The Mural Decoration Company.*

During the run of the Exhibition one of the principal features has been the exhibit of the Mural Decoration Company, which has met with great commendation. We have been asked to publish the fact that they have received instructions to repair and match the ceiling of Grimsthorpe Castle, the Lincolnshire seat of the Right Hon. the Earl of Ancaster. This is a very fine old ceiling designed by Sir John Vanbrugh, some 200 years old, and it speaks well for the quality and design of the patent plaster decoration of this firm that such an important commission should be placed in their hands by Mr. Thos. Athey, the earl's architect.

*Aspinall's Enamel.*

The attractive little maisonette which has been a source of attraction at many exhibitions obtains a large share of attention owing to its bright picturesqueness and the facility it affords for the effective display of the various applications to which the firm's world-renowned enamel lends itself. The building itself, as well as the chairs, tables, overmantels, &c., which it contains, are coated with the enamel in various bright, but at the same time delicate, shades of colour. "Wapicti," the new washable distemper, is also used with admirable effect. The specialty, however, to which the firm is now particularly desirous of directing attention is the "O" quality of enamel specially prepared for decorators' use. It has a brilliant gloss, and is made to work easy and flow under the brush. It is usually supplied in a pure white, but can be tinted if desired, or can be made to match any pattern.

*The Enamelled Metal Decoration Company.*

The pavilion erected by this company is effectively decorated inside and out with their patent "Emdeca," an embossed and enamelled metal ornamentation, which has the appearance of tiles, than which it is much lighter and less expensive, and it can, moreover, be fixed in positions where tiles could not be used; a notable feature of the decoration of the pavilion is a panel about 4 feet by 3 feet with a view of Windsor Castle in

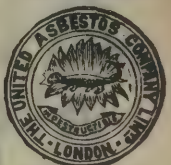
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Decorations in Bold Relief.  
Light in Weight. Plaster Effects.



Designs by Leading Artists.  
Absolutely Unflammable.

No. 1034. FRIEZE, 26 inches x 37 inches. 6s. 6d. per Panel. Weight only about 1½ lbs.

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CHIEF OFFICES—DOCK HOUSE, BILLITER STREET, E.C.

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blue, in imitation of old delft, the effect of which it admirably reproduces. It is suitable for hotels, restaurants, hospitals, shops, kitchens, lavatories, bathrooms, halls, &c., makes a capital ceiling for bars or other places where there is much gas, as it can be easily cleaned. Soft soap and water are sufficient to remove any stains, and to make the material shine like porcelain.

*Messenger & Co.*

The only display of horticultural apparatus is that of Messrs. Messenger, of Loughborough, whose glass-houses form an attractive feature in the building. About the houses themselves we did not notice any startling novelty, but in some cases their fittings deserve careful consideration. Their new ventilating gear, for instance, will be found of great value. It is not only suitable for green-houses and horticultural buildings generally, but hospitals, schools, public buildings, churches, &c., can be fitted with lever and other mechanical appliances, by which a single light or long ranges of continuous ventilators in any position can be opened simultaneously with ease. Messrs. Messenger are also showing a new method of heating, by means of which the sunk furnace pit is dispensed with, and their new iron sills, which are much cleaner and more durable than the old wood ones and no more expensive.

*Frederick Walton & Co., Limited.*

This firm have evolved an attractive little show out of the somewhat confined space at their disposal, and manage to find room to display some of their newest patterns and decorations with all the taste that we should look for from them. We are pleased to see that they are putting their goods—the substantial merits of which are too well known to be any further insisted upon—on the market at prices which place them within the reach of everybody who values an artistic and sanitary surrounding. Their ceiling design, No. 1,080, for instance, is a good, distinct, clearly-moulded and graceful pattern, which they are offering at 1s. per lineal yard. Their table-mats, too, the designs for which are by Lewis F. Day and other artists of repute, and which are in sets of six, from 9 by 6 inches to 14½ by 10½ inches, are sold at 2s. 6d. and 3s. 6d. per set.

*J. Mitchell & Co.*

A monumental display of sanitary appliances is arranged with considerable effect by this well-known firm, whose show of lavatories (single and in ranges), sinks, washtubs (also single and in ranges), urinals and w.c.'s comprise some excellent patterns and not a few novelties. Among the w.c.'s the place

*d'honneur* is occupied by the "Grecian," which conspicuously heads the exhibit, and claims attention by reason of its classic appearance and the grace of its lines and ornamentation. The design is pleasing in itself, and will lend itself to almost any scheme of colouring and harmonise with the most æsthetic style of decoration.

*Incandescent Gas Light Co.*

Conspicuously placed in the centre of the building is the stand of the Incandescent Gas Light Co., who, in addition to the ordinary types of burners which they have exhibited at previous exhibitions, are showing two novelties called respectively the "Gem" and the "Switch-light" burners. The former of these can be used with advantage where a less powerful illuminant than the "C" burner is required, and the very small amount of gas consumed, viz. 1½ cubic feet per hour, renders it the most economical form of light to be obtained; while the latter is made for use in large halls and other buildings where it is found necessary or convenient to turn the lights on and off from one point without having to use a torch or other method of lighting. Several novelties in fittings and globes are also shown, and among the latter some small ones of French design and manufacture are especially pleasing.

*Samuel Wright & Co.*

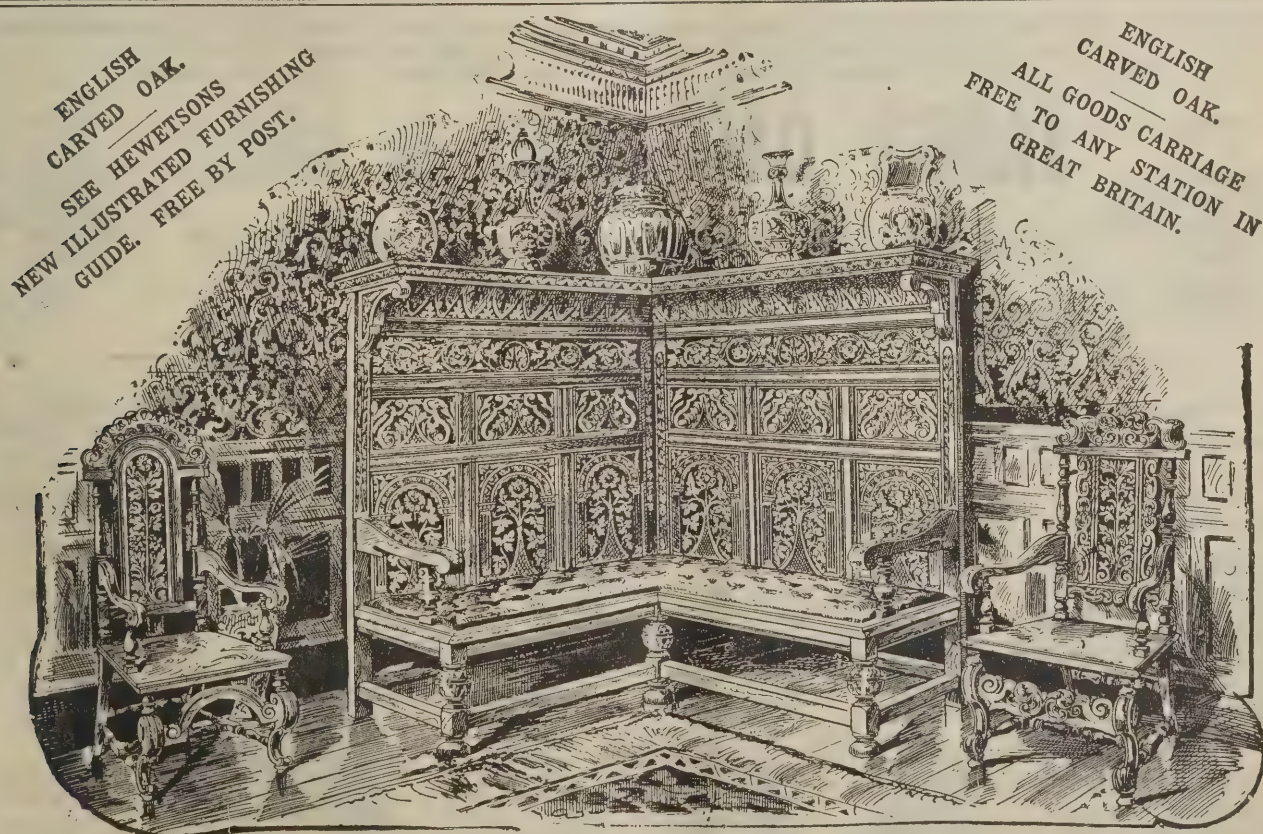
The exhibits sent by this firm are singularly few, but they amply make up in quality what they lack in quantity, and consist of a section of a highly-enriched ceiling, a portion of a very elaborate cornice, a pillar and capital, all of which are designed and finished with the artistic feeling and finish for which this firm has achieved a reputation.

*The London Hoist and Chain Company.*

This company has provided nothing in the way of novelty for this year's exhibition, and content themselves with exhibiting their hoisting appliances, pulley-blocks, cranes, winches, &c.

*Joseph Kaye & Sons.*

Messrs. Kaye & Sons are showing an elaborate selection of their now well-known locks of various makes and descriptions suitable for house, school, asylum, prison and fire-station doors, sliding doors of all kinds, drawers, desks, cupboards, exit-doors of all kinds, lift-doors, stable and loose box doors, night latches, engaged bolts, automatic bolts for folding doors, fanlight openers, window locks, waggon and cart door fasteners, cabinet locks and latches, fare collecting boxes for tramways, omnibuses, &c.



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

No. 319.—The "WORTLEY" CARVED OAK ARM-CHAIR, £4 15s.

No. 320.—CARVED OAK HALL COSY CORNER, 6 ft. 6 in. high, £24 10s.

No. 321.—The "KNIGHT" CARVED OAK ARM-CHAIR, £4 5s.

**HEWETSONS,** ARTISTIC FURNISHERS AND HIGH-CLASS DECORATORS, **TOTTENHAM COURT ROAD, LONDON.**



*Thomas Potterton.*

Mr. Potterton is, as usual, showing his patent range boilers for supplying hot water in large quantities and warming houses throughout, in connection with domestic supply heated by a kitchen of ordinary dimensions. He is also showing his new hot-water thermometer, which should be fixed on the main flow pipe as near the boiler as possible, and exposed to view; it will accurately indicate the temperature of water. The glass bulb of each instrument is immersed in a mercury bath protected by a thin steel tube, so there is little chance of injury. By the intelligent management of a kitchen fire used for a heating or domestic hot-water apparatus, and by regulating the boiler damper in summer so that the water is not heated much above 150 deg., which is hot enough for ordinary domestic purposes, no incrustation will take place. His altitude gauge, which accurately indicates if the cistern supplying the apparatus is full of water and avoids the necessity of going to the cistern to ascertain this, is of obvious utility; and another ingenious idea is his improved safety valve, the spindle of which is made of strong brass tube instead of a solid rod, a small petcock being fixed at the top, so that water can be drawn; if this is done it will indicate that the valve seating is free from incrustation. If water does not issue there is something wrong, and the valve and the pipe to same should be disconnected and examined.

*Yates, Haywood & Co.*

In the same position as at the last exhibition, Messrs. Yates, Haywood & Co. have a noble display of stoves, grates and overmantels in wood and cast-iron. Notable among the latter is a very fine specimen of admirable design and execution; it is of great size both as regards width and height, and although the lines and ornamentation are of an elaborate description, the whole thing is cast in only three pieces and the price is distinctly moderate. The firm is also making a strong point of their patent "Quadrant" kitchen, which while of distinctly attractive appearance, possesses the following advantages, and insures economy in fuel, fixing, use and great durability. It has a self-adjusting lifting fire, can be raised or lowered to any point with one hand. The movable parts do not come in contact with the fire, consequently no wedging or getting out of order is possible. The range fire cheeks and the back boiler can be taken out without disturbing any other part of the kitchen. Over and under-draught ovens can be made with enclosed iron flues requiring no brickwork setting.

Messrs. Yates, Haywood & Co. have for many years enjoyed a reputation for their goods, and their name is sufficient guarantee that any goods supplied by them will be of the best quality and workmanship.

*The National Opalite Glazed Brick and Tile Syndicate.*

The application of opalite as a new material for glazing bricks and wall surfaces is attractively demonstrated at the stand (Bay 20) of the above syndicate, where the inner and outer walls, ceiling, &c., of a bath-room are covered by the new method, which possesses many advantages, one (and by no means the least) of which is that it can be applied to an old or unsightly wall without any difficulty and at comparatively little expense. Others are that the material is imperishable; it does not by exposure to damp, frost, or heat, lose any of its beautiful polished surface, neither does it become patchy. There is a saving of nearly 20 per cent. on ordinary glazed work; it is readily repaired, and at much less cost than other systems of tiling or glazed work. Both old and new brickwork can be glazed; and the advantages of having walls glazed after the brickwork is finished are strongly urged, to secure a close joint and avoid a heavy waste in breakages. It is made in a variety of tints, and for beauty and brilliancy is far in advance of the old glaze. The surface being of a higher polish than ordinary glaze, dirt, &c., will not adhere to anything like the same extent. The reflecting power is far superior to that of any other glazing material; the reflected light is greatly increased, and none of its power is lost by exposure to damp. This advantage will be readily appreciated for subways, passages, basements, &c., where borrowed light is a necessity. For bath-rooms, lavatories, corridors, kitchens, larders, dairies, &c., it is invaluable, as the surface is not affected by moisture; it does not craze like ordinary glaze, and therefore needs no renewing. It has already been extensively applied to public and municipal buildings, hotels, hospitals, institutes, schools, baths, railway stations, and has invariably given great satisfaction.

*W. Gooding.*

Mr. Gooding tells us that he has brought out nothing new lately, as he has enough to do to keep pace with the demand for his patent interchangeable rubber stair treads, of which he is showing samples, and which are pretty generally known. These treads consist of an iron keeper pierced with a number of square-shaped holes, through which blocks of rubber are placed,

MELBOURNE INTERNATIONAL EXHIBITION, 1880-81, THE ONLY GOLD MEDAL, IN ADDITION TO FIRST-CLASS HONOURS  
ADELAIDE INTERNATIONAL EXHIBITION, 1887, THE FIRST ORDER OF MERIT;  
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MANUFACTURERS OF EVERY DESCRIPTION OF

## Cabinet, Builders', Furnishing, & Naval Brass Foundry,

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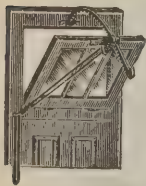


LONDON SHOWROOMS, 57 HOLBORN VIADUCT, E.C.

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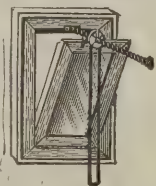
Patent Window Openers, for Opening, Closing & Securely Fastening Fanlights, Casements, Skylights, &c.

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**A2740 A2741**  
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5/6 12in. 3/6  
6/- 14in. 4/-  
6/9 16in. 4/6  
7/6 18in. 5/-  
10/- 24in. 6/-  
each.

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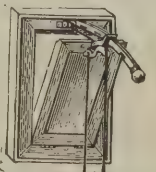
**A553**  
All Brass.  
3/4 x 15, 8/6  
1/2 x 18, 11/6  
**A553**  
Iron Screw.  
3/4 x 15, 7/6  
1/2 x 18, 10/-  
each.

##### LILLY'S PATENT FANLIGHT OPENER.



**A2623**  
Brass.  
3/9  
**A2624**  
Iron.  
2/6  
each.

##### BEANLAND'S QUADRANTS.

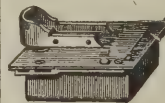


**9052**  
Iron. Brass.  
1/2 12in. 4/8  
1/11 16in. 6/8  
2/2 18in. 8/-  
each.

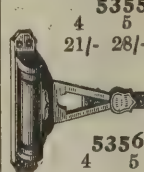
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**5753 Iron.**  
3 inch, 4/-  
4 " 6/-  
5 " 8/-  
**5754 Brass.**  
3 inch, 6/6  
4 " 10/-  
5 " 13/-  
per pair.



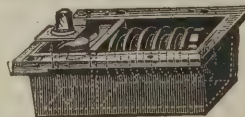
**2401**  
With 2in. Shoe,  
16/6 each.



**5355 Iron.**  
4 5 6in.  
21/- 28/- 36/- doz.  
**5356 Brass.**  
4 5 6in.  
35/- 45/- 55/- doz.

##### MACKIE'S PATENT "DEFIANCE" HYDRAULIC WATER-TIGHT FLOOR SPRING AND CHECK.

Size of Plate,  
12 x 8 in.  
Size of Box,  
10 1/2 x 6 x 3 1/2 in.



**906**  
80/-  
With top centre  
and brass shoe any size.

This Floor Spring is suitable for any sized door, and can be regulated to suit any force required.

The box is watertight and weatherproof, a distinct advantage when fixed in Banks, Board Schools, Libraries, and similar places, where the floors are frequently washed down.

It is also sent complete with an outer box to fix into floor, to facilitate the spring being taken out when necessary.

Working Models of these and other Specialties may be seen at our newly-fitted London Showrooms, 57 HOLBORN VIADUCT, E.C.  
Architects and Buyers are respectfully invited to inspect same.



these blocks forming the wearing surface, and affording a perfectly firm footing under all circumstances. They are easily adapted to existing stairs, and can be readily fixed by any man, two or three screws being sufficient to keep them in position. They do not in any way weaken the stairs, but greatly enhance the appearance.

*George Jennings.*

One of the most effective stands in the sanitary section of the exhibition is that of Mr. George Jennings, who has managed to arrange a number of such unornamental items as drain-pipes into quite an attractive display. He is showing stoneware drain-pipes, ditto with Stanford patent joints, Tyndale's patent double seal joint pipes, intercepting traps and grease traps, yard gullies, stoneware wall coping, bonding bricks and air bricks, damp-proof courses, terra-cotta vases, architectural terra-cotta moulding, bricks, facing bricks, building bricks, &c., and making a specialty of his patent "double seal" jointed pipes (Tyndale's patent), which are made of the best selected Dorsetshire clay, an imperishable material, homogeneous in texture and impermeable to water, and afford improved facilities for quick laying, testing and covering in, combined with a perfectly sealed and rigid joint. The method of jointing is a patented improvement upon the principle of the well-known "Stanford joint," in the addition of a deeper and under-cut socket, so that after the pipes have been laid and tested the additional security of a fillet of cement may be added for the purpose of insuring a more perfect and permanent connection. The concentric fitting of the "Stanford joint" also prevents any possibility of obstruction whilst jointing, due to a frill of cement being squeezed up inside the pipes through the socket. As an indication of the quality of the clay of which his pipes are made, Mr. Jennings is showing a large drain-pipe in Dorset clay which was laid at Anglesea Barracks, Portsea, twenty-five years ago, and which, having to be removed quite recently in the course of alterations, is seen to be in a condition exactly as new.

*H. J. & C. Major, Limited.*

Messrs. Major have the same stand and position in which we have been accustomed to see them for many past exhibitions, and if they are not showing anything strikingly new, they at least prove that they are not retrogressing in any way. Their *pièces de résistance* are, as before, their patent Roman and angular corrugated roofing tiles which require no mortar or cement, and no counter lathing. They are lighter in weight per square

than slates or Broseley tiles, and for that reason the timber required to support them is less costly. The natural colour of these tiles is a bright, cheerful red; they are also made blue or slate colour by an entirely new process, by which the colouring matter permeates evenly the whole substance of the tile.

*Candy & Co.*

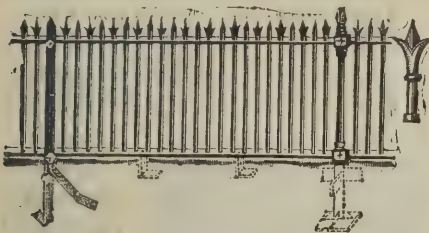
Messrs. Candy have a liberal assortment of white and coloured glazed bricks, salt-glazed bricks, buff granite vitrified stable and other paving bricks, buff vitrified engineering and facing bricks, &c., on show. They are, however, especially drawing attention to their buff vitrified Olympia stable bricks, which are grooved in one direction only, which insures rapid drainage and clean sweeping, two desiderata which are of paramount importance in the domestic economy of the stable. They are likewise extremely hard and heavy, and comparatively inexpensive.

*Linoleum Tile Company.*

The inlaid linoleum tiles manufactured by this company are attractively displayed at Stand 76. They embrace many new patterns and colourings in heraldic, æsthetic, grotesque and other designs, all of which are characterised by the excellence which has brought this company's wares to so high a position in the estimation of the public. Some special patterns and shapes have recently been introduced for the treads and risers of stairs, and when finished with the company's patent indiarubber nosings produce a capital effect, being at once bright, clean, safe, durable and comparatively cheap. The company are bringing out, too, a reversible mat for railway carriages, which is already being taken up by some of the leading railway companies, and will, no doubt, speedily be adopted by all, as in addition to its ornamental appearance, cleanliness and durability, they possess the very appreciable property of deadening to an almost incredible extent the noise inseparable from railway travelling.

*Joseph Arnold.*

The compact little display arranged by Mr. Arnold gives a fair idea of the various products of the valuable sandpits of which Mr. Arnold is the fortunate proprietor. We gave a full description of these phenomenal pits in our issue of March 20, 1896, from which it may not be amiss to reprint the following:—"It is estimated that the yield of sand is from 145,000 yards to half a million yards per acre. The sand, while of a uniformly excellent quality, varies in texture and colour from the pure



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white silicious sand absolutely free from iron and so fine as to resemble in appearance pounded sugar or table salt (a fine description invaluable for glass making), ranging in colour through all the shades of yellow and grey to a rich orange or dark brown, and in texture to grains the size of shot. A peculiarity of these beds, of which we append a couple of photographic views, is that the different grades of sand are found each in its allotted place, so there is no question of screening the coarse from the fine, each description being ready to hand, a fact which materially minimises labour in the getting, and, with the above-mentioned facilities for carriage, enables Mr. Arnold to put his sand on the market at a lower rate than that which usually obtains. The estate yields every description of sand suitable for building, brick-making, cement-work, filter beds, horticultural and stable purposes, &c. There is also an excellent argillaceous sand for moulding and foundry-work."

*Molesworth & Co.*

Messrs. Molesworth & Co., of Ketton, exhibit at Stand No. 127, Row F, a piece of ashlar with battlement coping, which is much admired, the warmth of colour making it very attractive. There is also a Corinthian capital, balustrades and a pillar of stone 3 feet 6 inches on bed to show depth. The durability of this stone cannot be better exemplified than by the two old date stones on this stand, one dated 1567 the other 1664, in a perfect state of preservation; the arrises of the latter are almost as sharp as when worked. We are also informed the proprietors are now quarrying blocks of immense size, and the quantity seems almost inexhaustible. The stone has a good surface, and from appearances we should say that when once faced it would very soon harden.

*Patent Victoria Stone Company.*

The Patent Victoria Stone Company's exhibit commands attention by reason of its monumental and at the same time very picturesque appearance. Here are shown a mullioned and transomed window in red stone made for the new buildings of the Army, Navy and Auxiliary Forces at Turnham Green; a massive truss for the new buildings in University Street being erected for Messrs. Shoolbred & Co., all the stonework of which is being done in patent Victoria stone; an entrance portico in Victoria stone, which has as good an effect as fine polished granite, for a new hotel at Clacton-on-Sea, and equals plain granite of a very fine texture; a balustrade for new buildings, Whittington Restaurants, Moor Lane, E.C.; a

very handsome example of a staircase for the West Ham Gas Company's new offices; a very fine carved panel by Mabey, which is undoubtedly a work of art, matching yellow Mansfield, and one in red Mansfield; a pair of handsome oval vases in red stone carved by Mabey; specimens of the red and buff tiles used to repave the entrance hall for St. Thomas's Hospital; a fine example of Gothic tracery for the Clerks and Warehousemen's Schools, Purley; some specimens of the platform coping as supplied to the Great Western Railway Company, &c. One is surprised at the beautiful effect that can be obtained by Victoria stone, and all visiting the exhibition should not fail to see this firm's stand. The Patent Victoria Stone Company have taken up the concessions of the Patent Opalite Tile Company for the counties of Nottingham and Leicester.

*Stanley Brothers, Limited.*

The excellence of the productions of this firm are too well known, and specimens have been seen at too many exhibitions to render an extended notice necessary. Their very effective exhibit is as usual built up of their salt glazed and enamelled bricks, blue bricks, roofing tiles, red ridges and finials, red and buff chimney-pots, ornamental red terra-cotta enrichments, semi-encaustic paving tiles, garden tiles, &c., a prominent position being assigned to their Jubilee Panel, of which we had occasion to speak at some length in a recent issue.

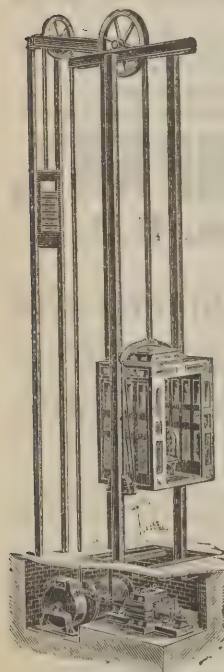
*The Grays Chalk Quarries Company.*

At this stand will be found a decorated brick window opening, intended to show the scope of bricks as to variety of colour and work. Bricks (machine and hand-made), reds (dark, medium and light), primrose (dark, medium and light), chocolate, vitreous and primrose hards, specially adapted for reservoirs. Mr. Currey, the secretary of the company, is also showing some special facing bricks in red and yellow, and a special brindle brick for the lining of reservoirs, which is particularly suitable for all engineering purposes. This brick has been used for the South Hants Waterworks Company, also for the South Essex Waterworks Company, in both of which places it has given great satisfaction.

*F. McNeill & Co.*

In our reference to this firm last week we omitted to mention the neat little brochure which the firm has just issued, giving at considerable length the uses of slag wool in building construction, &c., for fireproofing, sound-deadening and insulation of

## EASTON, ANDERSON & GOOLDEN, Ltd.,



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Broad Sanctuary,  
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AND  
ERITH IRONWORKS, KENT.

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FIRST-CLASS  
HYDRAULIC,  
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STEAM AND HAND  
POWER.

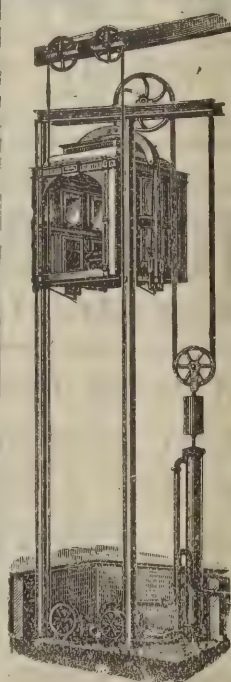
WATER-SAVING  
LIFTS  
FOR  
PASSENGERS, GOODS  
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DINNER SERVICE,  
PERFECT SAFETY.

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PASSENGER.  
GOODS.  
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SAFETY.  
SILENCE.  
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SCREENS,  
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STANDARDS,  
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BRACKETS,  
AND ALL KINDS OF  
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OR OIL  
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GIVEN TO  
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ABSOLUTELY DAMP-PROOF.  
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SPECIALITIES—  
Paint Ground in Oil, Ultramarine  
Blue, and Varnishes.

THOMAS PULFORD, 77 CANNON ST., E.C.



heat and cold. This little book, which Messrs. McNeill & Co., are issuing gratis, will be found very useful, and should be in the hands of every builder and contractor.

*Matthews & Yates.*

Messrs. Matthews & Yates are showing two of their continuous-current fans, such as they have recently fitted at the Trocadéro and other restaurants, several theatres, &c. One, a 24-inch size, makes 500 revolutions and discharges 3,000 cubic feet of air per minute, while the other, a 48-inch, makes 250 revolutions and discharges 13,000 cubic feet of air in that time.

*Frederick Jones & Co.*

This firm is showing the various purposes to which their silicate cotton or slag wool can be appropriately and advantageously applied. The chief of these are:—For fire-proofing, sound-proofing, or heat-proofing floors, walls, partitions, &c.; for lining roofs of houses, to render them impervious to climatic influences; for protecting iron girders in event of fire; for covering pipes, cisterns and other vessels exposed to extremes of heat or cold; for insulating purposes in cold-air stores, &c. Messrs. Jones & Co. are also showing their wool pipe-protector, the advantage of which lies in the fact that the thick wool lining being made in diagonal sections is intended to be wound round the pipe, and will thus accommodate itself to any bend or angle.

*The Anaglypta Co., Limited.*

Stand 44, Row B, is devoted to the display of the Anaglypta wall and ceiling decorations, the designs for which are all by well-known artists, and embrace a large variety of very excellent patterns both in high and low relief. There is a marked tendency just now for exceptionally high relief, and in recognition of this fact the company have got out some very fine specimens of Old English, Pompeian, English, French and Italian Renaissance, Elizabethan strapwork, "Adams" and Queen Anne, all of which are fully endued with the spirit of the respective periods. The Anaglypta Company are also supplying mouldings to match the different patterns which, in different widths and sizes for all purposes to which mouldings can be applied, have been found particularly useful in ceiling decoration, as by their use the Anaglypta, instead of being run right into the cornice, with which perhaps it does not strictly harmonise, can be cut according to the pattern, leaving a space of greater or less width between it and the cornice, the effect of which is greatly enhanced thereby.

*Cameo Woodworking Company.*

This company have an extensive assortment of samples of their "oppressed" ornamental wood moulds, panels, dadoes, cornices, mantelpieces, architraves, overmantels, chair rails, ceilings, picture rails, picture frames, finger plates, screens. The designs are in relief and in two or more colours, and it is claimed that the patent process adopted for the treatment of the wood (which is the exclusive property of this company)



prevents the burning or crushing of the fibre, and the wood after leaving the machine therefore retains its natural colour and remains perfectly solid. A variety of shades in colour can be supplied, ranging from a very dark brown up to a light biscuit colour. The various designs lend themselves most appropriately to fitting-up steamship or yacht cabins, railway carriages, tram cars, hotel lifts, billiard-rooms, bars, saloons, business premises, bank appointments, &c., and by a judicious arrangement of panels and mouldings can be made to present a rich and attractive appearance at a comparatively trifling outlay.

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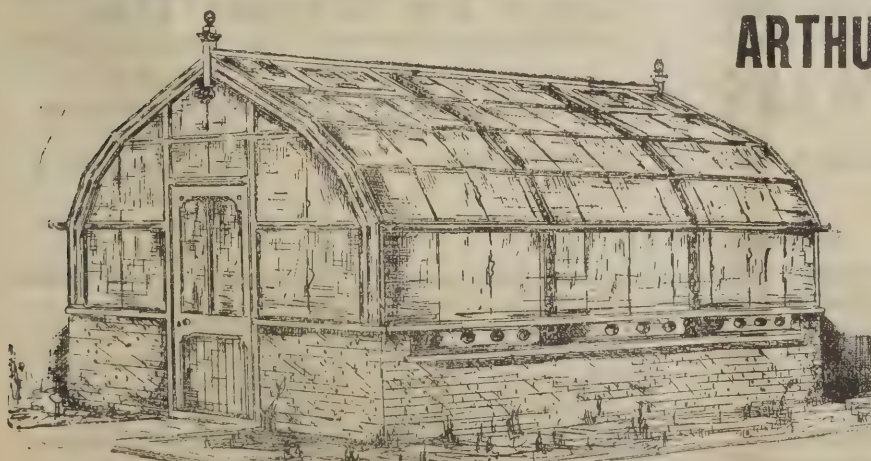
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*Broad & Co.*

Messrs. Broad & Co., Limited, Paddington, exhibit a large variety of white enamelled ware in channel pipes and bends, gully and grease traps, sewer-gas interceptors, and other drainage accessories, with all improvements up to date. This company is also exhibiting an excellent "impermeable" drain pipe, and also channel pipes, bends and gully traps manufactured of cream Bristol ware; these goods being quite impervious need no testing. Broad & Co.'s patent sink is one likely to be very largely used, as it obviates some of the objections to the ordinary scullery sink. The white enamelled drinking-water cistern exhibited is obviously perfectly adapted for the purpose, whilst the sewer-gas interceptors are now so well known as to need no comment. At this stand will be seen excellent patterns of fireclay closets, especially an "infantile closet" designed for schools; also manhole covers, drain pipes, and a selection of sanitary specialties for which the company is so well known. Some excellent specimens of terra-cotta are also exhibited, the buff being especially good.

*Adamant Company, Limited.*

The Adamant Company, of London and Birmingham, have a very handsome exhibit at their stand, which shows off to great advantage the merits of their patent composition; amongst some of the advantages of adamant we may mention the following claims. It is extremely quick setting and drying, and finishes with a very hard, firm, smooth face, and the small quantity of water required to mix the material is of great advantage, inasmuch as the plastering does not affect the wood work, as is the case in lime and sand plastering. The cost is very moderate, and although more than common plastering, gives a job equal to Parian or Keene's at about half the cost. The finer setting coat called Chromolith finishes pure white, and can be left from the trowel, and will take an exceedingly fine polish, and finishing an enamelled white. The special cornice material is also pure white, and all the mouldings run in this material are very hard and clean, and the arrises sharp and fine. The Adamant Company are makers of a special waterproof cement, which can be finished either with a trowelled face or stippled to give a rough cast appearance, and as this can be done in various tints the result is very effective. The company are also makers of special fireproof flooring blocks, which are at present being laid and giving great satis-

faction in several important buildings in the provinces. The blocks are composed of an "adamant" substance, and are made into a concrete with breeze or other like material, strengthening the same longitudinally with wood, iron or steel laths, according to their length and the weight required to be sustained, the said blocks having a length nearly, but not quite, equal to the distance between the bodies or vertical parts of the two girders, and of a breadth about one-third their length. The said blocks may be nearly of a triangular figure in cross section, although the upper surface may for the greater part be flat or curved. The lower surface of the block is flat and made rough for plastering, and the ends of the block have at their lower angles splayed recesses or rebates which, when the block is in position, the lower flange of the girder occupies. The splayed recess or rebate in the end of the block is of such a depth that when in position the lower surface of the said block is at a somewhat lower level than the bottom flange of the girder. Adamant blocks having been put in position on the girders, concrete is placed on the said blocks and girders to a height a little above the top of the girders. The said blocks and top flanges of the girders are embedded in the concrete, the upper surface of which constitutes the floor or the support for other floor finishing. The spaces under the bottom flanges of the girders, between the splayed ends of the "adamant" blocks, are filled in with "adamant" so as to form a foundation for the ceiling below.

*J. Armstrong & Sons.*

Messrs. J. Armstrong & Sons, 95 Dorset Road, Clapham, S.W., Stand No. 17, Row A, have a good display of drain-cleansing and chimney-sweeping machines. They are exhibiting a great improvement in the rods; the brass screws are much longer in the thread and double rivetted. It is, therefore, impossible for the screws to pull off or break from the rod, and they will with this improvement carry up to 400 lengths, or even more.

*Wm. Johnson & Sons.*

This firm of specialists in brick-making and general clay-working machinery, of Castleton Foundry, Armley, Leeds, show, as the chief feature of their exhibit, a new automatic cutting-off table for use in conjunction with plastic brickmaking machines. Hitherto many difficulties have been inseparable

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RAIN GAUGES, &c., &c.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, & 78 SWANSTON STREET, MELBOURNE.**



from the working of automatic tables, and Messrs. Johnson have given their special attention to overcoming these difficulties. The table shown is the outcome of careful study and experiments, and it is claimed for it that it is absolutely positive in its action, and that the simplicity of its design and the strength of its working parts make it a matter of impossibility for the table to fail in its action. This table is shown in conjunction with the No. 3 combination pugmill brick and tile making machine, fitted with crushing rollers, adapted for dealing with an ordinary plastic clay, and producing bricks at the rate of 10,000 and upwards per day.

An exhibit by Messrs. Johnson which appeals principally to makers of sand-faced pressed bricks is the hand-screw sand press, the moulds of which open and close, thereby avoiding all friction on the sides of the brick, and insuring the sand being evenly pressed into all sides of the brick. Some splendid samples of bricks finished on this machine are on view. In this machine, which is largely used by manufacturers supplying the London market for bricks, the improvement is in its simplicity of design and consequent reduction of the number of working parts, so that wear and tear and the necessity for renewals are nominal. The hand-lever brick press shown is also a most handy implement for brickmakers, and embodies the characteristics of the firm's work, namely, strength and neatness of design. The "Simplex" brick and tile cutting table on view is a decided improvement on the old-fashioned type of "Murray" table, inasmuch as the cross-cut wire and all waste ends are avoided, thereby increasing the productive powers of the machine.

Messrs. Johnson have recently taken up the manufacture of crushing and grinding machinery, and in connection with this department they are exhibiting a new and improved type of stone and ore crusher, the "Dragon" patent. This is in every respect a much simpler machine than the ordinary "Blake" type of machine, and ought to find a ready market with users of this class of machinery.

A "Dragon" patent air-separator is also shown, together with a large assortment of samples of various materials dealt with by this machine, which is adapted for separating the fine powder from the bulk in materials of such varying characters as cement, phosphates, basic slag, borax, cocoa, coffee, ginger and other dry ground materials. Varying degrees of fineness can be obtained in a most simple manner. A model of the patent shaft and fittings used in connection with the "Dragon" grinding mill is also shown.

*Ashton & Green.*

The excellent designs in grates, stoves, mantles and suites, invariably associated with this firm are illustrated by numerous examples attractively displayed in the large wall space which they have *pro tem.* appropriated. While all are excellent none possess any striking novelty to call for special mention. Their "Sine Quâ Non" kitchener is worthy of a line of special commendation. By a simple contrivance for raising or lowering, this range is easily convertible from close to open fire and *vice versa.* The patent ventilator carries away all smell of cooking. A patent baffle is fitted under the open fire hood to regulate the draught, to prevent smoke, and to enable a saucepan or kettle to be boiled on the top of the hood. By a special arrangement of side flues top or bottom heat is supplied to ovens. The boiler is of the boot or bath pattern, as preferred.

*Joseph Cliff & Sons.*

Messrs. Cliff & Sons' stand attracts attention by means of its well-displayed array of glazed sanitary ware, conspicuous among which are the Imperial porcelain bath and sink. Specimens are also shown of the white glazed urinal closets, white glazed channels, patent socket-jointed pipes, white and coloured glazed bricks, Hall's patent hanging tiles and grip tiles, Shepwood's patent partition bricks and ceiling tiles, Tiltman's patent partition bricks, Adam's patent dove-tailed frog bricks, Shoppee's bricks for arching and vaulting, chimneypots, architectural terra-cotta, glazed brick fireplaces, &c.

*G. & J. Haigh.*

This firm is showing specimens of their fireclay goods in glazed sinks, glazed bricks, sanitary tubes, firebricks, building bricks, &c.

*The Marble (Moreau-Rae) Syndicate.*

The syndicate have on view examples showing the adaptability of their artificial marble to the purposes of staircases, dados, mantlepieces, table-tops, balustrading, columns, vases, fountains, &c., and of a variety of colours and markings in which it can be produced.

*R. Mason.*

At Stand 120, Row F, is exhibited Mason's patent reversible window, which seems a successful attempt to provide a means for safely cleaning windows, but is at the same time more, for it secures the ventilation of a room, effected by means of a screw arrangement fixed on to the lower window-frame, which

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The Company are aware that in Bootle and Penmaenmawr their Patent has been infringed, but having reason to believe that in other parts of the country their process for manufacturing Artificial Stone by pressure has been used, the Company will pay the above amount for such information as will enable them to take the necessary steps to protect their interests.

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works into a socket on the other, and can be tightened up or regulated so as to leave space as desired for the air to pass upward into the room, at the same time safely securing the windows. When tightened up it is perfectly secure and free from rattle. These sashes have been in use at many important public and private buildings, and have given every satisfaction, as is proved by the numerous testimonials and repeat orders. The manufacturer is Mr. R. Mason, Window Works, Hemsworth, Yorks.

#### *The London Mosaic Company.*

This company have a most interesting collection of specimens of their various productions at Stand 86, Row D, including stained-glass mural painting, tile painting, parquet flooring, wood-block flooring, tiling and marble, glass and granite ceramic. The finished designs of several stained-glass windows which they have prepared are beautiful examples of ecclesiastical work, being original in treatment and of great artistic merit. Parquet flooring is exhibited in various patterns, many of which are quite new, and show the same care taken in their treatment that makes the exhibit worthy of the attention of members of the profession. The designs for mosaic pavement of work now in hand are as good as any we have seen, and the whole exhibit reflects great credit on Mr. C. F. Davis, the art director and manager. The address of the firm is the London Mosaic Company, 13 South Wharf, Paddington, London, W.

#### *The Weldon Stone Quarries.*

At Stand No. 139, Row F, Mr. John Rooke, Weldon Grange, Corby, Kettering, has an interesting exhibit of stone from these quarries; in particular, a date stone from Kirby Hall, 4 feet by 2 feet, which was placed in position in the year 1690. It fully proves the weather-resisting properties of this stone, for the edges are now sharp and clean, and bear little or no evidence of centuries of exposure to our trying climate, and certainly none of decay.

Mr. Geo. F. Harris, F.G.S., author of "Granites and our Granite Industry," in his report on Weldon Stone, says:—"Weldon stone is a typical oolite composed of oolite spherules and shell fragments of the more durable form of carbonate of lime bound together by sub-crystalline calcite. By reason of the interpenetration and joining together of a large proportion of the spherules also, the stone is rendered more durable than the majority of oolite building stones, which are dependent

alone on the nature of their cementing material for their enduring qualities. From the general microstructure of the Weldon freestone, I am of opinion that it is very suitable to withstand the corrosive effects of the acids in the atmosphere of large cities as well as in the country." This stone is an easy and cheap stone to work, as it saws readily without water, is durable, and hardens under exposure, and that it resists frost and water is proved by the above example. These quarries have recently been reopened on a large scale, and the stone has been used at the University Library, Cambridge; Eton College; Chapter-house, Lincoln Cathedral; Rochester Cathedral; Royal College of Music, and the recently reopened church of St. Saviour's, Southwark.

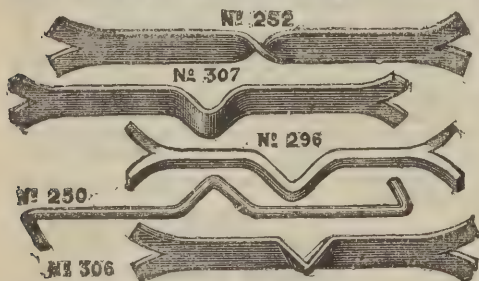
#### *Wippling's Patent Window Co.*

Three interesting little exhibits are to be found at Stand 15A. The principal exhibit is a patent window of the above firm, to which we have made reference before. This window is a very cheap, simple and effective arrangement, which can be fixed by any carpenter and joiner with very little trouble. The result is that for cleaning purposes or for repairing the window has simply to be brought into the room, without the danger of standing outside, which has been the cause of such a terrible amount of loss of life. At the same stand we notice an entirely novel system for ornamental tiles. In consequence of this invention any architect can have his designs photographed on to the tile, or a photograph of any picture or public building. We shall have a further notice of this later on. One more system of metallic lathing—the latest—known as Dickinson's system, is exhibited at this stand. The prices seem to be particularly low, which will doubtless cause it to meet with favour when put upon the market.

#### *W. H. Martin & Co.*

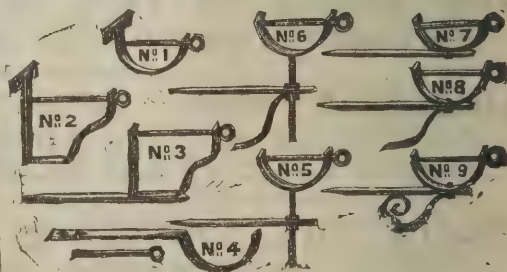
At Stand 86A, Row D, Messrs. W. H. Martin, Bewlay Cliff Wharf, James Street, Camden Town, have a good exhibit of samples of lime, cement, plaster, sand, &c. The sand and ballast are from the Leighton Buzzard Sand Company, Limited, for whom Messrs. W. H. Martin & Co. are agents, and who are able to effect prompt delivery of any order sent them, their wharf on the Regent's Canal being opposite the Camden goods dépôt. They hold also a large stock of Greaves's blue lias lime, which they deliver in sacks bearing the registered trade-mark of Messrs. Greaves, Bull & Lakin, thus insuring the genuineness of the article; also of the celebrated Kentish and

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Bedfordshire limes, Medway Portland selenitic and heavy Warwickshire Portland cements, and Roman, Keene's and other plasters, bricks, slates, chimney-pots, fire goods, tiles and sanitary goods.

T. S. Pulfora.

Stand 121 is a *multum in parvo* of decorative pigments. Mr. Pulford's colours ground in oil have achieved a deserved reputation. One of his specialties is his damp-wall paint, which forms a complete coating, and is impervious to moisture; it effectually resists atmospheric action. Other specialties are his ultramarine blues, his vermillionette, gold paint, &c. We are told that Mr. Pulford's is the only paint which has received the official approval of the New South Wales Government.

Randall Bros.

Messrs. Randall Bros. (also known as the Copal Varnish Company), while showing a goodly assortment of enamels and varnishes and specimens of work treated with them, do not profess to have brought any novelty with them this year, preferring to rely on their Paris white japan, which they recommend as specially adapted to the decoration of walls, ceilings and doors of bath-rooms, bedrooms, drawing-rooms, hospital wards, schools, breweries, lavatories, ship's cabins, &c.

C. G. Picking.

Mr. Picking, whose stand is generally noticeable for its businesslike substantiality of appearance, has brightened it up this year by adding an extensive assortment of useful and ornamental objects in terra-cotta, for the manufacture of which, by the way, his Bound's Green clay is singularly suitable to his more important if, to a superficial less attractive, show of fireproof building specialties. These latter consist of his well-known and largely-specified interlocking twin-arch tiles, resting between two steel joists and formed so as to completely encase the underside thereof, and having special dovetailed grooves jagged to receive the plaster. A special feature of this system is that each tile interlocks with that adjacent to it on either side, thereby adding to its strength. The whole is covered with concrete, making a homogeneous mass. Picking's fireproof and sound-proof par-

tioning consists of interlocking tiles 2½ inches in thickness. Plain, glazed on one side, or glazed on both sides are also shown, built up so that the neatness of the joints, facility of handling, and generally satisfactory results may be fully appreciated. They make admirable partitions, being hard, clean and sound-proof, while their cost is, comparatively speaking, phenomenally small.

Maurice's Porcelaine Company.

Messrs. Maurice's Porcelaine Company have two exhibits facing each other, and each equally attractive in its particular way by reason of its bright colouring and effective arrangement. At one of these Messrs. Maurice are showing their porcelaines, varnishes, varnish stains, liquid gold, brushes, &c., and at the other, which takes the form of a pavilion, the inner and outer walls are decorated with the firm's specialties, thus giving a practical demonstration of their utility and effectiveness. As the various colours were applied to this building since its erection at the exhibition, a fair estimate can be formed of their brilliance and quick-drying qualities.

Potter & Co., Limited.

Potter's patent fireproof floor is effectively shown at Stand 14. For this flooring it is claimed that it is extremely light, weighing only 20 lbs. per superficial foot; is practically sound-proof, the total disconnection of floor and ceiling deadens the passage of sound; is sanitary, affording no room for vermin, dust, or insects; will resist fire for a very protracted period, and is of great strength—the strongest form of concrete is that of an arch. All the materials being in compression, no metal ties are necessary, as in flat concrete floors.

King & Sons.

The honeycomb wine-bin, which is the specialty of this firm, has been sufficiently long known to have established a reputation for practical utility, but it may not be amiss to recount some of the advantages which its makers claim for it. These advantages are numerous and obvious, and among them we may mention its simplicity, cheapness and durability, the great number of bottles that can be stored in a given space and their adaptability to spaces of irregular form and odd corners, ends of passages, &c. Each bottle, having a separate chamber,

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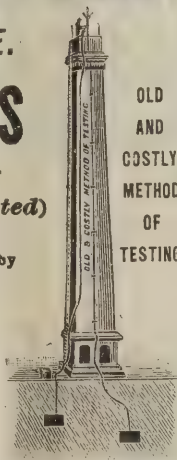
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is protected from currents of air and sudden changes of temperature, and the breakage of one bottle cannot affect any other. The tubes (little larger than a bottle) can be handed down awkward cellar-stairs down which framed racks would not pass. Being porous, the tubes will absorb water sprinkled over them, and the evaporation that ensues will materially reduce the temperature, so that where wines and aerated waters are required to be kept cool the patent "honeycomb" wine-bin becomes a simple and ready form of refrigerator when so treated.

*S. & E. Collier.*

Messrs. Collier have, as usual, a diversified collection of their manufactures, comprising their ornamental tiles for vertical tiling, the designs for which are in most cases of high excellence—eaves tiles, gable tiles, hip and valley tiles, plain and ornamental angle tiles, &c. Their specialty just now, however, is their hand-made patent rough-faced and sand-faced tiles, with nibs or holes, for which it is claimed that they will weather with extreme rapidity and "vegetate" freely. Messrs. Collier are also showing specimens of balustrades, mouldings, &c., and Fletcher's patent vacuum chimney-pot.

*M. T. Medway.*

Mr. Medway's exhibit is not a large one, nor is he showing any novelty, contenting himself with specimens of his hand and dinner lifts, hydraulic gears, &c.

*J. C. Broadbent & Co.*

This firm exhibit, as usual, their model of building, showing various methods of applying silicate cotton or slag wool, along with samples and patterns showing application of silicate cotton or slag wool in detail for building and other purposes.

*John P. White.*

A goodly array of wood chimneypieces is on view at Stand 62, where Mr. White has specimens, some of which are remarkable for their quaint and artistic qualities. This, however, is not surprising, as they are the conceptions of such well-known designers as James S. Cooper, George Jack, W. R. Lethaby, G. Le Moins, C. H. B. Quennell, C. F. A. Voysey, and others of equal renown.

*Paragon Patent Glazing and Roofing Company.*

We have already on more than one occasion had occasion to draw our readers' attention to the admirable system of glazing which is the *raison d'être* of this company. Everyone knows the trouble and expense involved in the periodical painting, repairing, and renewing of ordinary glass roofs. In this system the substitution of a very simple locking internal fastening for the bolts, screws, and other intricate internal and external fastenings used in other systems enables builders themselves very easily and very quickly to fix the bars and glass, and also allows inexperienced persons to replace broken glass, and so obviates the expense of calling in a glazier. The absence of outside fastenings prevents the corrosion which results from the action of the atmosphere consequent upon iron being used in contact with zinc or other metals, and also provides the exterior of the roof with a perfectly smooth appearance.

*George J. Farrow.*

Mr. Farrow is again showing his patent improved portable iron scaffold, for which he claims speed in erection, adaptability to the height of any room or building, movability in any direction upon cast wheels, the tyres of which are of india-rubber. It can be made useful as observatories, triumphal arches, fire-brigades, look-out towers, and many other purposes.

*Diespeker & Co.,*

Who inform us in artistically designed letters that they are the only firm in the United Kingdom exclusively engaged in mosaic work, show a large number of very fine specimens of Roman and Venetian marble mosaic for floors, and of Venetian glass mosaic for mural decoration. They also exhibit many designs of floors they have executed, among which we specially noted one in Roman marble mosaic as laid at the National Portrait Gallery for the late Ewan Christian, and another for the Royal College of Music, of which Sir Arthur Blomfield was the architect. The work executed by this firm for H.M. Office of Works is represented at the exhibition by Venetian marble mosaic as laid at the new General Post Office, St. Martin's-le-Grand, and that for H.M. War Office by Venetian marble mosaic as laid at Lydd Camp.

They also show a sample of Venetian marble mosaic which has been adopted by the Metropolitan Asylums Board for their various hospitals, and of which during the last

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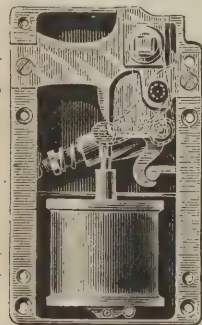
"The Slave" Single & Double Action Silent Door Spring Hinges,

The Double Action Shallow Well Hinge,

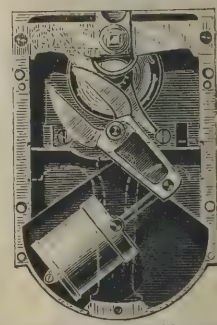
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**"PATENT SASH LINES."**

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PATENT GOLDEN EAGLE SASH LINE, COPPER WIRE CENTRE.  
NOTHING TO TOUCH THEM.  
**MIDLAND ROPERY, BIRMINGHAM.**



year they have laid about 12,000 yards at Brook Hospital, Shooters Hill, at the South-Eastern Fever Hospital, the South-Western Fever Hospital, the North-Western Fever Hospital, and the Nursing Home, South Wharf, Rotherhithe. The circular mosaic skirting introduced into these buildings is also shown, and this seems to be a great improvement on the old method of the right angle between the floor and the wall, as the circular skirting prevents any lodging of dirt or water. We are informed that about 10,000 yards of this skirting and of their Venetian marble mosaic is being laid by them at the General Hospital, Birmingham.

There is also a design for the mosaic floor which this firm executed at "Olympia," and over which, according to the turnstile report, far more than 30,000,000 people have passed. We understand that, in spite of this extraordinary traffic, the mosaic does not show any sign of wear, and this seems to give good ground for Messrs. Diespeker & Co.'s offer to guarantee their mosaic for thirty years.

*David & Sant.*

At Stall No. 141 a good display is to be seen of the well-known Forest of Dean stone. As our readers are well aware, this stone has been very extensively used in the South and West of England, and the company are now pushing their trade for the London district. There are three colours—blue, grey and red. One of the principal claims for this stone is that it always retains its colour, and will not turn black from exposure. This sandstone is easily worked, and has a particularly fine finish; it is, therefore, of special service to monumental masons. In consequence of the large number of quarries of which Messrs. David & Sant are owners, they are able to cope with any orders that may be entrusted to them.

*Freeman & Shoosmith's Close-sealed System of House Drainage.*

One of the largest stands is that of Mr. George Freeman, Gordon House, Frederick Place, Brighton, who is exhibiting at Stand 92, Row D, the various patents comprised in the Freeman & Shoosmith system of close-sealed house drainage. The patent sanitary pipe and undrawable joint provides a quicker and easier method of constructing a drain. The pipes are made at the spigot end on the tapering principle with a shoulder and deep grooves. The socket is on the bell-mouthed principle with similar deep grooves inside. When jointed together with cement they form a perfect undrawable joint. They can be laid to a straight line or easy curve without splaying the spigot, or at any gradient.

*The Patent Close-sealed Intercepting Trap.*—By using this intercepting trap better means are provided for making the joint at the nose of the trap, it having a tapering clearing eye. Better facilities are provided for testing the whole of the joints of the drain. The drain testers or plugs can be fixed in the trap itself. Having a separate arm on each side of the trap at angles of 30 and 45 respectively, right and left handed, it is immaterial which side of the trap the fresh air inlet or gully for area water has to be placed. The whole of the drain with the fresh-air inlet, branches, soil pipes and exhaust ventilators can be tested at the same time. After the drain has been tested the stoppers can be put on and a small joint or layer of ordinary fine mortar laid on the same, and afterwards a thin layer of gauged cement. This immediately forms the close-sealed arrangement to the interceptor and drain.

*The Patent Reversible Yard Sink or Gully Trap.*—By using this trap better means are provided for making the joint at the outlet of the gully, the nose of the gully being longer and further out from the body of the gully. Also, by having an oval opening on the nose, should the drain at any time become choked, the stoneware stopper can be taken out and the branch of the drain cleared by means of a rod or cane being used instead of having to break open the drain. Having an oval opening on the nose of the trap, better facilities are provided for clearing out the surplus cement from inside the pipe, thereby doing away with the danger of its becoming choked by having the burrow of cement left in, which cannot at the present time be got at with the ordinary gully now in the market.

*The Patent Water Seal Gauge.*—This invention provides means for testing the water seal of closet traps, gullies or yard sinks and sewer-gas interceptors. It is most essential that the above-mentioned traps, &c., should have sufficient water seal to prevent the escape of the dangerous sewer gases. This invention supplies a long-felt want for some accurate means of testing the said water seal, and by its use the exact depth of seal can be obtained without the disagreeable practice of passing the hand into the soiled trap, &c.

We shall in a future issue refer at greater length to this firm's exhibit.

*H. & F. Bonten.*

This firm have a remarkably fine exhibit of plain and wrought rolled iron ornamental architectural mouldings, to which the attention of architects should be carefully extended, as it is quite

a new departure in iron decoration which lends itself admirably to a style of architecture which is coming increasingly into vogue. Among the plain sections shown are small and light angles, channels, T and Z half-round, oval, and triangle. It is, however, in the ornamental department that this firm claims pre-eminence, and the designs shown certainly justify the claim in a very high degree. Among these are mouldings, garden and entrance-gates, railings, handrails, pillars, balconies, staircases, verandahs, &c. Of special importance where excellence predominates are the self-contained sections for the construction of shop-front windows with roller-blind channels attached, and by an ingenious introduction of ornamental iron mouldings the glazing frame is effected, thereby offering a wrought-iron window at once fireproof, ornamental and inexpensive.

*Greaves, Bull & Lakin.*

Messrs. Greaves, Bull & Lakin have a comprehensive exhibit of their well-known lime and cements, and the purposes to which they can be applied. The quality of the cement is shown by various briquettes, which demonstrate its hydraulicity, high-cementing powers and perfect impervious joint. They show a sample which was found adhering to the Greathead shield after being driven through the Blackwell Tunnel, in the construction of which Greaves' cement was exclusively used as a grout, entirely preventing the inroad of water from the Thames, and a piece of concrete which, after being thirty years in the Metropolitan Railway arch, was subsequently exposed for eight years to the deleterious effects of the London atmosphere. A sample of stone from Wilmcote Quarries, sawn, rubbed and tooled for tennis-courts, &c., is also shown.

*Val de Travers Asphalte Paving Company, Limited.*

This company have on their stand No. 15, Row A, a very interesting display of their asphalte showing its application for various purposes, and also specimens of asphalte and concrete taken from Cheapside after many years' wear, which proves its lasting qualities.

*The Arragon Joinery Company.*

At Stand No. 123, Row 7, the Arragon Joinery Company, 2 Walbrook, E.C., have a very good display of square and round turned joinery and mouldings, the cost of which is less than Swedish joinery. They also exhibit the L.O.O. safety window-cleaner, by which both sides of a window are cleaned simultaneously and by one action, without opening the sashes more than 3 inches. It is light, simple and strong, and no alteration to existing window-fittings is necessary.

*Ratner Safe Company.*

At Stand No. 16 the Ratner Safe Company are showing a various collection of their fire and thief-proof safes and strong-room doors; they have recently supplied among others the following well-known firms:—The Army and Navy Stores, Messrs. D. H. Evans & Co., Peter Robinson and the Incandescent Gaslight Company.

*Chas. Pay Roberts.*

At Stand No. 18 Mr. Roberts is showing his well-known system for the separation and cleansing of rain-water. We have so often referred and spoken highly of this system that it is hardly possible to add any more. The best proof of the value of Mr. Roberts's patent is the extent to which his business has grown.

*Pilkington's Tile and Pottery Company.*

The tiles shown in this exhibit comprise some remarkably fine specimens, notable among which is No. 6, a very effective tile designed by Louis F. Day, and specially suitable for panels and over walling. Nos. 4 and 13, in artistic shades of blue and green, by Voysey, are very fine examples. There are also some very pleasing specimens of their cloisonné tiles, the specialty about which is that the design having raised outlines, the colours are effectually confined within their prescribed limits, which keeps the design sharp, and obviates the blurred edges which in ordinary embossed tiles too frequently mars their effect. In addition to these specialties, they are showing a large variety of tiles suitable for all purposes for which tiles can be used, such as borders, pilasters, friezes, dados, hearths, fender curbs, briquettes, &c., and we must not forget to mention figure panels in low relief, which are excellent in design and colouring.

*Charteris & Longley.*

This firm, located at Stand 112, which is devoted to the exhibition of their patent perfected wood-block flooring and high-class parquetry. The designs are alike numerous and excellent, and the woods employed in the manufacture leave nothing to desire either in colour or texture. Messrs. C. & L.'s perfected system does not depend on any auxiliary for its efficiency—each block is complete in itself. The tongue at each end of block fits into the rabbeted dovetail at side of other blocks, binding



them together in such a manner as to make it impossible for a block to work up, and laid with their special mastic composition, which is specially prepared to stand high temperature; the result is a floor firm and immovable. It is as easy to lay as the old-fashioned square-ended block, and there being no loose screws or dowels, there is no fear of these being left out by careless workmen. The all-important matter of drying the timber is effected by Shapland's patent system, which is a natural process, in which the temperature is never above 80 deg. Fahr. The cells are gently exhausted of the pyro-ligneous acid and other moisture, which is conveyed to the outer air—there is no condensation, and consequently the wood is never sodden and there is no discolouration. They are manufactured by special machinery at works at Peckham and Crawley. This system has been largely adopted.

#### *Mansaque & Co.*

Messrs. Mansaque are showing some very fine specimens of their Moorish tiles, a most effective form of decoration, of which we had occasion to speak in connection with the opening of the new entrance (in Charing Cross Road) to the Alhambra, where the mural decoration was so effectively carried out by this firm. The designs here, as there, are exact copies of those which may be seen in the Alhambra at Granada, the Alcazar at Seville and the Mosque at Cordoba. These tiles are eminently suitable in large places of entertainment, such as theatres, music and public halls, hotels, &c., and wherever durability, richness of colour and brightness are desirable, marvellous effect being obtained from their sparkle and lustre, and they only need to be better known to be widely appreciated by architects and all interested in such matters.

#### *George Wragge.*

In a well-arranged exhibit in the centre of the building Mr. Wragge is showing some fine specimens of metal-work, among which may be enumerated a strikingly handsome wrought-iron baldachino for St. Catharine's Church, Burnley, Lancashire; wrought-iron gates for the National Bank of England (Leeds branch); wrought-iron gates for Whitefields, Manchester (Lord Derby's estate); wrought-iron and copper sign for the London and Lancashire Insurance Company, wrought-steel sashes and frames, wrought-iron and bronze balusters, panels, railings, &c.; polished coinage metal fittings, finger-plates, &c.; sections (registered) of bronze, steel and wrought-iron for casements. Photographs of finished work in great variety are also shown.

#### *Sutton & Co.*

Messrs. Sutton & Co. are making a specialty of their Sabine's steam floor quarries for drying sheds, for which they claim that they afford the simplest and most economical system of heating drying sheds, as they form a perfect floor in themselves, and are heated by exhaust (or live) steam. The floors are so arranged that the steam can be turned to or from any portion, and the heat can also be regulated to any degree. Proper provision is made for the outlet of the steam and condensed steam in each quarter of the floor. In laying a drying floor with Sabine's patent quarries, the only requirement is that the ground shall be made level, and the quarries are laid on a thin layer of cement or mortar, and jointed with ordinary cement. No mid-feathers or other blocks whatever are required.

#### *S. W. Outram & Co.*

This firm makes its first appearance at the Building Exhibition with an extended range of their patent "Aquarius" closet, which possesses the following strong points:—The outlet is adjustable to any position; the joint is submerged and must be perfectly sound, otherwise the water will reveal the defect; the joint is so simple that an unskilled workman can make it, and when made is actually the strongest part of closet; it affords the easiest possible inspection.

#### *Green & Co.*

Green's patent stoneware channel blocks, also shown, are specially designed for the sectional formation of the floors of manholes and inspection chambers—any combination can be effected, in limited space, with any number of sewers or drains, from any direction. The bottoms of inverts are continuous, with no drops from higher levels to break and disturb the flow of drainage, and the branches are formed in such a way as to direct the drainage into the flow of main channel. The blocks are interchangeable—and may be fixed in any desired position—and the rebated joints enable a solid construction to be effected. May also be had with socketed joints. The blocks, which are right and left handed, are made in our "Silicated Stoneware," and are highly glazed with our "Special Salt-glazed Enamel," and a good deal of space is devoted to Green's patent "stopless" disconnecting and ventilating interceptor, which is specially designed for the easy passage of solids and to utilise the full force of the liquid drainage to scour and clear the trap. These results are obtained by a combination of entirely novel features, viz.:—The peculiar and vary-

ing section of the waterway, the position and extended straight form of tongue, the induced forward action in the rear part of the well, and the easy ascent of the front part. The compacted form of pipe sockets, allowing the trap to be fixed in the least possible room, the sockets and spigots shaped to prevent the formation of burrs in connecting pipes with the trap, and the square base placed diagonally, giving great stability when fixed.

#### *Albion Clay Company.*

The attractive display of this company consists of samples of clays from which the "granitic-stoneware" pipes are made. The company are the sole proprietors of these clays (not fire-clay). By their careful blending without the admixture of any other material a hard, dense, impervious, incorrodible and imperishable stoneware body is made specially adapted for sanitary purposes. It is claimed that the pipes, &c., made from these clays do not "sweat" under pressure. They withstand the severest test, and have been proved equal in every respect to the best quality of "London made" or other pipes made from the Dorset clays.

#### *Mark Gentry.*

Mr. Gentry's pretty little stand is quite a compendium of the wares for the excellence of which the exhibitor is well known, comprising a variety of ornamental panels of various sizes, shapes and designs, grotesque, floral and geometrical, dates, monograms, &c., specimen arch bricks for gauged work—these can be made to any size or specification; a small brick, running five courses to the foot, which is being especially manufactured for the house—Cheveley Park Mansion—which Mr. McCalmont is erecting at Newmarket; fine rubber bricks, both moulded and plain, in light or dark red, and both of excellent colour; mouldings, string-courses and various other varieties of bricks, all of which are remarkably of high quality in texture and colour.

#### *The Eagle Range Company.*

The excellences of the various ranges made by this firm are too well known to need any recapitulation. They are showing some excellent specimens of their various types, but no special novelties; without these, however, their exhibits always manage to interest a large number of visitors, who evidently take a great interest in watching the manipulation of the fires, and listening to the intelligent explanations given by the attendants.

#### *A. & G. Taylor.*

Although making no appreciable show as exhibitors, this firm have come prominently to the front in the course of the exhibition, as they took photographic groups of the opening ceremony and other parties in which the Lord Mayor and Lady Mayoress prominently figured, as well as taking views of nearly all the exhibits, the results of which were in all cases eminently satisfactory and artistic.

Among the other exhibitors whose exhibits lack of space prevents our noticing at greater length are the following:—H. Hart: Drain and chimney-cleansing machines, ranging from 30 feet to 200 feet lengths. Every description of drain and sweeps' tools, brushes, &c. Rigby Battock & Co.: High class painting brushes and artist's tools. Lyte's Metallic Woven Stair Tread Company, Limited: Patent stair treads. David Caldwell Simpson: Revolving window frame made to revolve on pivot, so that the whole of the frame and sashes can be turned completely inside out. L. Told: Model tower made of Dundry freestone, Somersetshire. W. Foster: Bay window and carriage door fitted with Foster's patent spring rack. Thomas Green & Co., Ltd.: "Smithfield" gas-engines, with dynamo and electric installation. Thos. Kemp: Model of improved system of house drainage, patent intercepting traps, showing pipes fitted for use with and without manholes. Durrans's Patent Syndicate: Durrans's "Kallio" metallic jointed airtight cover, "Kallio" self-cleaning galvanized iron cisterns. Wilson & Co.: Patent dioptric pavement lights, patent dripless roof lights, patent safety pavement lights, &c. Cranstone Engineering Works, Limited: Dinner service lift, self-sustaining hand-power warehouse lift, &c. A. E. Parnacott, jun.: Pneumatic water waste preventing flushing cistern (patent applied for). John Knowles & Co.: "Vitrifine" stoneware pipes (with original certificate of a challenge test), patent anti-vap street gully, &c. G. & F. Couzens: Ball trap gully, flap trap gully for preventing the flooding of basements or cellars, tidal wave interceptor, &c. Pease's Tubular Construction Syndicate, Limited: Tubular floor of light trough ironwork and concrete. Bratt, Colbran & Co.: Wood chimney-pieces, stoves, tiles, wrought-iron and other metal work, stained-glass, iron and marble chimney-pieces, kitchen ranges, &c. James G. Tuxford: Small model roof covered with fancy Gothic slates, slate ridge and slate finials; various sample slates, finials and ridges; specimens of slate cleavage, &c.



*Writing Fluid.*

We have just seen samples of this new ink, and are much pleased with it. It flows readily from the pen and is of good colour.

In conclusion, we can heartily congratulate Mr. Montgomery for his production, with the assistance of an exceedingly able Council, of a most interesting and successful exhibition, and trust that in future years the Building Trades Exhibition may be if possible, an even greater success.

**VARIETIES.**

THE Secretary of State for Foreign Affairs has received a despatch from H.M. Consul-General at Christiania, stating that tenders are invited for the delivery to the Municipality of Stavanger of a certain number of gas, water and drain pipes. Tenders for the above must be received at the Stavanger State engineer's office by April 1 next. Such further particulars as have been received may be seen at the Commercial Department of the Foreign Office any day between the hours of 11 A.M. and 6 P.M.

MR. JOHN USHER is the donor of 8,000*l.* towards the foundation of a Chair of Public Health in the University of Edinburgh, by whose liberality, combined with that of the late Mr. A. L. Bruce and members of his family, the Chair is likely to be instituted at an early date.

**TRADE NOTES.**

MESSRS. EASTON, ANDERSON & GOOLDEN, LIMITED, inform us that having disposed of their premises in Whitehall Place, their London address on and after March 25 will be Broad Sanctuary Chambers, Broad Sanctuary, S.W., adjoining the Westminster Palace Hotel.

WE are requested to state that Mr. Smellie, of the firm of Adshead & Smellie, will attend at their stand at the Furniture Exhibition on the opening day, Friday, April 2.

THE new offices for the Cheshire Lines committee, at the Central Station, Manchester, are being warmed and ventilated by means of Shorland's patent Manchester grates, supplied by Messrs. E. H. Shorland and Brother, of Manchester.

MESSRS. STREET & CO., advertising agents, of 30 Cornhill, E.C., and 5 Serle Street, W.C., announce that in consequence of their increasing business and for the convenience of their West End clients, they will open on Monday, April 5, 1897, a branch establishment at 164 Piccadilly, London, W.

**BUILDING AND BUILDERS.**

MR. WILLIAM SHEPHERD has been appointed president of the Central Association of Master Builders of London for the ensuing year, Mr. B. J. Greenwood and Mr. Thomas Gregory vice-presidents, and Mr. Charles Wall treasurer.

THE old Museum buildings, Norwich, are about to be altered into public baths. The tender of Mr. H. C. Greengrass, of Norwich, for 720*l.* has been accepted, as well as the tender of Messrs. Bradford & Co., of Salford, to supply and fix boilers, &c., and hot and cold water supplies and heating apparatus, or 814*l.*

THE Charity Commissioners having approved of the removal of Christ's Hospital to Stammerham, near Horsham, the contract for the foundations has been let to Messrs. Longley, of Crawley. The quantities for the superstructure are being prepared.

A WARDEN'S house is to be erected in connection with the Bermondsey Wesleyan Settlement, at a cost of 2,000*l.*

A PUBLIC library designed by Dr. Rowand Anderson was opened at Thornliebank on Saturday. It is a memorial of the late Mr. Alexander Crum.

THE premises of Messrs. Kirk & Randall, Warren Lane, Woolwich, suffered from a fire on Monday, when part of the roofing was destroyed.

MESSRS. DUPONT & CO.'S tender for construction of a winter garden at Southend, amounting to 5,316*l.*, has been accepted.

A WORKHOUSE is to be erected for the Evesham Union from ans by Mr. G. H. Hunt.

**THE WIDENING OF FLEET STREET.**

ON Tuesday next, the 30th inst., at the Commissioners of Sewers, Mr. Alderman Treloar will move that the necessary notices be served to acquire all interests in all the premises (15 houses) between Ludgate Circus and Salisbury Court, so



ESTABLISHED OVER HALF A CENTURY.

**BILLS OF QUANTITIES, SPECIFICATIONS, CONTRACTS, PLANS,**

LITHOGRAPHED IN BEST STYLE & WITH GREAT EXPEDITION BY

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LIBERAL DISCOUNTS ACCORDING TO ARRANGEMENTS.

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Manufacturers of JOINERY suitable for all purposes, from the Cottage to the highest class of Mansion and Public Building.

**IN HARD OR SOFT WOODS.**

Church, Bank, Office, Shop, Ship, Yacht and other Fittings. School Seats and Desks. Chimney-pieces. Horticultural Buildings, &c.

MOULDINGS. ELECTRIC LIGHT CABLE CASINGS AND COVERS.

STEAM SAWING, PLANING, AND MOULDING MILLS.

Joinery and Fittings have been manufactured at these Works (which are the largest in the South of England for some of the most important buildings in this Country and Abroad.

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**THORNTON-PICKARD**  
**CAMERAS.**

Complete "Amber" outfit from 45*l.* 13*s.*  
"AMBER" and "RUBY."  
Illustrated Catalogue free.

The Thornton-Pickard Manufacturing Co., Ltd., Altrincham, near Manchester.

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FIRE**



**INSURANCE COMPANY,  
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Liberal Commission allowed to BUILDERS AND ARCHITECTS for introduction of Business. Subscribed Capital, £2,127,500.

**SIR WILLIAM BURNETT & CO.'S**  
Timber Preserving Solution, &c.  
**THE HYDRARCYRUM CUM ZINCO PROCESS**  
(CHURTON'S PATENT, 1895).

For over fifty years the firm of SIR WILLIAM BURNETT & CO have been preparing a solution for the preservation of Timber Felt, Canvas, Rope, Sacks, &c., from dry or wet rot, the attacks of insects, vermin (rats, &c.). Particulars and prices, with testimonials of the Sole London Agents:—

**WILSON & CO., 11 PHILPOT LANE, LONDON, E.C.**

**READING CASES.—A NEW well-made Reading Case**

for "THE ARCHITECT" can be supplied on application to the Publisher, the charge for which is 2*s.* 6*d.*—Address, P. A. GILBERT WOOD, 175 Strand, London, W.C.



that this important improvement may be at once proceeded with. The London County Council has agreed to pay 65,390*l.* towards the cost of this portion of the improvement, and it is hoped that the Commissioners of Sewers will adopt Mr. Alderman Treloar's proposal. The improvement is much needed, and will, when completed, make Fleet Street 60 feet wide, adding 16 feet to the width from Ludgate Circus to Salisbury Court; that is to say, for 320 feet of its length. The entire length of Fleet Street from Temple Bar to Ludgate Circus is 1,670 feet, so that the proposal is to widen at once about one-fifth of the whole length of the street.

### THE TIMBER SUPPLY OF THE BRITISH EMPIRE.

A PAPER was read by Dr. Schlich, professor of forestry at the Royal Indian Engineering College, Coopers Hill, at the Imperial Institute on Monday night on "The Timber Supply of the British Empire." Sir Steuart Colvin Bayley presided. The lecturer said the average annual imports of timber into the several parts of the Empire during the years 1890-94 amounted to 19,135,000*l.*, while the exports averaged 5,114,000*l.*, showing that the net imports into the Empire reached the enormous sum of 14,021,000*l.*, an increase of 2,293,000*l.* in six years, or a mean annual increase of 382,167*l.* The United Kingdom was by far the greatest importing country within the Empire, having taken timber to the amount of 17,595,000*l.* out of the total of 19,135,000*l.* During 1894 the timber imported into Great Britain and Ireland from British Colonies and dependencies was valued at 4,274,484*l.*, and from foreign countries at 14,149,055*l.* By far the larger portion of the timber imported into the United Kingdom came from Russia, Sweden, Norway, Germany, France and the United States, Canada being the only British dependency which at all equalled the export countries on the Baltic. Canada was estimated to contain 1,248,798 square miles of woodlands, but enormous tracts of that area did not contain any useful timber, while the remainder was by no means so well taken care of as it ought to be. Fires were frequent and disastrous, and the quantity of timber thus lost to the colony was calculated to be many times more than that cut down and exported. Notwithstanding those drawbacks, however, he believed that with proper management and careful conservation of the forests, Canada might, at a moderate relative expenditure, supply the whole world for many years to come. He advocated the creation of a forest department in

this country, the careful conservation of existing and the creation of new forests by planting vacant lands, the establishment of schools of forestry and model plantations for the guidance of private owners, and Government grants in aid of those objects.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

6060. Archibald Griffin Rider and Edwin Russell, for "Improvements in and relating to sliding sash windows."

6066. The Wilkinson Sword Company, Limited, for "An improvement in door locks."

6113. Frederick Charles Lynde, for "Improvements in flushing cisterns and the like."

6121. Joshua William Taylor, for "Improvements in means for removing steam and vapours from buildings, and for promoting ventilation; applicable also for the prevention of draughts in chimneys."

6129. Thomas Bainbridge, for "The ladder grip and scaffold rest."

6138. James Hart Skinner, for "Improvements in or relating to chimney, ventilating and like cowls."

6191. John Abraham Noel, for "Improvements connected with chimney or ventilator tops."

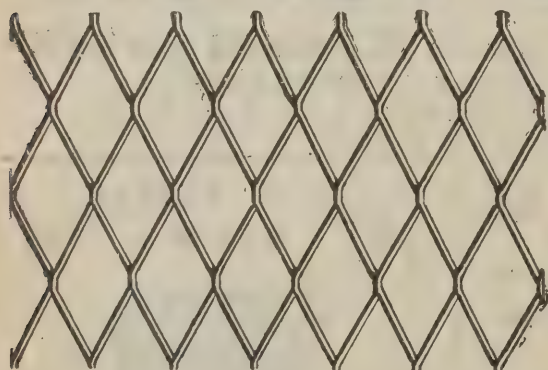
6224. Edward Taylor, for "Improvements in sash-fasteners."

6242. John Henry Vidal, for "Improvements in the flushing of water-closets."

6310. William Gardiner, for "An improved window fastener."

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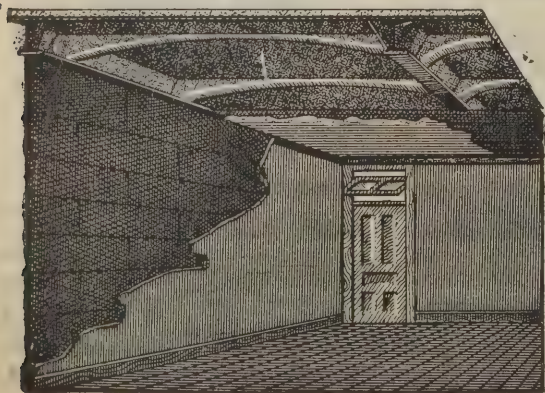
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## CONTRACTS OPEN.

ABERDEEN.—April 3.—For improvements on blacksmith's house at Thriepfield, Udney. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ABERDEEN.—April 5.—For alterations to dwelling-house at Easter Powlair and new steading of offices at Shannel. Mr. George Cocker, Balnahard, Aboyne.

ACCRINGTON.—April 3.—For alterations to floor and ceiling and supplying cases for museum. Mr. W. J. Newton, Town Hall, Accrington.

ALNWICK.—April 5.—For erection of house and premises at Christon Bank. Mr. George Reavell, jun., architect, Alnwick.

ASHTON-UNDER-LYNE.—April 14.—For constructing embankment, &c., for formation of reservoir. Messrs. G. H. Hill & Sons, 3 Victoria Street, Westminster.

ASHTON-UNDER-LYNE.—For erection of six houses in Nelson Street, Hooley Hill. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

AUDENSHAW.—For alterations to St. Stephen's Central Schools. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

BALLINAMALLARD.—April 3.—For building school. Rev. George M'Meel, Ballinamallard, Ireland.

BARDON.—April 2.—For main drainage works. Mr. J. B. Everard, 6 Millstone Lane, Leicester.

BARNESLEY.—April 7.—For erection of three houses and outbuildings, Dobie Street. Mr. Herbert Crawshaw, architect, Regent Street, Barnsley.

BATH.—April 12.—For extension of the buildings of the Bath Corporation electric-light works, Dorchester Street. Mr. F. H. Moger, clerk, 3 Wood Street, Bath.

BATLEY.—April 5.—For making-up roads. Mr. O. J. Kirby, Market Place, Batley.

BELFAST.—April 16.—For extensions to shop premises, corner of Bridge Street and High Street. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue, Belfast.

BIRKENHEAD.—April 7.—For sinking bore-hole. Mr. George Miller, 9 Hamilton Square, Birkenhead.

BRADFORD.—April 5.—For partly rebuilding two warehouses. Messrs. Milnes & France, architects, Bradford.

BRADFORD.—April 9.—For erection of three houses in Corban Street, Wakefield Road. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

BRADFORD.—April 6.—For erection of a Board school at Clayton. Mr. Abraham Sharp, architect, Albany Buildings, Market Street, Bradford.

BRANDON.—April 5.—For alterations and additions to Board schools. Messrs. E. Boardman & Son, Queen Street, Norwich.

BRISTOL.—April 5.—For rebuilding warehouse and factory. Mr. Henry Williams, architect, 24 Clare Street, Bristol.

BRISTOL.—April 7.—For erecting condensing plant for the electrical committee. Mr. H. Faraday Proctor, Temple Back, Bristol.

BURNLEY.—April 10.—For erection of memorial in Scott Park. Mr. Wm. T. Fullalove, town clerk, Town Hall, Burnley.

BUSHMILLS.—April 10.—For enlarging church. Mr. David Douglas, Bushmills, Ireland.

CARDIFF.—April 5.—For erection of bottling stores, &c., at the Eagle Brewery. Messrs. Veall & Sant, architects, 5 and 6 Arcade Chambers, High Street, Cardiff.

CASTLEFORD.—April 15.—For pulling down and setting back boundary wall, Wheldale Lane, and alteration of causeway; also for the taking up and relaying footpath in Bridge Street. Mr. H. H. Broadbent, clerk, Castleford.

CHATHAM.—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

CHELMSFORD.—April 7.—For erection of a pair of small villas, Primrose Hill. Mr. F. Whitmore, architect and surveyor, 17 Duke Street, Chelmsford.

COCKERMOUTH.—April 3.—For repairing roads. Mr. Wilson, surveyor, Cockermouth.

CORK.—April 3.—For alterations and additions to warehouse. Mr. Robert Walker, South Mall, Cork.

CUPAR-FIFE.—April 5.—For erection of a villa at West End. Mr. David Storrar, architect, Cupar-Fife.

DERBY.—April 5.—For erection of boundary wall, stable, shedding and fencing. Mr. R. J. Harrison, borough engineer, Babington Lane, Derby.

DEVON.—April 9.—For erection of dwelling-house at Bovey Tracey. Mr. Samuel Segar, architect and surveyor, Newton Abbot.

DOVERHAY.—April 3.—For laying drains, &c. Messrs. Ponsford, Joyce & Davis, 24 The Avenue, Minehead.

DURHAM.—April 14.—For rebuilding of the Lord Collingwood Hotel, Felling. Mr. H. Miller, architect, Felling.

EASINGTON.—April 7.—For supplying and fixing hot-water heating apparatus. Mr. G. Phalp, surveyor, Haswell viaduct, Sunderland.

EASTBOURNE.—April 10.—For alterations and additions to Satara, Fairfield Road. Messrs. C. and C. B. Benson, architects, Yeovil, Somerset.

EDINBURGH.—April 7.—For reflooring and reseating Carllops Free Church, and enlarging vestry. Mr. W. Harrison, Walston, Penicuik.

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CUMBERLAND.—April 20.—For erection of a stone bridge over the Camp Beck at Walton Mill Ford, in the parish of Walton. Chairman of the Rural District Council, Brampton, Cumberland.

EBBW VALE.—April 12.—For erection of a school to accommodate 157 children, near Steelworks Houses, with out-offices, boundaries and playgrounds. Mr. George Rosser, architect, Victoria Buildings, Abercarn.

EDINBURGH.—April 3.—For constructing reservoir. Mr. James Wilson, 72A George Street, Edinburgh.

ELGIN.—April 5.—For alterations to Commercial Hotel buildings. Mr. Charles C. Doig, architect, Elgin.

ESSEX.—April 19.—For erection of infirmary to be built on the ground adjoining the school at Witham. Mr. F. Whitmore, architect, 7 Duke Street, Chelmsford.

FARNBOROUGH AND ALDERSHOT.—April 8.—For erection of thirteen cottages at Farnborough and thirteen at Aldershot. Mr. W. G. Jones, architect and surveyor, 3 Broadway, Woking.

GRADE.—April 3.—For building cattle and root-house. Mr. W. Rowe, St. Ruan Farm, Grade, Cornwall.

GREENOCK.—April 12.—For constructing outfall sewer. Town Clerk, Municipal Buildings, Greenock.

GREENWICH.—April 3.—For supplying porcelain baths. Mr. A. Budds, Public Baths, Greenwich, S.E.

GUILDFORD.—April 5.—For supplying and fixing turbine plant and power pump. Mr. C. H. Adams, Water Office, Guildford.

HALIFAX.—April 3.—For building engine-house. Mr. W. Clement Williams, architect, 29 Southgate, Halifax.

HALIFAX.—April 8.—For alterations and additions and the formation of patent spring dancing floor to West and Pellon Wards Liberal Club. Mr. Medley Hall, architect, 29 Northgate, Halifax.

HANLEY.—April 6.—For erection of shop premises at the corner of Marsh Street and Broad Street. Messrs. R. Scrivener & Sons, architects, Hanley.

HEBDEN BRIDGE.—April 5.—For building Catholic institute, assembly-hall, &c. Mr. W. Wrigley, architect, Crossley Terrace, Hebdon Bridge.

HEYBRIDGE BASIN.—April 6.—For building two pairs of cottages. Mr. P. M. Beaumont, Maldon, Essex.

HOUNSLOW.—April 5.—For making up and sewerage roads. Mr. W. A. Davies, Town Hall, Hounslow.

HUDDERSFIELD.—April 7.—For erection of six dwelling-houses at Moor Bottom, Honley. Mr. George Brooke, Zetland Hotel, Ramsden Street.

HYTHE.—April 20.—For erection of a Wesleyan church and schools. Rev. C. Norman, Holmlea, Hythe.

ILKESTON.—For erection of public offices, Market Place. Mr. Charles W. Hunt, architect, Ilkeston.

IPSWICH.—April 13.—For alterations and additions to Tower House, for the School Board. Mr. J. S. Corder, architect, Tower Street, Ipswich.

IRELAND.—For erection of a creamery at Ballinlirlick, county Sligo. Mr. M. Jennings, secretary, Ballinlirlick Co-operative Agricultural and Dairy Society, Limited.

IRELAND.—April 10.—For erection of creamery at Bunkey Bridge, within easy distance of Castleconnel and Lisnagry railway stations. Mr. W. L. Stokes, Mulgrave Street, Limerick.

IRELAND.—April 17.—For erection of house and offices at Carlton premises, Enniskillen. Mr. Thomas Elliott, architect, Enniskillen.

IRELAND.—April 8.—For erection of a dispensary and dispensary residence at Foley Hill, Aghalee. Mr. Edwin Jas. Donaldson, clerk, Workhouse, Lurgan.

IRELAND.—April 14.—For erection of a schoolhouse at Riverstown. Rev. Andrew Quinn, P.P.

KEIGHLEY.—For roofing (in wood) the pavilion of the Keighley Lawn Tennis Club; also for the outside painting of the pavilion. Mr. Holmes Wright, jun., Mayfield.

KENDAL.—April 5.—For erection of Bryce Memorial Institute, Burnside. Mr. John F. Curwen, architect, 51 Highgate, Kendal.

KENDAL.—For erection of six dwelling-houses at the Lound. Mr. John Hutton, architect, Kendal.

KING'S LYNN.—April 5.—For constructing covered service reservoir. Mr. E. J. Silcock, borough engineer, King's Lynn.

LEEDS.—April 9.—For setting back boundary wall of Board School playground. City engineer, Municipal Buildings, Leeds.

LEEDS.—April 21.—For erection of stone abutments and wing walls for steel bridge over the river near Rodley. Town clerk.

LEEDS.—For erection of a boot factory in Ashley Road, Burmantofts. Mr. Walter A. Hobson, architect, 82 Albion Street, Leeds.

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**LEEDS.**—April 5.—For erection of shop and warehouse, Wellington Road. Mr. C. Fredk. Wilkinson, architect, 35 Park Square, Leeds.

**LEICESTER.**—April 7.—For erection of a mission church at Knighton Fields. Messrs. Everard & Pick, architects, 6 Millstone Lane, Leicester.

**LEIGH.**—April 7.—For supplying and erecting boiler engine and laundry plant. Messrs. Banks, Fairclough & Stephen, architects, Leigh, Lancs.

**LERWICK.**—April 14.—For constructing waterworks. Mr. A. Sanderson, 72A George Street, Edinburgh.

**LIMERICK.**—April 10.—For erection of a gate lodge at Fern Bank. Messrs. J. P. Evans & Co., 131 George Street, Limerick.

**LLANELLY.**—April 10.—For rebuilding and extending Libanus Independent Chapel, Pwll. Mr. D. L. Jones, architect, West-end, Llanelly.

**LLANHILLETH.**—For labour only, for completing twelve houses and two shops at Llanhilleth. Mr. Telford Evans, 8 Queen Street, Cardiff.

**LLANHILLETH.**—April 6.—For building police-station. Mr. William Tanner, county surveyor, Llanhilleth.

**LLANWONNO.**—April 15.—For rebuilding St. David's Church, Gyeillon. Mr. E. M. Bruce Vaughan, architect, Cardiff.

**LONDON.**—April 15.—For building casual wards, Harrow Road. Mr. Henry F. Aveling, 289 Harrow Road, W.

**LONDONDERRY.**—April 12.—For erection of five houses at Park Avenue. Mr. E. J. Toye, architect, Strand, Derry.

**LURGAN and BELFAST.**—April 12.—For erection of a new station building in brick on the up-platform at Lurgan, also station building in timber at Adelaide Avenue, Belfast, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

**MANCHESTER.**—April 7.—For alterations to the boiler-house, workhouse, Crumpsall. Messrs. Mills & Murgatroyd, architects, 23 Strutt Street, Manchester.

**MANSFIELD.**—April 6.—For making-up streets. Mr. Frank Vallance, Mansfield, Notts.

**MIDDLESBROUGH.**—April 5.—For building six houses. Messrs. R. Lofthouse & Sons, architects, Middlesbrough.

**MONMOUTH.**—April 12.—For building engine and boiler houses, pump chamber, &c. Messrs. Bramwell & Harris, 5 Great George Street, Westminster, S.W.

**MONMOUTH.**—April 12.—For erection of engine-house, boiler-house, boiler seatings, flues, chimney shaft and concrete races for the turbines at the generating station, the collecting tanks and pump-chamber at the sewage pumping station, &c. Messrs. Bramwell & Harris, engineers, Great George Street, Westminster, S.W.

**MORLEY.**—For erection of two cottages in Howdenclough Road. Mr. James Scarth, Britannia Road.

**MORTLAKE.**—April 12.—For erection of stables, steam-roller house and cart-sheds at the Mortlake depot. Mr. G. Bruce Tones, engineer and surveyor, Council Offices, High Street, Mortlake.

**MOUNTAIN ASH.**—April 12.—For building workmen's hall and institute. Alderman William Jones, Oakwood, Aberffwd Road, Mountain Ash.

**NEWQUAY.**—April 30.—For building hotel. Mr. Silvanus Treval, architect, Truro.

**NUNEATON.**—April 5.—For constructing sewers. Mr. J. S. Pickering, Council Offices, Nuneaton.

**OBAN.**—April 15.—For municipal buildings. Mr. Alexander Shairp, architect, Oban.

**PADDINGTON.**—April 13.—For erection of casual wards in Woodfield Road, Harrow Road. Mr. F. J. Smith, architect, 17B Great George Street, Westminster.

**PENZANCE.**—April 8.—For building shed at the pig market. Borough surveyor, Public Buildings, Penzance.

**PENZANCE.**—April 8.—For concreting floor of Sheep Market. Mr. T. H. Cornish, Public Buildings, Penzance.

**PONTYPRIDD.**—April 3.—For erection of school to accommodate 320 boys, 320 girls and 485 infants in the Llan Wood. Mr. A. O. Evans, architect, Post Office Chambers, Pontypridd.

**POPULAR.**—April 7.—For erection of a register office in rear of 45 Upper North Street. Messrs. Clarkson, 136 High Street, Poplar, E.

**REDCAR.**—April 5.—For alterations and additions to 27 High Street. Mr. Henry Hearse, architect, 22 Westbourne Grove, Coatham, Redcar.

**REDRUTH.**—April 14.—For building infirmary. Mr. Sampson Hill, architect, Redruth.

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REDRUTH.—April 24.—For erecting winding engine at the Basset Mines. Mr. Nicholas Trestrail, Redruth.

ROCHDALE.—For brickwork for erection of ten houses in Howarth Cross Street. Mr. J. Whitworth, 21 Millgate, Halifax Road, Rochdale.

RUGBY.—April 8.—For constructing main outfall sewer. Mr. D. G. Macdonald, surveyor, Rugby.

SALFORD.—April 8.—For erection of shelter and latrines at the David Lewis Recreation Ground, Peel Park. Mr. Richard Mottram, mayor.

SANDBACH.—April 2.—For building shop. Mr. Alfred Price, architect, Elworth, Sandbach.

SHEFFIELD.—April 3.—For erection of roof, principals, slate laths, and cast-iron guttering for rector-house at Grimes-thorpe Station. Mr. Hanbury Thomas, Commercial Street, Sheffield.

SHIREMOOR.—For erection of five houses at Shiremoor. Messrs. Davidson & Bendle, architects, 33 Grainger Street West, Newcastle.

SOUTHAM.—April 3.—For rebuilding schoolroom and renovating church. Mr. A. J. Sinnett, London House, Southam, Warwickshire.

SOUTHAMPTON.—April 13.—For constructing brick and concrete and stoneware pipe sewers. Mr. W. B. G. Bennett, Municipal Offices, Southampton.

SOUTHAMPTON.—For erection of the Avenue Congregational Church. Mr. Edw. T. Sims, hon. secretary, Portswood Lane, Southampton.

SOUTHEND-ON-SEA.—April 7.—For construction of a gallery at west end of interior of pier pavilion. Mr. Harold Harlock, borough surveyor, Clarence Road, Southend.

SOUTH MOOR.—April 3.—For building twelve cottages. Mr. J. Errington, Ox Inn, Oxhill, Durham.

SOUTHWARK.—April 6.—For erection of a reception-house and caretaker's house, on a site in King James Street. Mr. Oliver Ernest Winter, surveyor, Vestry Hall, Borough Road, S.E.

STAFFORD.—April 12.—For alterations at Guildhall and additions to pumping station at Milford. Mr. W. Blackshaw, borough engineer and surveyor, Borough Hall, Stafford.

ST. GEORGE-IN-THE-EAST.—April 2.—For alterations, &c., at the workhouse, Raine Street, Old Gravel Lane, E. Mr. G. A. Wilson, architect, Vestry Hall, Cable Street, E.

STOCKPORT.—April 8.—For erection of a workhouse at Stepping Hill. Mr. Charles F. Johnson, clerk, Union Offices, Shaw Heath, Stockport.

ST. PANCRAS.—April 19.—For construction of a block of underground conveniences in Mansfield Road. Mr. William Nisbet Blair, surveyor, Vestry Hall.

STROUD.—April 2.—For erection of stabling and horse-keeper's house. Secretary of the Way and Works Committee, Midland Railway, Derby.

TEWKESBURY.—April 20.—For erection of an isolation hospital, with roads and fencing, on a piece of ground near Tredington. Mr. James Villar, architect, 1A Cambray, Cheltenham.

TWERTON-ON-AVON.—For erection of school buildings at Lansdown View. Messrs. Silcock & Reay, architects, Octagon Chambers, Misom Street, Bath.

WAKEFIELD.—April 8.—For erection of a caretaker's house at the sewage works, Dircar, Crigglestone. Mr. Frank Massie, engineer to the Council, Tetley House, Wakefield.

WAKEFIELD.—April 5.—For building electric-lighting substation. Mr. R. Porter, Town Hall, Wakefield.

WALSALL.—April 3.—For building house, workshops and offices. Mr. J. R. Cooper, Borough Offices, Walsall.

WALWORTH.—April 6.—For building postmen's office. Mr. H. Tanner, 15 Whitehall Place, S.W.

WANTAGE.—April 5.—For erection of buildings of a technical department at the King Alfred's Grammar School. Messrs. Jotcham & Son, Wantage.

WEST HAM.—April 13.—For erection of sewage pumping engine and boiler-houses and electric-lighting buildings at the Abbey Wharf, Stratford. Mr. Lewis Angell, engineer to the Corporation, Town Hall, Stratford, E.

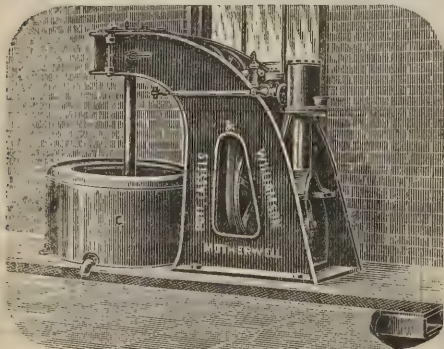
WEST HAM.—April 13.—For building sewage pumping engine, boiler and electric lighting houses. Mr. F. E. Hilleary, Town Hall, West Ham, E.

WEST HARTLEPOOL.—April 2.—For building post office. Secretary, H.M. Office of Works, 12 Whitehall Place, London, S.W.

WESTMINSTER.—April 2.—For building doctor's room and for asphalt paving for the Guardians of Westminster Union. Messrs. J. Waldram & Son, 17 Buckingham Street, W.C.

WHITBY.—April 5.—For erection of suburban cottage residences, near Hawsker Station. Messrs. R. Lennard & Son, architects and surveyors, 10A Cliff Street.

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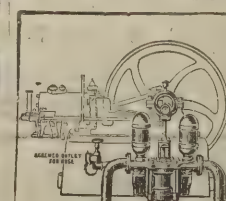
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WINDSOR.—April 6.—For making-up roads. Borough Surveyor, Helena Road, Windsor.

WOKING.—April 22.—For constructing cast-iron, concrete and stoneware sewers. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, S.W.

YORKS.—For erection of a shed in Burras Lane, Otley. Messrs. Fairbank & Wall, architects, 3 Manor Square, Otley.

YORKS.—For erection of twelve houses at Windhill Cragg, Shipley. Mr. J. Crawshaw, architect, 54 Otley Road, Shipley.

YORKSHIRE.—April 14.—For erection of additional farm buildings at Thwing, in the East Riding. Messrs. H. O. & F. O. Piercy, The Elms, Lowthorpe.

## TENDERS.

### BARNESLEY.

For erection of a house and outbuildings at Cudworth. Mr. HERBERT CRAWSHAW, architect, 13 Regent Street, Barnesley.

#### Accepted tenders.

G. Mellor, mason.  
C. H. Straker, joiner.  
M. Fleming, slater and plasterer.  
B. Denison, plumber.  
Beaumont Bros., painter.

### BRADFORD.

For erection of four through houses at Laisterdyke. Mr. G. C. GAMBLE, architect, Parkinson's Chambers, Market Street, Bradford.

#### Accepted tenders.

J. Rushworth, Clayton, mason.  
J. Schofield, Laisterdyke, joiner.  
Hill & Nelson, slater.  
M. Slinger, plumber.  
D. Hainsworth, plasterer.  
L. Sunderland, painter.  
Total, 968*l.* 16*s.* 6*d.*

### BRIDLINGTON QUAY.

For the draining, kerbing and formation of Richmond Street. Mr. J. EARNSHAW, architect, Wellington Road, Bridlington Quay.

B. ROBINSON, Hull (accepted). . . . . £530 0 0

### CAMBERLEY.

For erection of two pairs of cottages at Camberley, Surrey, for Mr. H. W. Harris. Mr. JOSEPH GREENAWAY, architect, 19 Duke Street, Reading. Quantities supplied.

John Bottrill & Son	£1,360	0	0
E. Spooner	1,300	0	0
J. B. Seward	1,284	0	0
W. Smith	1,260	0	0
Spear & King	1,210	0	0
G. Searle	1,180	0	0
E. Field	1,154	0	0
McCarthy E. Fitt	1,150	0	0
D. Taylor	1,120	0	0
W. HAWKINS, Reading *	985	0	0

\* Revised tender, £820, accepted.

### CHICHESTER.

For repaving, kerbing and channelling of the four main streets of the city.

PATENT VICTORIA STONE COMPANY, London (accepted at per schedule).

### CREWE.

For forming, making, asphaltting and draining grounds of isolation hospital. Mr. GEORGE EATON-SHORE, borough surveyor.

Contract No. 2.—Forming foundations, &c., of carriage-ways and walks.

J. Ford	£535	12	9
A. Hulse	364	0	0
F. Bennie	194	6	2
G. Morgan	192	18	9
F. Lunt	188	8	6
J. JOHNSON, Crewe (accepted)	111	7	2
Borough surveyor's estimate	181	17	0

Contract No. 3.—Laying asphalt over carriage-ways and walks.

A. Hulse	£169	2	0
Constable & Co., Limited	146	19	10
F. Bennie	136	16	8
North of England Asphalt Co.	127	15	11
S. Jones	121	12	6
Asphalt Lime & Concrete Co.	120	14	0
J. J. INGHAM, Bradford (accepted)	112	12	10
J. Ford	112	10	8
Borough surveyor's estimate	136	16	8

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**CORNWALL.**

For erection of two shops and dwelling-houses in Bank Street, Newquay.

G. MINERS, Marazion, Cornwall (*accepted*).

**CROYDON.**

For pulling-down premises in George Street on site of proposed extension of premises. Mr. A. BROAD, architect, 3 High Street, Croydon.

S. E. BONSALE, Peckham ( <i>accepted</i> )	£90	13	0
E. J. Saunders	80	0	0
Newmans, Limited	70	0	0
M. J. Allen	70	0	0
Marshall & Son	60	0	0
J. Baptiste, jun.	52	0	0
G. Tatum	43	10	0
D. W. Barker	25	0	0

**DEPTFORD.**

For erection and completion of the Broadway Theatre, Deptford, for Messrs. David Allen & Sons. Mr. W. R. G. SPRAGUE, architect.

Martin, Wells & Co.	£25,759	0	0
J. W. Falkner	25,718	0	0
Lawrence & Sons	24,835	0	0
Dove Bros.	24,400	0	0
Patman & Fotheringham	24,284	0	0
McCormick	24,155	0	0
S. R. Lamble	24,073	0	0
Kirk & Randell	23,765	0	0
W. Down	23,642	0	0
Howell J. Williams	23,456	0	0
Harris & Wardrop	23,570	0	0
Foster & Dicksee	23,136	0	0
Burman & Son	23,095	0	0
H. L. Holloway	23,080	0	0
Wilkinson Bros.	22,571	0	0
Gray Hill	22,313	0	0
WALTER WALLIS, Balham ( <i>accepted</i> )	21,157	0	0

**ESHOLT.**

For formation of roads and sewers on the Hollin Bank Estate, Esholt, Yorks. Messrs. EMPSALL & CLARKSON, architects, 7 Exchange, Bradford.

J. YEADON, Guiseley, Leeds (*accepted*) . . . £650 0 0

**CUPAR-FIFE.**

For constructing a filter in two divisions, each 75 feet by 36 feet, with relative wells, pipes and fittings, &c., and a steel gangway, 38 feet span, at the Clatto Reservoir. Mr. HENRY BRUCE, engineer, Cupar.

A. Waddell & Son	£2,190	6	9
G. Mackay & Son	1,847	11	1
A. Stewart	1,721	13	1
J. Strachan & Son	1,715	14	8
W. Caragher	1,662	17	4
J. KIRKALDY, Cupar-Fife ( <i>accepted</i> )	1,657	6	1

**FULHAM.**

For making-up and paving Bagley's Lane, Section 1, for the Fulham Vestry. Mr. CHARLES BOTTERILL, surveyor.

**Roadway.**

Greenham, Hammersmith	£330	0	0
Nowell & Co., Kensington	328	0	0
Wimpey & Co., Hammersmith	320	0	0
Mears, Fulham	314	0	0
Parry, Fulham	311	0	0

**York.**

Parry	180	0	0
Nowell & Co.	179	0	0
Wimpey & Co.	178	0	0

**Adamant.**

Wimpey & Co.	124	10	0
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**Victoria.**

Victoria Stone Co., Kingsland	112	0	0
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**Imperial.**

Imperial Stone Co., East Greenwich	119	0	0
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**HALIFAX.**

For erection of the Ovenden Ward Constitutional Club at Lee Mount. Mr. JOSEPH F. WALSH, architect, L. and Y. Bank Chambers, Halifax.

**Accepted Tenders.**

N. Greenwood, mason.

N. Furniss, joiner.

J. Viney, painter.

T. Davenport, slater and plasterer.

P. M. Walker & Co., ventilating.

Westminster Patent Flooring Company, concretor.

Barraclough and Ambler, plumbing and heating.

J. Berry, ironfounder.

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GREAT YARMOUTH.

For domestic additions to shop, St. Nicholas's Road. Mr. JAMES E. TEASDEL, architect, 3 Queen Street, Great Yarmouth.		
R. Banks	£389	10 0
J. Rund	374	10 0
J. Balls	360	10 0
A. Wright	358	5 0
J. Read	351	6 0
J. F. Bray	348	0 0
G. Beech	337	0 0
C. Wiseman	333	0 0
J. Moore	326	0 0
A. E. Bond	325	0 0
H. Whall	317	0 0
E. Bland	283	6 0
F. GRIMBLE, Northgate Street (accepted)	279	0 0

HALIFAX.

For erection of two pairs of semi-detached houses at Lightcliffe. Mr. JOSEPH F. WALSH, architect, L. and Y. Bank Chambers, Halifax.		
<i>Accepted tenders.</i>		
T. Dawson, Lightcliffe, mason.		
M. Woodhead, Lightcliffe, joiner.		
G. Calvert, plumber.		
T. Lister & Sons, slater and plasterer.		

HEYWOOD.

For enlargement of the cemetery. Mr. JAMES DIGGLE, borough engineer.		
S. & A. TAYLOR, William Street (accepted).		

HUDDERSFIELD.

For erection of a shed at the Archill and Cudbear Works, Hillhouse Road. Messrs. JOHN KIRK & SONS, architects, Huddersfield.		
<i>Accepted tenders.</i>		
Stead & Kaye, mason.		
Richardson & Wilson, joiner.		
Milnes & Garside, plumber.		
G. Moxon, painter.		
T. B. Tunnacliffe, slater.		
Calvert & Co., ironfounder.		
W. H. Heywood & Co., patent glazier.		

ILFORD.

For tar-paving Cleveland Road Schools playground, for the Ilford School Board.		
W. Gibbs	£714	0 0
J. Mowlem & Co.	596	0 0
Hobman & Co.	550	0 0
Bensted & Son	545	10 0
Asphaltic Limestone Concrete Co., Limited	495	0 0
CONSTABLE & CO., Kentish Town (accepted)	465	0 0
Architect's estimate	671	0 0

KETTERING.

For 760 yards lineal of 2 foot 6 inch diameter outfall sewer, with flushing chamber, manholes, junctions, &c. Mr. T. R. SMITH, engineer and surveyor.		
R. Lock	£1,974	0 0
Siddons & Freeman	1,920	0 0
Bentley, Son & Partington	1,766	0 0
G. Bell	1,735	0 0
Johnson & Langley	1,728	18 6
T. Smart	1,661	12 6
H. H. BARRY, Nottingham (accepted)	1,630	0 0
For supply of cast-iron manhole and lamphole covers, step-irons, flushing valves, gullies and other ironwork required in connection with the construction of sewers and surface-water drains. Mr. T. R. SMITH, engineer and surveyor.		
Glenfield Company	£1,967	18 6
Salmon & Co.	1,639	5 0
Glendon Engine Works Co.	1,361	18 6
E. Woolley	1,304	14 6
Cort, Paul & Cornick	1,195	1 1
J. Williamson & Co.	1,166	19 6
J. Needham	1,152	6 4
Blakeborough & Sons	1,151	2 2
H. F. Billson	1,075	6 8
G. Harvey & Co.	1,073	13 0
A. Barnes & Co.	1,066	17 8
J. Gibbs & Co.	1,061	15 2
Mobbs & Co.	1,055	16 4
Arnes, Crosta & Co.	1,031	10 2
S. Wright	1,022	11 4
J. Lees & Sons	942	1 10
Exors. of D. Clarke	913	0 0
A. MACKINTOSH & SONS, Cambridge (accepted)	895	9 9

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## KNARESBOROUGH.

For extending the main sewer at Oatlands, Pannal, from Hookstone Road to Firs Lane. Mr. R. ANNAKIN, surveyor, 44 Station Parade, Harrogate.

J. Ford	£1,091	0	0
J. Whitaker	811	0	0
F. U. Simpson	616	0	0
H. Leedham	540	0	0
W. ANNAKIN, Franklin Road, Harrogate (accepted).	517	0	0

## LANGTOFT.

For restoration of the roof of north aisle of parish church. Mr. J. C. TRAYLEN, diocesan surveyor, Stamford.

Gelsthorpe, Bourne, Lincs.	£195	0	0
Wade, St. Neots	178	0	0
Roberts Bros., Stamford	142	0	0
Pine, Werrington	138	0	0
Cave, Market Deeping, Langtoft.	135	0	0

Note.—No tender accepted at present.

## LEEDS.

For erection of twenty-one houses at New Road Side, Horsforth.

## Accepted tenders.

W. Flesker & Sons, bricklayer and mason	£2,183	10	0
T. Baldwin, joiner	796	0	0
L. Routh, plasterer	283	10	0
W. Atkinson, slater	176	7	0
T. Brearcliffe, plumber	138	0	0
L. Riley, painter	52	10	0

## LONDON SCHOOL BOARD.

For exterior painting and interior cleaning, Everington Street.

E. T. Folley	£497	0	0
W. Hornett	390	0	0
F. G. Minter	390	0	0
F. T. Chinchin	385	0	0
C. Gurling	383	0	0
T. Cruwys	368	0	0
Marchant & Hirst	360	0	0
W. R. & A. Hide	357	10	0
W. Chappell	555	0	0
W. HAMMOND (accepted)	348	0	0

## LONDON SCHOOL BOARD—continued.

For exterior painting and interior cleaning, Flora Gardens.

T. Hooper	£558	0	0
W. Hammond	349	0	0
F. G. Minter	300	0	0
W. Hornett	291	0	0
W. Chappell	285	0	0
T. Cruwys	283	0	0
W. Brown	267	0	0
W. R. & A. Hide	257	10	0
F. T. Chinchin	257	5	0
E. T. FOLLEY (accepted)	247	0	0

For exterior painting and interior cleaning (new and old portions), St. Dunstan's Road.

W. Brown	£358	0	0
F. G. Minter	351	0	0
T. Cruwys	348	0	0
E. T. Folley	337	0	0
W. Hornett	337	0	0
C. Gurling	330	0	0
W. Chappell	329	10	0
W. Hammond	329	0	0
F. T. Chinchin	323	7	0
W. R. & A. HIDE (accepted)	308	10	0

For exterior painting and interior cleaning, Eglinton Road.

Johnson & Co.	£450	0	0
G. Barker	373	0	0
W. Banks	365	13	6
T. Cruwys	364	0	0
W. Hornett	354	0	0
C. Foreman	334	0	0
J. H. Hodgkin	333	0	0
E. PROCTOR (accepted)	320	0	0

For exterior painting and interior cleaning, Hague Street.

W. Shurmer	£450	0	0
A. W. Derby	390	0	0
J. T. Robey	375	0	0
W. Silk & Son	344	0	0
W. Lawrence	341	7	0
J. F. Holliday	330	15	0
J. Kybett	327	0	0
G. Barker	299	15	0
S. H. CORFIELD (accepted)	264	0	0

## THE SOUTHAMPTON STEAM JOINERY CO., BELVEDERE WORKS, SOUTHAMPTON.

London Office: 11 Clement's Inn, Strand, W.C. Estimates supplied.

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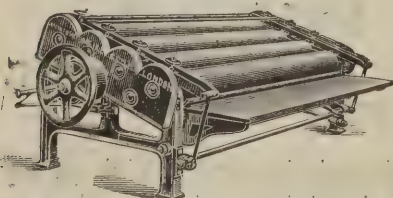
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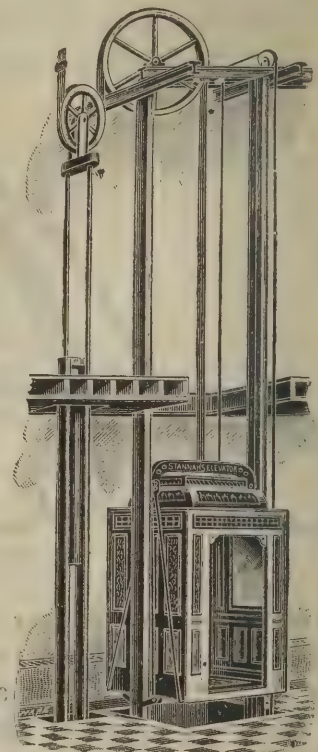
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LIFTING MACHINERY OF ALL KINDS.

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20 Southwark Bridge Road, London, S.E.



## LONDON SCHOOL BOARD—continued.

For interior cleaning, Mina Road.

W. V. Goad	£415	0	0
W. & H. Castle	394	0	0
H. Line	349	0	0
W. Smith	349	0	0
J. F. Ford	346	0	0
Johnson & Co.	338	0	0
B. E. Nightingale	326	0	0
HOLLIDAY & GREENWOOD (accepted)	296	0	0

For exterior painting and interior cleaning, Salter's Hill.

A. J. Acworth	£359	17	6
Rice & Son	312	0	0
Maxwell Bros., Limited	310	0	0
J. & C. Bowyer	295	0	0
H. Leney	281	7	0
J. Garrett & Son	278	0	0
E. P. Bulled & Co.	269	0	0
E. B. Tucker	254	0	0
H. Somerford & Son	233	0	0
HOLLIDAY & GREENWOOD (accepted)	214	0	0

For exterior painting and interior cleaning, Woodland Road.

A. J. Acworth	£366	4	9
Rice & Son	342	0	0
J. & C. Bowyer	319	0	0
E. P. Bulled & Co.	319	0	0
J. Garrett & Son	304	0	0
G. Kemp	282	0	0
Maxwell Bros., Limited	275	0	0
H. Leney	265	7	0
Holliday & Greenwood	249	0	0
E. B. TUCKER (accepted)	238	0	0

For interior painting, Powis Street.

J. H. Hodgkin	£251	0	0
G. Summers	248	0	0
A. J. Fenn	245	0	0
Jones & Groves	239	12	0
E. Proctor	225	10	0
W. Banks	219	17	6
Holding & Son	197	0	0
C. FOREMAN (accepted)	172	0	0

## LONDON SCHOOL BOARD—continued.

For interior cleaning, Brewhouse Lane. Second competition.

A. E. Symes	£101	10	0
Jones & Groves	86	6	0
Johnson & Co.	69	0	0
W. Banks	64	14	6
G. Wales	63	5	0
J. F. Holliday	58	10	0
D. GIBB & CO. (accepted)	52	10	0

## MAIDENHEAD.

For alterations and additions to the Swan Hotel. Mr. J. H. DEACON, architect, Great Marlow.

C. W. COX & SON (accepted)	£197	0	0
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## MIDDLESBROUGH.

For erection of new premises in Dundas Mews. Mr. FRANK MARTIN, architect, West-end Buildings, Darlington.

J. JOHNSON, Acklam Terrace (accepted)	£404	10	0
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## NORTHUMBERLAND.

For erection of new Travellers' Rest Hotel at Blyth.

J. Howe & Co.	£5,189	0	0
T. Craggs	4,911	0	0
W. B. Weightman	4,583	0	0
J. C. Hope	4,536	0	0
H. Bower	4,498	0	0
J. & W. Simpson	4,199	0	0
BARROW & TEMPLE, Blyth (accepted)	3,530	18	5

## PETERBOROUGH.

For erection of a house at Bedford Street. Mr. J. G. STALLEBRASS, architect, North Street, Peterborough.

R. Nichols	£240	0	0
G. Nichols	230	0	0
Walker	218	0	0
Bailey	215	0	0
WATSON & LUCAS, Peterborough (accepted)	£197	0	0

For erection of a house at Stanground. Mr. J. G. STALLEBRASS, architect, North Street, Peterborough.

Cracknell	£470	0	0
Nichols	450	0	0
Bailey	391	0	0
SIBLEY (accepted)	380	0	0

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FOR HARDENING,  
WATERPROOFING & PRESERVING  
BUILDING MATERIALS.  
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Summer Dried Seasoned Stone for Winter Use.

## PARQUET FLOORINGS

One inch and 1/4-inch thick.

Immense Stock always ready for Laying.

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Turpin's Patent 5/16 inch thick.  
Laid in Patent Composition on Concrete,  
Stone, and Deal Floors. (See section.)

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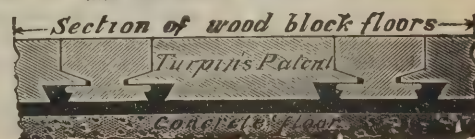
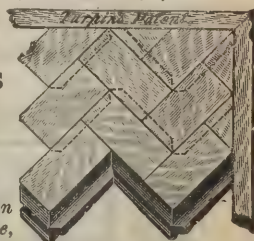
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Executed in all  
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One inch thick, from 4/10 1/2 per yard super.  
Also in Pitch Pine, Teak, Deal, &c.

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TURPIN'S  
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LOCKING  
SYSTEMfor Laying  
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Concrete, Stone,  
and Deal Floors

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QUEEN'S RD.,  
Bayswater,  
London.  
**TURPIN'S**  
Parquet Floor, Joinery  
and Wood Carving  
Co., Ltd.

ESTABLISHED 28 YEARS.



**OMAGH.**

For erection of labourers' cottages, for the Guardians.

*Accepted tenders.*

C. McCrory, Omagh, four cottages	£498	8	0
J. McCann, Corrahesk, two cottages	169	10	0

Note.—No satisfactory tenders received for other cottages.

**PENRITH.**

For erecting two cottages at Clifton. Messrs. G. WATSON &amp; SON, architects, 3 St. Andrew's Place, Penrith.

*Masonry.*

Davidson & Hope	£379	13	5
J. Lewthwaite	368	15	0
DIXON & GARDINER, Penrith (accepted)	305	0	9

*Joinery.*

J. SARGINSON, Eamont Bridge (accepted)	171	0	11
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*Slating.*

J. Lowthian.	41	3	3
J. BAILEY, Penrith (accepted)	38	2	0

*Plumbing, &c.*

J. Jackson	65	15	0
J. Purdie	64	9	6
G. Carruthers	60	0	0
G. SMILEY, Penrith (accepted)	59	0	0

*Contracts Nos. 1, 3 and 4.*

G. Dickson, Penrith	493	9	2
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**READING.**

For erection of a nurses' home at the Reading Union Workhouse, for the Guardians. Mr. JOSEPH GREENAWAY, architect, 19 Duke Street, Reading. Quantities supplied.

McCarthy E. Fitt	£1,550	0	0
Collier & Catley	1,489	0	0
W. Bourton	1,462	0	0
G. H. Tucker	1,441	0	0
G. Dixon	1,427	10	0
H. Higgs & Sons	1,410	0	0
G. Searle	1,400	0	0
John Bottrill & Son	1,386	0	0
W. Stokes	1,378	0	0
T. Pilgrim	1,375	0	0
W. Hawkins	1,335	0	0
D. TAYLOR (accepted)	1,300	0	0

**RUABON.**

For erection of eight houses, King Street, Cefn. Mr. J. W. JONE architect, Brooklea, Acrefair, Ruabon.

J. T. Jones	£1,693	0	0
J. Davies	1,592	0	0
J. Carden	1,590	0	0
R. HOPLEY, Ruabon (accepted)	1,580	0	6

**SEDBERGH.**

For building an entrance lodge to Akay, Sedbergh, for Mr. C. E. Taylor. Mr. JOHN HUTTON, architect, Kendal.

BRASSINGTON BROS. & CORNEY, Settle, Yorkshire (accepted)	£400	0	0
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**SHIPLAKE.**

For erection of an entrance lodge at Fairholme, Shiplake-on-Thames, Oxon, for Mr. Hy. M. B. Davies. Mr. JOSEPH GREENAWAY, architect, 19 Duke Street, Reading.

*Quantities supplied.*

John Bottrill & Son	£520	0	0
G. Searle	490	0	0
W. Stokes	449	0	0
W. Bourton	435	0	9
W. Hawkins	425	0	0
D. Taylor	396	0	0

**SURBITON.**

For making-up about 1,500 yards of carriageway and footpaths, with sewers, gullies, lamp columns, &amp;c., at Douglas Worthington, Ellerton, Dennen, and Cotterill Roads. Mr. SAMUEL MATHER, surveyor.

S. Hudson	£4,696	4	11
Free & Sons	4,666	0	0
W. Adamson	4,397	0	0
S. KAVANAGH, Surbiton (accepted)	3,877	0	9
Surveyor's estimate	3,817	0	0

**WOKINGHAM.**

For erection of offices, &amp;c. Mr. A. E. SIDFORD, architect. Quantities by Mr. A. J. FOSTER.

H. Clark	£459	0	0
J. B. Seward	448	0	0
Architect's estimate	450	0	0

Bricks supplied and delivered free on site by employers.

**Indeca** REG.  
Wall and Ceiling Coverings.

THE  
ENAMELLED METAL DECORATION  
COMPANY,

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**MESSRS. B. FINCH & CO., Ltd., 82 Belvedere Road, Lambeth, S.E.,** Manufacturing Sanitary Engineers, beg to remind Architects, Surveyors, and Builders that they undertake High-class Plumbing. They are prepared to Estimate on a schedule of prices, and they can refer the profession and others to large Plumbing Contracts recently executed by them both in London and the Provinces, amongst others to the Trocadero Restaurant, Piccadilly Circus. Messrs. FINCH & Co. have in their constant employ a large staff of registered plumbers. Architects and others can rely upon the work being executed with efficiency and despatch.

**Sole Makers of Finch's Siphonic W.C. & Finch's Urinal for Women, &c.**

AWARDS OBTAINED: LONDON, 1862, 1874; PARIS, 1867, 1878; CHICAGO, 1893.

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**147 STRAND, LONDON, W.C.**

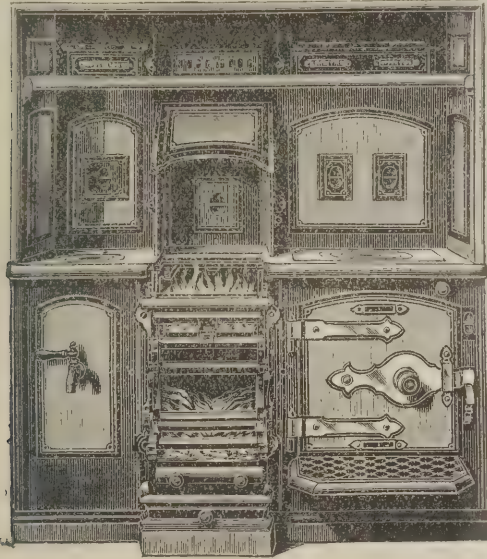


**BUILDING TRADES EXHIBITION.**

IN our notice of the exhibition last week we inadvertently omitted a reference to the exhibit of the

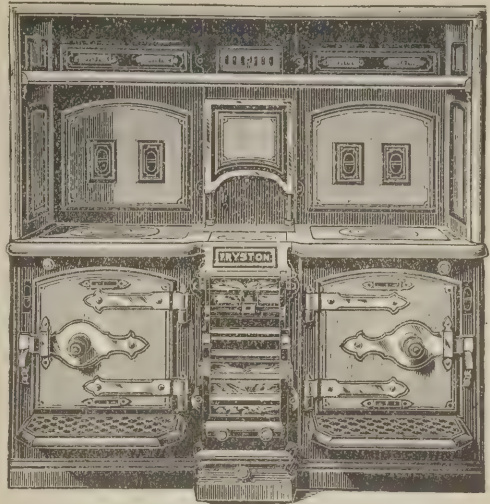
*Ferrybridge Foundry Company,*

who showed their new "Fryston" kitchener, which certainly deserves a few words of description, as it marks a distinct departure from the ordinary run of cooking stoves, inasmuch as it is at the operator's will a simplex or a duplex stove, and



this is brought about in a very simple manner, as the illustrations show. The top fire, which is all that is required for top heat, grilling, frying, boiling, &c., rests on a movable grate, which can be, at the discretion of the cook, removed from bar to bar or entirely dispensed with. For bottom heat the bottom grate only is required, and on this a shallow fire only is sufficient to produce the required result. Either of these fires will be found sufficient to heat the boiler, the ovens can be used for

baking or roasting, and the economy of fuel is sufficiently obvious, while, when an open fire is required for roasting purposes, it suffices to remove the loose grate, fill up the basket,



and a large fire surface is at once obtained. As regards price, the "Fryston" kitchener compares well with others in the market, and looks like having a big future.

*Walter Gibbs & Sons.*

Messrs. Gibbs & Sons showed some fine samples of brilliant-cutting, French embossing, back-painted mirrors, &c., and a large variety of advertising tablets. A conspicuous feature of this stand was however an embossed or brilliant-cut decoration embracing Gibbs's patent amber staining. It is a combination of white and gold, and is a beautiful form of glass decoration.

*John Grundy.*

Mr. John Grundy was represented by his "Helios" and "Sirius" smoke-consuming grates for chimneypieces, the "Hestia" slow and quick-combustion portable warming and ventilating stoves, the "Calorifer" and the well-known Grundy smoke-consuming central fresh-warmed air-heating apparatus for public buildings and private dwellings.

# IMPORTANT TO ARCHITECTS

**WM. WALLACE & CO.** have special facilities for carrying out Architects'

Designs in the best manner at the lowest possible cost, and invite drawings and specifications for Estimates (free of charge).

**Specimens** of the **High-class Workmanship** and **Materials** supplied by **Wm. Wallace & Co.** may be inspected at the under-mentioned Clubs and Institutions:—

ROYAL COLONIAL INSTITUTE,  
CLAYBURY ASYLUM (L.C.C.),  
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MIDDLESEX HOSPITAL (Convalescent Home),  
LONDON FEVER HOSPITAL (Nurses' Home),  
BANSTEAD ASYLUM (L.C.C.),  
ROYAL ASCOT GOLF CLUB,  
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,  
DULWICH COLLEGE,  
HOXTON HOUSE ASYLUM,  
NATIONAL CLUB,  
ORIENTAL CLUB,  
LONDON EXHIBITIONS CO.,  
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151, 152, 153, 154 & 155 CURTAIN ROAD, LONDON, E.C.



*A. J. Ellis.*

Ellis's patent compensation system, as exhibited, is a thoroughly reliable and economical glazing, watertight, and simple to fix. An ordinary workman can fix it, or replace broken glass in a very short time. The sash-bars are of steel, with condense gutters, and are light and strong. The compensating arrangements consist of a spring clip, which presses the zinc caps on the glass. The spring clip is kept in position by a brass bolt, which passes through a round hole in the steel sash-bar. The bolt hole in the zinc cap is oval, thus allowing a slight play on the bolt. The glass and metal is therefore free to expand, and any breakage of glass through a sudden change of temperature is prevented. Ellis's patent steel flooring is composed of rolled steel sections, with fillets on both sides of webs to carry bent plates. The sections are interchangeable and reversible. The flooring is constructed on the girder principle, having thick flanges and thin webs. It is therefore strong and light. The 2-feet by 8-inch sections have  $\frac{3}{4}$ -inch flanges and  $\frac{3}{4}$ -inch webs. This section may be used longitudinally without main girders for road bridges up to 22 feet span. Ballast plates with parapets or handrails may be fixed to outer flanges of troughs. The flooring has been used by railway engineers and county surveyors, and has given great satisfaction.

In the galleries, which were for the most part given over to the purposes of the handicraft competitions, room was found for a fine display of architectural drawings lent by Sir Horace Jones, Henry Hall, F.R.I.B.A., and J. P. Seddon, F.R.I.B.A. Among the works of the former were the fine designs (three in one frame) for the Guildhall Library, showing interior, exterior and museum, others for the Council Chamber, Guildhall School of Music, Leadenhall Market, and Billingsgate, &c. Mr. Hall showed his premiated designs for the Admiralty and War Office, Whitehall, and Mr. J. P. Seddon was represented by his designs for the decoration of Lambeth Chapel; chancel screen, Ingham Church, Norfolk; decoration of St. Paul's; Aberystwith College (several drawings); cartoon designs for the window of Llanbadarn Church, &c., all of which are too well known to need special reference. Mr. Seddon also sent in a collection of his water-colour drawings, consisting principally of landscapes, and a superb chimneypiece in American walnut and mosaic, mosaic panels, &c.

On Saturday evening Sir Arthur Arnold, ex-chairman of the London County Council, accompanied by Lady Arnold, pre-

sented the medals and certificates to the successful competitors in the handicraft competitions at the Building Trades Exhibition at the Agricultural Hall. Professor Banister Fletcher presided, and said that nearly 100 genuine working men had entered the competitions, or 100 per cent. more than competed at the exhibition of 1895. The consultative council of the exhibition were of opinion that, inasmuch as the apprenticeship system was dying out, these competitions, which might be greatly extended in the future, would prove of the greatest value in the technical education of the workmen. That a desire existed for the obtaining of records of merit was shown by the fact that during the evenings of that week the competitors had worked ten hours without any pay. The verdict of the judges was that the work had been done well, but that the competitors were for the most part weak in technical knowledge. Sir Arthur Arnold then distributed the prizes, and, on the motion of Mr. Charles Barry, a vote of thanks was passed to him and Lady Arnold for their attendance. In reply, Sir Arthur Arnold said he had to congratulate the promoters of the exhibition on the unqualified success of their venture. Such success, however, should not be surprising when the fact was borne in mind that the building trade was the largest industry of London, and more artisans were connected with it than with any other trade. With that trade, too, so much of the health and comfort of the people was bound up that it was most important that the workers should be intelligent men with a thorough knowledge of their business. He could imagine no better means of promoting that thorough knowledge than the competitions which had been conducted at that exhibition.

WE have received some particularly fine examples of the Japanese paperhangings supplied by Messrs. C. E. Leopold & Co., 24 Cecil Court, Charing Cross Road. In diversity of design they cover a very wide field, rendering them suitable for all purposes to which a rich form of decoration can be applied, such as theatres and music halls, hotel and public bars, halls and staircases, house-boats, flats, billiard, dining and drawing-rooms, &c. Among the patterns before us, perhaps the most beautiful, certainly the most striking, is a very bold rendering of magnolias and palm trees. This, however, is of great breadth of design, and would be suitable only for the decoration of a very large building; but for covering walls of smaller dimensions an extensive range of styles is offered for choice.



# EWART'S COPPER "CROWN" VENTILATOR

FACTORY—346, 348, 350 EUSTON RD.,  
LONDON, N.W.



## ILLUSTRATIONS.

SALISBURY CATHEDRAL.—FROM THE NORTH-EAST.

SALISBURY CATHEDRAL.—DETAILS, SOUTH SIDE.

SALISBURY CATHEDRAL.—SOUTH CHOIR AISLE.

GRAND STAIRCASE, STAFFORD HOUSE, ST. JAMES'S.

SEMI-DETACHED HOUSES, SNEYD PARK, BRISTOL.

## BUILDING AND BUILDERS.

A CHURCH extension scheme has been started at Plymouth which contemplates the erection of six new churches in the "Three Towns." Two sites have already been given, and it is expected that the remaining four will also be obtained without cost.

THE Great Northern Station Hotel at Leeds is to be closed until July 17 for structural alterations.

THE foundation-stone of the Carnegie Free Library at Wick was recently laid by Mr. Hew Morrison, of the Edinburgh Free Public Library.

THE Primitive Methodist buildings in Great Western Street, Manchester, are to be enlarged by the addition of a new lecture hall and several classrooms.

OXFORD PLACE CHAPEL, Leeds, the largest Wesleyan chapel in the city, is to be reconstructed at a cost of 18,000*l*. The rebuilding includes a synod hall to hold some 600 persons.

A COMMITTEE of Landudno Council will meet Mr. Silcock, the architect for the proposed municipal buildings, in order to have the cost reduced to 12,000*l*.

MEMORIAL-STONES were laid on the 27th ult. of the new Wesleyan Sunday School, Lockwood, in the Huddersfield Buxton Road circuit, which is being erected at a cost of 4,000*l*.

THE new bridge to be erected across the river Ayr, a little eastward of the railway, is to be begun this month. The structure, which is principally of iron, will be a handsome one. The bridge is designed specially to give access to the new show ground in Wallacetown, purchased by the Agricultural Association. It will also connect a new road which is to be formed through Craigie grounds. The bridge will be about

40 feet wide, of three spans (71 yards in length), and will cost a little over 6,000*l*. The approaches, &c., are to cost 1,000*l*. more. The bridge will be finished by the end of the year.

WHILE some men were engaged in pulling down the front wall of the Southampton Gaol, on which was a large representation of the borough arms carved in stone, the wall suddenly collapsed with a loud noise, which resounded through the neighbourhood and created a deal of excitement. A lad in the employ of Mr. Dibben, of St. Mary's Road, who was engaged in picking up bricks to throw into a cart, was knocked down and partly buried in the material which fell. The men who were occupied in pulling down the wall, seeing that it was about to give way, were fortunately able to jump clear and so escaped injury.

## VARIETIES.

A COTTAGE hospital has just been built at Aharacle. It is a commodious building of two storeys and has been furnished with all modern appliances.

A SPACIOUS school which has been erected by the Unitarians of the Britain Hill Church, Heywood, was formally opened on Saturday last. The old school is to be added to the church to increase its size.

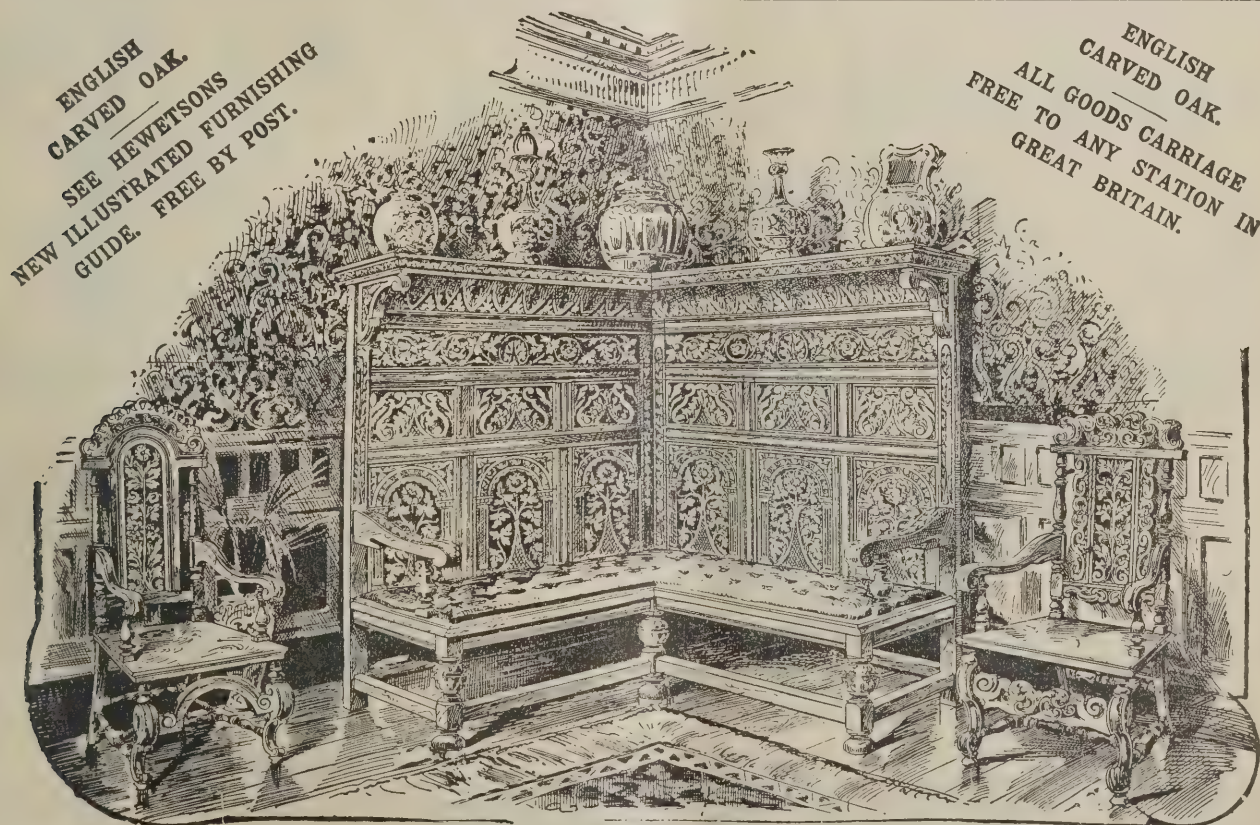
THORN Wesleyan Chapel, Bacup, has just been reopened after undergoing improvements which have cost 380*l*. The Rev. J. D. Brash, of Liverpool, was the preacher for the occasion.

IN the course of excavating for some new buildings on the 27th ult. the Chatham Corporation's workmen discovered two skeletons which archaeological experts declare to be those of Romans who were buried about 1,500 years ago.

A VALUABLE collection of pictures, including examples of Landseer, Cox and Moreland, has been lent for exhibition in the reading-room of the Newington Public Library, Walworth Road, by a lady who wishes to remain anonymous.

SIR EDWARD LAWSON has presented to the parish church of Beaconsfield a window in memory of Canon Cholmeley, the late rector. The lights represent his connection with Magdalen College, Oxford, with Lincolnshire, his native county, and with Salisbury, of which he was a prebend.

THE fourth monthly dinner organised by the members of the London Chamber of Commerce will take place on Tuesday next, at 6.15 for 6.30 P.M., at the Trocadero Restaurant, Shaftes-



A PAGE FROM HEWETSONS NEW ILLUSTRATED PRICED CATALOGUE.

No. 319.—The "WORTLEY" CARVED OAK ARM-CHAIR, £4 15s.

No. 320.—CARVED OAK HALL COSY CORNER, 6 ft. 6 in. high, £24 10s.

No. 321.—The "KNIGHT" CARVED OAK ARM-CHAIR, £4 5s.

**HEWETSONS,** ARTISTIC FURNISHERS AND HIGH-CLASS DECORATORS, **TOTTENHAM COURT ROAD, LONDON.**



bury Avenue, W.C. The subject for discussion will be "Art in its Relation to Industry," and Sir James Linton, P.R.I., will take the chair; and amongst those who have promised to attend and speak are Mr. Marcus Stone, Mr. Walter Crane, and Mr. H. S. Mendelssohn.

THE death is announced as having occurred on the 27th ult. of Mr. Thomas Leonard Ellis, ironmaster, Coatbridge, after a brief illness. He was the youngest son of the late Mr. Thomas Ellis, the founder of the North British Ironworks, Coatbridge, one of the largest malleable ironworks in the country. The deceased was a comparatively young man, and was a member of the recently formed limited company that now conducts the works. He leaves a widow and child.

COLINTON Church has recently undergone some internal improvements in the way of reseating, painting, &c. A marble tablet has been erected to the memory of the late R. A. Macfie, of Dregghorn, and another has been placed to the memory of the late Sir James Liston Foulis, Bart., and at the west door a beautiful panel has been placed giving some details of the ancient church of the parish.

FUNDS to be devoted to the purchase of English pictures have been placed at the disposal of the Royal Academy by the Government of one of the Australian colonies. The sum of a thousand a year will be entrusted to the charge of the Forty, under conditions similar to those which govern the Chantry Fund, and the choice of the pictures will be left entirely to the discretion of the President and Council.

THE interior of St. Mary's Roman Catholic Church, Lochee, has been improved by the erection of a very fine altar. Surmounting the altar is a canopy of white marble, the table also being of the same material. In front is a circular ornament containing a representation of a pelican and its young, whilst above the table is the pyx of variegated alabaster, flanked on each side by the representation of an angel bearing a thurifer.

A HANDSOME stained-glass window, which has recently been placed in St. Giles's Parish Church, Newcastle-under-Lyme, was dedicated on Sunday, the 28th ult., with considerable ceremony, the Mayor and Corporation attending in state to do honour to the occasion. The window is an artistic specimen, and has been supplied by Messrs. Hardman & Co., of Birmingham, the cost being about 1,000*l*. The design occupying the seven principal lights is the Crucifixion.

THE old parish church of Swinton, South Yorkshire, having taken fire owing to defective heating apparatus, has been burnt down. In about half an hour the roof fell in, and the old-fashioned high-backed seats and gallery were consumed. The parish documents were saved by the curate, the Rev. J. G. Patrick. The damage is estimated at about 3,000*l*., and the church was insured for 2,000*l*.

### TRADE NOTES.

MESSRS. E. H. SHORLAND & BROTHER, of Manchester, have just supplied their patent warm-air ventilating Manchester grates to the Upton Asylum, Chester.

MESSRS. STEEL & GARLAND, LIMITED, of Sheffield and London, have declared and paid a dividend on the ordinary shares at the rate of 11 per cent. per annum for the half-year ending December 31, 1896.

THE Frost-Proof Water-Pipe Syndicate, Limited, has recently been formed in Birmingham to develop certain patents it has acquired for preventing the splitting of water service pipes under the action of frost. Some very severe tests of the pipe have just been completed in Birmingham. With the aid of a large local ice-making plant, lengths of the pipe, after being filled with water and the ends hermetically sealed, were frozen solid throughout, then thawed and tested for leakage under pressure, this cycle of operations being repeated on one length of pipe many successive times without a sign of a fracture. We understand that a public company will shortly be formed to put it on the market, and shall doubtless be able later on to describe and illustrate fully what certainly appears to be a very valuable commercial invention.

### WOOD PAVING IN EDINBURGH.

A DEPUTATION from Edinburgh Town Council, which was sent to London to collect information in regard to the best methods of wood paving, reports that the members are satisfied that the Australian hard woods possess valuable and peculiar qualities, rendering them highly suitable for street paving purposes. They consider that the hard woods recommended will not be excessive in cost, nor far behind in durability, having in view the fact of Edinburgh traffic being so much lighter than that of London. On the respective merits of the various woods they recommend that black butt and tallow wood be fairly tested. In view of the fact that Edinburgh depends so largely

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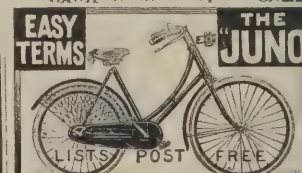
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for its prosperity on its attractiveness to strangers and tourists, as well as on its comfort for a residential population, the deputation recommends that Princes Street should be paved in sections with Jarrah, Jarrahdale and Karri, with black butt and tallow wood between the tramway rails, and that as much as possible of this should be done while the tramway operations are being executed.

### GLAZED BRICKS.

THE Midland Glazed Brick Company, Limited, established now for many years, have perhaps been more successful than any other fire-clay manufacturers in the Staffordshire district in building up a large and expanding trade in white glazed bricks. When it was first proposed to make these goods in that county the difficulty presented itself whether it would be possible, as the fire-clay of North Staffordshire was more ferruginous than that of Leeds and the North of England, to prevent the iron showing through the enamelled face. By dint of great care in selecting the clay, exposing it to generous atmospheric action, carefully desiccating and slow skilful firing in the kilns, the Midland Glazed Brick Company are now able to produce most satisfactory glazed surfaces.

It is claimed, moreover, and we think with a measure of reason, that the Staffordshire clays being remarkably dense and impregnated with granulated iron, there is less danger of these bricks absorbing and retaining the damp, either externally or from other causes, than with the clays mined in other districts.

At least, from the growing estimation in which the bricks are held by architects and engineers, it would appear that what the Midland Glazed Brick Co. claim are generally admitted as facts. Probably the specially hard enamel, obtainable only in the potteries where the works are situated, lessens also the risks of the crazing or chipping of the glazed surfaces so often complained of.

We learn on good authority that the company's goods have been selected and used in fifty-four Board and public schools in the United Kingdom, and as the rough usage in these buildings is perhaps greater than in any other edifices, there is good reason to credit what is claimed.

We are informed that in the palatial hotel now being erected on the Duke of Bedford's estate, to be known as the Hotel Russell, the Midland Company's white glazed bricks will be used throughout.

The London agents are Messrs. Freeman & Freeman, of 200, &c. Phoenix Street, St. Pancras Station, N.W., where a stock is kept, or samples can be seen.

### FIRE AT CHESTER TOWN HALL.

AN alarming fire, which for rapidity and extent of destructiveness has not been equalled even in the eventful history of old Chester, occurred at the town hall there on Saturday evening.

The fire, which commenced in the council chamber, was fanned by a strong westerly wind, the roof was soon ablaze, and in twenty minutes from the discovery of the outbreak the roof fell in. The flames were fortunately driven across the building by the westerly wind, and this facilitated the efforts of the firemen in saving the remainder of the pile. Had the wind been in a northerly direction it would have been practically an impossibility to prevent the total destruction of the hall. As it was the flames blazed fiercely towards the tower, and at one time communicated with the huge wooden beams running up the centre. In half an hour the flames were confined to the area of the council chamber, and when the steamer got into proper working order mastery was soon obtained of the flames.

The portraits which were hung in the mayor's parlour and the committee rooms were saved, but some were seriously damaged in the process. The fire burned through the door leading from the council chamber to the adjoining room, but there it was checked. It was difficult to give even an approximate idea of the damage, but it will probably amount in round figures to 10,000*l*. This loss is covered by insurance in several offices.

The cause of the outbreak is a matter of conjecture. That it started immediately over the ceiling of the council chamber is certain, but whether it had ignited suddenly or been smouldering for some time cannot be ascertained. It is stated that one of the chimneys at the north end of the hall was on fire in the evening, and that fact, together with the surmise that there had been a defective flue running near the roof, would supply sufficient cause for the outbreak.

The town hall, which is built in the Gothic style, was erected at a cost of 50,000*l*. The foundation-stone was laid in October 1865, by the mayor, Mr. Robert Frost, and the building was opened by the Prince of Wales on October 15, 1869, on which

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occasion the mayor, Alderman T. G. Frost, was knighted. By a strange coincidence the old Exchange or town hall, which occupied an adjoining site, was entirely destroyed by fire in December 1863, and it was believed that the outbreak on that occasion was also due to a defective flue.

### CONVALESCENT HOME, LITTLEHAMPTON.

ON March 21 the new Convalescent Home, erected by Mr. Henry Harben, at a cost of over 50,000*l.*, was opened. It is intended for the reception of working men. It is built in the Georgian style of architecture, and stands in grounds of over nine acres. It is set back 250 feet from the esplanade, and has a frontage of over 170 feet. It is lighted throughout by electricity. The westward end of the home is marked by an octagonal bay, this being carried up two floors, while on the east wing is the entertainment hall. On each side of the main entrance is a sheltered terrace, facing due south, on which seats are placed, so that the inmates may have the full benefit on fine days of the sun and the Channel breezes. This sheltered terrace is 5 feet above the level of the roadway, and about 14 feet above high-tide level. The entrance is reached by a flight of stone steps, and over this rises a square tower surmounted by a copper dome having a large dial clock face on each of the four sides, and higher still, and supported in a teak turret is the hour-bell (weigh 8 cwt.), to which is attached an electric fire alarm. The main corridor, which runs east and west, is 112 feet in length and 7 feet wide, the walls being faced with white and green glazed bricks, and the flooring of oak and jarrah wood laid diagonally. The room of the secretary is entered from the main corridor, and adjoining this is the matron's-room, in which there is a switch-board, giving the matron absolute control over the electric-lighting arrangement; electric bells communicate from each room, and the laundry, engine-house, electric-light station and engineer's cottage can be communicated with from the matron's-room by telephone. The waiting or medical-room is next to the matron's-room, and is fitted with cupboards for the use of the medical officers. There is a large smoking-room, well-lighted and ventilated, overlooking the terrace towards the sea.

Adjoining is the quiet room for private meditation and prayer; also a spacious and handsome reading-room and library, well fitted with enclosed bookcases of pitch-pine, and

having two fireplaces and a large octagonal bay window, through which extensive views north, south and west can be obtained. At the extreme west end of the corridor is the patients' entrance and immediately inside the porch is the lavatory, fitted with large wash basins with a supply of hot and cold water, &c., and from the lavatory is a teak staircase leading to the boot-room in the basement and to the garden. The dining-room is capable of seating forty persons, although by the use of small tables sixty can be comfortably accommodated. What is known as the administrative block is entirely separated from the home. There is a large kitchen, the walls of which are lined with glazed bricks, and it is fitted with large range and hot plate, &c., and has a lift to the meat store under. The scullery, which adjoins, is also lined with glazed brick, fitted with steam appliances for fish and vegetables, and other cooking apparatus, white glazed sinks, &c., the heating of both fresh and salt water for baths being arranged from these services, while the salt water is passed through copper tubes in a large cylinder and heated by steam. The servants' hall, which is near the kitchen, is provided with private lockers, &c., for the servants; and there are two larders, wine, beer and matron's store, and large coal cellar, all of which are lined with white glazed brick; while there is an electric lift, which can be used for both passengers and luggage, opposite which is a servants' staircase running to the entire height of the building and communicating with the bedrooms set apart for their use. The principal staircase leads from the centre of the main corridor immediately opposite the front entrance; it is of solid teak, with pitch-pine balusters and strings, and is lighted by electric lights from gun metal standards fixed on the panels, the windows being filled with painted glass with artistic designs emblematic of "Peace and Rest." On the second flight of the great staircase—that is, from the first to the second floor of the building—is a second painted-glass window. The first floor corridor is the same length as the main corridor, 112 feet, and it is heated by means of radiators, is lined with glazed bricks in two soft-toned shades, and has panelled pitch-pine ceilings and polished oak or jarrah wood floor in squares laid diagonally.

The invalids' room is at the extreme west over the reading-room and is arranged to form a comfortable day-room or ward. This is one of the most handsome rooms in the home, and a lovely view is to be obtained from the octagonal bay window; this bay, having a fireplace, is so arranged that it can be curtained off to form a sitting-room for any patients who may be unable to go downstairs. There are bedrooms on each side

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of the corridors. Two bath-rooms are on the second floor, fitted with hot and cold fresh water supply, and hot and cold salt water, housemaids' sink, hot air linen cupboards, &c. The matron's bedroom is so situated as to adjoin the only entrance from the administrative block to the home; it is fitted with switches for shutting off the electric light to any portion of the home, the electric-lighting system being so perfected that the light can be switched on to any bedroom upon the patient communicating with the matron by bell; while there are also a fire-alarm and telephonic communication with the engineer's cottage at night. Every detail, indeed, has been most carefully thought out, even to the locks, which throughout have been specially designed, so that should a patient be locked in his room and unable to open the door, the matron with her master key can open the door from the outside, whether the key is in the lock or not. The bedrooms on both floors are similar, and every bedroom has a fireplace. In addition to the two bath-rooms there is on the second floor a room with fresh-water douche. A tank-room adjoining contains tanks to hold 3,000 gallons of fresh water and 1,000 gallons of salt water; the sea-water is pumped by electric motor from a tank underground, which is filled at high tide direct from the English Channel. The electric-light station is built some 300 feet to the rear of the home, everything being in duplicate. The whole of the laundry apparatus is worked by an electric motor, and there is a pump-house in which there is a well 50 feet deep, from which the whole of the fresh-water supply is obtained, and there is a Maignen's apparatus for softening the water. There are also houses for the engineer, gardener, &c. The buildings have been erected by Messrs. Holland & Hannen from the designs and under the superintendence of Mr. Frederick Wheeler, of London and Horsham.

### MANUAL INSTRUCTION CENTRES.

THE following circular has been issued by the Education Department:—"My lords have had under consideration the question of the construction and situation of rooms for manual instruction in connection with public elementary schools. They find that these rooms have often been built on sites originally approved only for ordinary school accommodation, and that the open playgrounds have thereby been reduced in size and the sources of fresh air supply to the schools have been injured, in violation of the principles laid down in the building rules (see

rule 15, schedule 7, New Code). They consider that the following rules should be observed:—(1) Manual instruction should not be given in the classrooms of the school. (2) A room to be used for manual instruction need not be on the same site as the school to which it is attached. (3) A room to be used for manual instruction should not be built on a site already occupied by the playground of a school, unless it can be so built that the school continues fully to fulfil the conditions of building rule 15 as to uncovered space, and that the supply of fresh air to the school is not impeded. (4) The plan, arrangements, construction, lighting and ventilation of the room should be those suitable for a workshop rather than those suitable for a school. The construction should accordingly be simple. The roof may be either of lean-to or other ordinary form according to circumstances. Its height at the windows in front of the benches need not be more than 10 feet. The light must be ample. The temperature should not be so high as in an ordinary classroom. A flat ceiling is not as a rule necessary. The ventilation should be ample by inlets at a height of 5 feet from the floor and by outlets at the highest point. Their lordships are informed that satisfactory buildings can be provided at a cost of 10s. per superficial foot, and that the maximum cost ought never to exceed 15s."

### THE AMERICAN TARIFF.

IN the new American Tariff Bill the following charges are proposed to be levied on building materials, &c.:—

Firebrick, not glazed or decorated, 1 dol. 25 cents per ton; glazed or decorated, 30 per cent. *ad valorem* (against 25 per cent.).

Brick, other than firebrick, not glazed or decorated, 25 per cent.; if glazed or decorated, 30 per cent.

Tiles, glazed or unglazed, valued at not exceeding 40 cents per square foot, 8 cents per square foot; exceeding 40 cents, 10 cents per square foot and 25 per cent. *ad valorem* (against 25 per cent. unglazed and 40 per cent. glazed).

Roman, Portland and other hydraulic cement in packages, 8 cents per 100 lbs., including weight of package in bulk, 7 cents per 100 lbs. (against the same and other cements, 10 per cent. *ad valorem*).

All articles composed of earthen or mineral substances not specially provided for, if not decorated 35 per cent., if decorated 45 per cent. (against 30 per cent. *ad valorem*).

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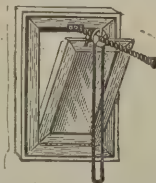
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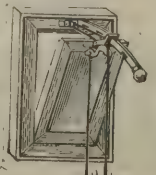
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3/4 x 15, 7/6  
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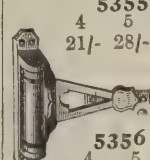
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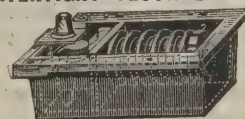
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Size of Plate,  
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Gas retorts 3 dols. each, lava tips or burners 10 cents gross, and 15 per cent. *ad valorem*, carbons for electric lighting and filter tubes 50 per cent. (against 20 per cent. for gas retorts), porous pots for electric batteries without metallic connections 20 per cent.

Unpolished cylinder, crown and common window glass not exceeding 10 inches by 15 inches square,  $1\frac{1}{8}$  cent per lb. (against 1 cent); above that and not exceeding 16 inches by 24 inches,  $1\frac{1}{8}$  cent; not exceeding 24 inches by 30 inches,  $2\frac{3}{8}$  cents; 24 inches by 36 inches,  $2\frac{7}{8}$  cents; 30 inches by 40 inches,  $3\frac{3}{8}$  cents; 40 inches by 60 inches,  $3\frac{7}{8}$  cents; above that,  $4\frac{3}{8}$  cents (against  $2\frac{1}{8}$  cents); provided that unpolished cylinder, crown and common glass imported in boxes shall contain 50 square feet as nearly as sizes will permit, and the duty shall be computed thereon according to actual weight of glass.

Cylinder and crown glass polished not exceeding 16 inches by 24 inches, 4 cents (against  $2\frac{1}{2}$  cents per square foot); 24 inches by 36 inches, 6 cents (against 4 cents); 24 inches by 60 inches, 20 cents (against 15 cents); above that, 40 cents (against 20 cents per square foot).

Fluted, rolled or rough plate-glass, or the same containing a wire netting within itself, not including crown, cylinder or common window glass, not exceeding 10 inches by 15 inches square,  $\frac{3}{4}$  cent per square foot; 16 inches by 24 inches, 1 cent (against  $\frac{3}{4}$  cent); 24 inches by 30 inches,  $1\frac{1}{2}$  cent (against 1 cent); all above that 2 cents (against  $1\frac{1}{2}$  cent); and all fluted, rolled or rough plate-glass weighing over 100 lbs. per 100 square feet shall pay an additional duty on the excess at the same rates herein imposed provided that all the above plate-glass, when ground, smoothed or otherwise obscured shall be subject to same rate of duty as cast polished plate-glass unsilvered.

Cast polished plate-glass, finished or unfinished and unsilvered, not exceeding 16 inches by 24 inches square, 8 cents per square foot (against 5 cents); 24 inches by 30 inches, 12 cents (against 8 cents); 24 inches by 60 inches,  $22\frac{1}{2}$  cents; above that, 35 cents (against  $22\frac{1}{2}$  cents).

Cast polished plate glass silvered and looking-glass plates, not exceeding 16 inches by 24 inches square, 9 cents per square foot; 24 inches by 30 inches, 13 cents (against 10 cents); above that, 40 cents (against 23 cents); but no looking-glass plates or plate-glass silvered when framed shall pay less rate of duty than that imposed upon similar glass of like description not framed, but shall pay, in addition thereto, upon such frames the rate of duty applicable thereto when imported separate.

Cast polished plate-glass, silvered or unsilvered, and cylinder, crown or common window glass, when silvered or unsilvered, when bent, ground, obscured, frosted, sanded, enamelled, bevelled, etched, embossed, engraved or otherwise ornamented or decorated, shall be subject to duty of 10 per cent. in addition to the rates otherwise chargeable thereon.

Stained or painted windows, glass windows or mirrors, not exceeding 144 square inches, and all glass or manufactures of which glass or paste is component material of chief value not specially provided for, 45 per cent.

Bar iron, rolled or hammered, comprising flats, round iron not less than  $\frac{7}{8}$  of an inch in diameter, and square iron not specially provided for, 6-10c. per lb.; round iron in coils or rods, less than  $\frac{7}{8}$  of an inch in diameter, and bars or shapes of rolled iron not specially provided for, 8-10c. per lb., provided all iron and slabs, blooms, loops, or other forms less finished than iron in bars and more advanced than pig-iron, except castings, shall be subject to a duty of 5-10c. per lb., provided all iron bars, blooms, billets, or sizes or shapes of any kind in manufacture of which charcoal is used shall be subject to a duty of 12 dols. per ton.

Boiler and other plate-iron or steel for whatever purpose used, except saw-plates hereinafter provided for, not thinner than No. 10 wire-gauge, and skelp-iron or steel valued 1c. per lb., 5-10c. per lb.; valued above 1c. and not above 2c., 6-10c. per lb.; not above 4c., 1c.; over 4c., 30 per cent. *ad valorem*, provided that all plate-iron or steel thinner than No. 10 wire-gauge shall pay duty as iron or steel sheets.

Hoop or band or scroll or other iron or steel valued at 3c. per lb. or less, 6-10c. to 9-10c., provided that hoop or band-iron or steel cut to length or wholly or partly manufactured into hoops or ties shall pay 1-10c. more duty.

Railway bars of iron or steel or part steel and rails, 7-20c. per lb.; railway fish plates,  $\frac{1}{2}$ c. per lb.; sheets of iron or steel, common or black, including all iron or steel commercially known as common or black, taggers, iron or steel and skelp iron or steel valued at 3c. per lb. or less, thinner than No. 10 and not thinner than No. 20 wire gauge, 7-10c. per lb.; not thinner than No. 25, 6-10c.; not thinner than No. 32, 1 1-10c.; thinner than No. 32, 1 2-10c.; provided all common or black sheet iron or sheet steel not thinner than No. 10 shall pay duty as plate iron or steel.

Sheet iron or sheet steel polished, planished, or glanced by whatever name designated, 2c. per lb., provided that plate or sheet or taggers, iron or steel other than the polished, planished,

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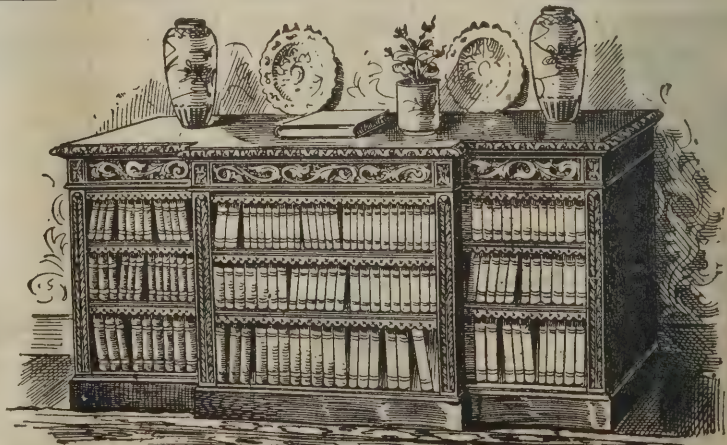
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or glanced herein provided for which have been pickled or cleaned by acid or by any other material or process or which is cold-rolled or smoothed only, not polished, shall pay  $\frac{1}{4}$  c. per lb. more than corresponding gauges of common black sheet or taggers iron or steel.

Sheets or plates of iron or steel or taggers iron or steel, coated with tin or lead, commercially known as tin plates, terne plates and taggers tin,  $1\frac{1}{4}$  c. per lb.; no allowance or reduction of duties shall be made for partial loss or damage in consequence of rust or of discolouration upon any description of iron or steel or upon any article wholly or partly manufactured of iron or steel or upon any manufacture of iron or steel.

On all iron or steel bars or rods of whatever shape or section, which are cold-rolled, cold-drawn, cold-hammered, or polished in any way in addition to ordinary processes of hot rolling or hammering there shall be paid  $\frac{1}{4}$  c. per lb. in addition to rates provided.

On bars or rods which are hot rolled and on all plates or sheets of iron or steel of whatever shape other than polished, planished, or glanced sheet iron or sheet steel before provided for which are cold-rolled, cold-hammered, blued, brightened, tempered or polished by any process in such perfected surface finish or polish better than the grade of cold rolled smooth only before provided for there shall be paid 1 c. per lb. additional duty, and on steel circular saws  $\frac{3}{4}$  c. per lb. in addition to the rate provided for steel saw plates.

### EXTRAS AND DAMAGES FOR DELAY.

ON Saturday, the 20th ult., the case *Dodd v. Chinton* came before the Court of Appeal. It was a builder's action brought to recover balance due under a contract, and was originally tried in the Whitchurch County Court. The claim was admitted, but there was a counterclaim by the building owner to recover 50% as liquidated damages for delay in completing the work. By the contract the plaintiff undertook to make certain alterations and additions to the defendant's house for 664%, as set forth in the specification and according to the general conditions annexed thereto. By clause 1. of the general conditions "the whole of the works, and any other works that may be ordered as additions to this contract, are to be executed and completed in the best and most workmanlike manner, and with the best materials of their several kinds, and everything to be done to the full spirit and intent of this contract, which is intended to

comprise everything necessary to the perfect completion of the works. Every part of the works to be done to the satisfaction of the architects, and their direction to be followed in every respect, and their opinion on all questions relating to the works or contract to be final and conclusive." Clause 4:—"Any authority given by the architects for any alteration or addition in or to the works is not to vitiate the contract, but all additions, omissions, or variations made in carrying out the works for which a price may not have been previously agreed upon are to be measured and valued and certified for by the architects, and added to or deducted from the amount of the contract as the case may be, according to the detailed schedule of prices on which the contract was formed. The schedule of prices to apply to all deductions and to additions up to 15 per cent. above the amount of the contract; any additional works beyond 15 per cent. above the amount of the contract and any item to which the schedule of prices does not apply to be allowed for at such prices as the architects may consider fair and reasonable." Clause 24:—"... the whole of the works to be completed by the first day of June, 1892, under a penalty of 2% per week for every week that any part of the works remains unfinished after that date as liquidated damages." Extra works to the amount of 22% 18s. 8d. were ordered, and the total works were not completed until twenty-seven weeks after the time specified for completion. The defendant, after allowing two weeks additional time for the completion of the extra works ordered, counterclaimed for 50%, being 2% per week for twenty-five weeks, as liquidated damages for the delay in completion. The County Court judge held that the ordering of the extra works was a waiver of the stipulation to pay damages for delay, and gave judgment for the plaintiff on the counterclaim. In the Divisional Court Mr. Justice Wills agreed with the County Court judge, while Mr. Justice Wright differed. The judgment of the County Court judge therefore stood. The defendant appealed.

The Court dismissed the appeal.

The Master of the Rolls said that the question was whether the building owner was entitled to claim certain penalties by way of liquidated damages from the builder on account of the works not having been completed in the specified time. It was said that the building owner disintituled himself from claiming the penalties by having ordered extra work to be done beyond that provided for in the specification. The extra work admittedly delayed the completion beyond the time that would have been occupied in executing the specified works. The

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contract gave the building owner the right to call upon the builder to do extra works. A recognised rule had been laid down in *Holme v. Guppy* that if the building owner ordered extra works beyond the specified works which increased the time necessary for completion, the building owner was disabled from claiming penalties for delay in completion. If that were not so, it would be a most unreasonable burden to put upon the builder to do extra works; and then, if the whole works were not completed within the specified time, to claim the specified penalties from him. Then it was held in *Westwood v. Secretary of State for India* that the fact that the contract entitled the building owner to call upon the builder to do extra works did not prevent the application of the above rule. Then came *Jones v. St. John's College*, which was an exception to that rule. In that case it was stated in the pleadings that the builder had agreed, if extra works were ordered, to complete the entire works within the stipulated time. The Court held that if the builder was foolish enough to agree to that, even though it became impossible to complete the works within the time, he must take the consequences. In the present case the builder did not by the agreement undertake such a foolish responsibility. The rule of construction was that if a particular construction led to an unreasonable result the Court would be slow to adopt that construction. In *Jones v. St. John's College* the contract was set out in the pleadings and admitted on demurrer. The present contract could not be construed as was the contract in *Jones's* case. Therefore, the building owner, though entitled by the contract to order extra works, had, by ordering the extra works, deprived himself of the right of claiming the penalties for delay. They would, therefore, adopt the judgment of Mr. Justice Wills in preference to that of Mr. Justice Wright.

The Lords Justices delivered judgment to the same effect.

### THE CHEMISTRY OF METALS USED IN CONSTRUCTION.

A LECTURE by Professor J. M. Thomson on "The Chemistry of Certain Metals used in Building Construction" was given at Carpenters' Hall on the 17th inst. The Professor referred to the difficulty of selecting a suitable subject. Having in previous lectures dealt with "Building Stones, Mortars and Cements" and with "Some Preservative Agents," the first idea was to say something in regard to wood. It might, however, have

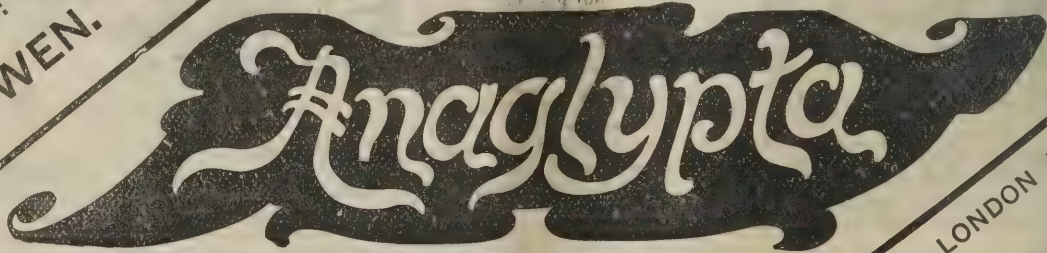
seemed impertinent to speak to those who are thoroughly acquainted with wood in their own particular hall, and therefore "Metals" had been selected as the subject. By a series of experiments an endeavour would be made to consider certain principles which underlie the chemical changes taking place in the extraction of metals from their ores, and in the action of air, water, carbonic-acid gas and various acids on metals. A primary distinguishing feature between metals and other bodies is that metals united with oxygen form a base, or basic body. Next comes the characteristic that all metals are expanded by heat. This is of great importance, and is a point that has to be considered in placing a lengthy piece of metal in a building. Different metals have different degrees of expansion. A bar composed of two metals fastened side by side, one of which expands readily and to a great extent, the other reluctantly and to a less degree, if exposed to the action of heat will curve and twist in a peculiar manner as the result of this difference in the properties of the two metals.

Other properties of metals are tenacity, malleability, ductility and fusibility. Copper is an extremely tenacious metal. It can be elongated without breaking, and is largely used in the form of wire. The purer the copper the more tenacious the wire. No one would think of using a lead wire, it would break at once. But lead is malleable, and is extremely useful as a covering body because of its resistance to atmospheric action. It is also used in the manufacture of sulphurous acid. Lead sheets can be worked into any desired form. Metals are fusible at greatly varying degrees of temperature. Certain metals fuse in boiling water. Alloys composed of two or more metals exhibit peculiar phenomena. Many fuse at a much lower temperature than either of the component metals. This is the case with Rose's alloy, Wood's alloy, and with all kinds of type metal.

In extracting metals from their ores the great change which takes place is the reaction of reduction. This is carried out by several methods, by the simple fusion of the ore, or by reducing the ore with gases, generally hydrogen or carbon monoxide. In certain cases of reduction there is an extraneous change, the constituents of the ores being made to assist in the operation. In the lead furnace the fire plays over the ore and sulphurous-acid gas is formed, and the resulting reaction between the sulphide and oxide of lead facilitates the reduction. The open blast furnace, which many will remember, has given place to a furnace in which the gases evolved are collected at the top and made to pass over the fire, thus cheapening the process of

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reduction of the iron from the ironstone packed between layers of coal and limestone in the furnace.

A great number of metals are extracted by the fusion of a compound of the metal, generally a haloid compound, with another metal. Aluminium was originally extracted in this way by the use of sodium, but is now obtained by the reduction of electrolysis. Various galvanical or electrical processes are adopted for the reduction of metals, the most common being that in which the ore is decomposed by an electrical current. Another method is by amalgamating the required metal with mercury and then recovering the mercury. This is frequently done in extracting gold.

The rusting of iron is very familiar, but it is not a simple matter to say what actually takes place. A ready assumption is that the first coating of oxide or rust should have a protective influence, but it is not so, because the chemical change is a continuous one. Iron exists in a perfectly colourless form, but it is difficult to keep it so unless air is excluded. Certain springs which contain iron, although quite colourless at their source, soon impart by the action of the air a brown colouring to their banks, or the stream itself is tinged with brown. If water containing iron in this colourless state be rapidly agitated with air in a large glass vessel it will become brown. It is by the strong affinity of iron for the oxygen of the air that rust is formed, and can only be prevented by some preservative covering. In the case of iron lined with tin or zinc, so long as the lining is perfect no action takes place, but the moment a fault occurs a reaction is set up, very often increased by the electric or galvanic action of the one metal on the other. Lead, it has been stated, withstands the action of the atmosphere, but it is readily acted on by vinegar, as in the manufacture of white lead, and by most vegetable acids. There is a considerable amount of vegetable acids present in the soil, and their presence in union with carbonic-acid gas has a serious corrosive effect on lead pipes. The lead becomes reduced to a fine white powder, and the pipe is pitted with holes. Very few waters affect lead, a small quantity of mineral matter in the water generally forming at once an insoluble sulphide of lead on the surface, which becomes a protective coating and prevents further action. Waters containing mineral matter are said to be hard waters. With a very soft or with an absolutely pure water the lead is more assailable.

Many substances too numerous to mention act on metals. Chlorine acts readily on certain metals, and is largely used in

the haloid processes above referred to. Chlorine fumes are extremely powerful; when used for disinfection all metals have to be covered up and protected, or they become much corroded. Chlorine has a powerful influence on copper. The soft green colour of copper spires is produced by the chemical action of the air; but climate has much to do with the process, as much finer effects are seen abroad than with us. By treating copper with ammonia, and then with an oxidising agent, similar results might be obtained.

A series of interesting experiments illustrating and explaining the various phenomena was given by the Professor, who received an enthusiastic vote of thanks on the motion of Sir F. Abel, who presided.

### STEAM ENGINES AND BOILERS BILL.

THE Liberty and Property Defence League has issued a protest against this Bill, which was read a second time in the House of Commons on February 17, in which it is stated that during the last twenty years no accident attributable to ignorance or incompetence on the part of "persons in charge" has occurred in the United Kingdom, except in trades exempted from this Bill. Owners of expensive boilers and engines never have given and never will give charge of their property to a mechanic without first inquiring into the mechanic's fitness for his work. No owner of machinery can possibly want to have an explosion or accident on his premises, which might wreck his machinery, stop his business and involve him in heavy damages. There is no demand among trade unionists, engineers, or working men for this Bill, which was devised by a small group of so-called "Labour" leaders. If the Bill became law it would be used by agitators in the following very practical way:—No engine could be started in the majority of factories or in any steam-power-using enterprise in the United Kingdom, unless an officially "certificated person in charge" handled the throttle valve. The "Labour" leaders would insist on every qualified man in the kingdom joining a "Certificated Engineers' Trade Union." A small group of irresponsible agitators in London would then find themselves possessed of statutory power to stop every factory or enterprise depending on steam power in the kingdom in one day. Were the often threatened "general strike" to be attempted by the Socialist Labour party, there might be plenty of perfectly competent and trustworthy men without "certificates" willing

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to take temporary charge of pumping, ventilating, &c., engines; this Bill would prohibit any of them going to work until examined and certified by Home Office inspectors.

### THE UNDERPINNING OF HEAVY BUILDINGS.

IN a paper by Mr. Jules Brenchaud, communicated to the American Society of Civil Engineers, the writer refers to the great difficulties experienced in preventing injury, by settlement of heavy buildings, when it is necessary to excavate and build on the immediate adjacent building site.

The specific case treated of is a building which was to be carried 30 feet (two storeys) below the street level, over one half of which had to be made watertight, as it was below water-level. The total depth of foundation being 45 to 50 feet below the sidewalk, these foundations consisted of close-fitting rectangular pneumatic caissons all around the exterior of the new building site and cylindrical intermediate ones for columns.

As every square foot of the property had to be built upon the problem was to pin the adjacent buildings up during caisson sinking and construction periods. This was accomplished by placing vertical cylindrical iron columns in slits in the walls, extending from the foundation upwards. These were founded at the bottom on rock or very hard hard-pan, and at their tops the bearings were spread out by transverse horizontal slits in the walls, in which were placed nests of I beams on top of the columns.

The cylindrical columns were 10 inches to 30 inches in diameter, the smaller ones being forced down by a 60-ton hydraulic jack, in sections 5 feet long at a time, to proper bearing; some also were partially sunk by water jet. The larger ones under the heavier building were sunk by compressed air, as neither the water jet nor jack would force them through a layer of hard-pan to the rock.

The larger columns were first made of cast-iron, but after one becoming injured by forcing past a boulder, the rest were made of rivetted steel sections.

These columns were filled, after sinking, with Portland cement concrete.

The writer then details several similar cases where the application has been successful, and concludes by stating that, while this method is not (evidently) of universal application, it will be found the best means of transferring the load of an

adjacent building to a lower foundation with a minimum of obstruction to the building site about to be used; also that, as these underpinnings are left in place, there is no danger of that slight subsidence which takes place when other kinds of temporary underpinning are removed.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

6834. William Thompson, for "Improvements in the method of constructing casement windows."

6869. Julius Theodor Köhler, for "An improved press for manufacturing tiles."

6937. William Oates and John Johnston Green, for "A socketless access pipe for making connections or repairs in drain pipes and in the method of connecting same."

6996. Richard Brown Evered, for "Improvements in water-closets."

7017. William Hewitt, for "Improvements in apparatus for the manufacture of tiles."

7062. Thomas Parker, for "Improvements in and relating to brick-making machines."

7086. George Gore Meyer, for "Improvements in the construction of scarf slides or fastenings."

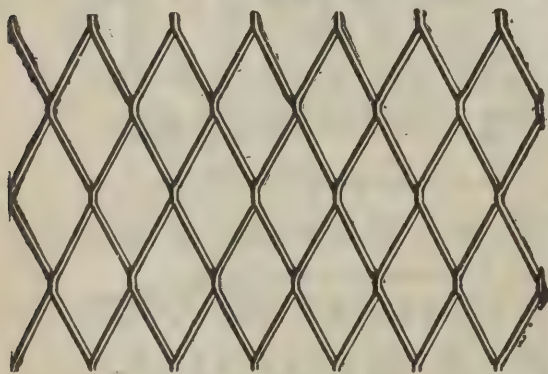
7157. William Hall Keys, for "Improvements in the manufacture of certain bricks, tiles, and the like."

7169. John Shanks, for "Improvements in trough closets or latrines."

7266. Samuel Fildes and Henry Fildes, for "Improvements in window fasteners."

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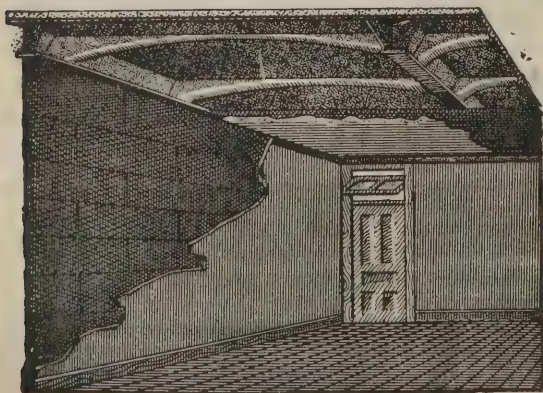
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*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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**To Librarians of the Public Libraries and Reading-rooms.**—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

## NOTICE.

*Next Friday being Good Friday, THE ARCHITECT will be published on Thursday. All Advertisements intended for this Number must reach the Office not later than 3 p.m. on Wednesday, April 14.*

*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

**ABERYSTWYTH.**—For erection of a school and house adjoining the Shiloh Chapel. Messrs. Hipkiss and Bassett, architects, Post Office Chambers, Terrace Road, Aberystwyth.

**ALNWICK.**—April 13.—For erection of a pair of villas, Swansfield Park Road. Mr. Wm. Robson Hindmarsh, jun., architect, Alnwick.

**ALNWICK.**—April 10.—For erection of a pair of cottages, Hotspur Place. Mr. Wm. Robson Hindmarsh, jun., architect, Alnwick.

**ASHTON-UNDER-LYNE.**—April 14.—For constructing embankment, &c., for formation of reservoir. Messrs. G. H. Hill & Sons, 3 Victoria Street, Westminster.

**BARNESLEY.**—April 13.—For erection of twelve houses in Farrar Street. Mr. George Moxon, architect, Central Chambers, Church Street, Barnsley.

**BATH.**—April 12.—For extension of the buildings of the Bath Corporation electric-light works, Dorchester Street. Mr. F. H. Moger, clerk, 3 Wood Street, Bath.

**BELFAST.**—April 12.—For rebuilding shop and stores in Castle Place. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue.

**BELFAST.**—April 16.—For extensions to shop premises, corner of Bridge Street and High Street. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue, Belfast.

**BELPER.**—April 17.—For erection of new isolation hospital on Crich Lane. Mr. Maurice Hunter, architect, Bridge Street, Belper.

**BIRKENHEAD.**—April 21.—For erection of twenty-five cottages at Hinderton Road. Mr. A. E. Bolter, secretary to L. & N.-W. & G.W. Railway Companies Joint Committee, Paddington Station, London.

**BISHOP AUCKLAND.**—April 10.—For erection of considerable extensions to the St. Anne's Schools. Messrs. Clark & Moscrop, architects, Darlington.

**BODMIN.**—April 17.—For erection of a single residence near the Great Western Railway Station. Mr. William J. Jenkins, architect, Bodmin.

**BRADFORD.**—April 12.—For erection of a large block of warehousing in Union Street, three dwelling-houses in Toller Lane, and dwelling-house, stabling and warehouse in Wilton Street. Messrs. James Young & Co., architects, 62 Market Street, Bradford.

**BRISTOL.**—April 12.—For erection of a warehouse, &c., in Narrow Wine Street. Mr. Thomas Scarnmell, architect and surveyor, 12 John Street, Bristol.

**BUCKHURST HILL.**—For erection of two pairs of semi-detached villa residences. Mr. Batting, 7 John Street, Adelphi, W.C.

**BURLEY-IN-WHARFEDALE.**—For erection of a residence. Messrs. Isitt, Adkin & Hill, architects, Prudential Buildings, Bradford.

**BURNLEY.**—April 10.—For erection of memorial in Scott Park. Mr. Wm. T. Fullalove, town clerk, Town Hall, Burnley.

**BUSHMILLS.**—April 10.—For enlarging church. Mr. David Douglas, Bushmills, Ireland.

**CARDIFF.**—April 10.—For erection of attendants' rooms and carrying-out other alterations at the workhouse. Mr. Edwin Seward, architect, Queen's Chambers, Cardiff.

**CARDIFF.**—April 29.—For taking down the existing chimney-stack, with a portion of the flues, at Cogan Pumping Station, and the rebuilding of the chimney and flues in brickwork. Mr. C. H. Priestley, engineer, Town Hall, Cardiff.

**CASTLEFORD.**—April 15.—For pulling down and setting back boundary wall, Wheldale Lane, and alteration of causeway; also for the taking up and relaying footpath in Bridge Street. Mr. H. H. Broadbent, clerk, Castleford.

**CHATHAM.**—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

**CLAYTON-LE-MOORS.**—For erection of club-house. Mr. W. Hopwood, broker, Lower Barnes Street, Clayton-le-Moors.

**COLCHESTER.**—April 15.—For erection of an electric-light station, consisting of a boiler-house, engine-house, cast-iron tank and chimney shaft. Mr. H. Goodyear, borough engineer and surveyor, Colchester.

**CORNWALL.**—April 14.—For enlarging, renovating and repewing the U.M.F.C. Chapel at Trevena, Tintagel. Messrs. Wise & Wise, architects, Launceston.

**COUPAR ANGUS.**—April 10.—For erection of additional maltings. Mr. Robert Grant, Bengarth, Blairgowrie.

**COWBRIDGE.**—April 12.—For erection of new classrooms, &c., at Grammar School. Mr. E. Jenkin Williams, architect, 14 High Street, Cowbridge.

**CRICKHOWELL.**—April 13.—For alterations and additions to the National Schools, Llangattock. Mr. F. Baldwin, architect, 8 Lion Street, Brecon.

**CUMBERLAND.**—April 20.—For erection of a stone bridge over the Camp Beck at Walton Mill Ford, in the parish of Walton. County surveyor and bridgemaster of Cumberland, at the Courts, Carlisle.

**DARLINGTON.**—April 12.—For erection of an entrance lodge and model cottages at Neasham Hall. Mr. G. Gordon Hoskins, architect, Northgate, Darlington.

**DUBLIN.**—April 14.—For erection of additional apartments at the Convent House, North Brunswick Street. Mr. John O'Neill, clerk, Board-room, North Brunswick Street, Dublin.

**DUNFERMLINE.**—April 12.—For erection of extensive additions to and alterations on mansion house and stable offices. Mr. Andrew Scobie, architect, Dunfermline.

**DURHAM.**—April 14.—For rebuilding of the Lord Collingwood Hotel, Felling. Mr. H. Miller, Felling.

**DURHAM.**—April 14.—For rebuilding of the Lord Collingwood Hotel, Felling. Mr. H. Miller, architect, Felling.

**EASTBOURNE.**—April 10.—For alterations and additions to Satara, Fairfield Road. Messrs. C. and C. B. Benson, architects, Yeovil, Somerset.

**EBBW VALE.**—April 12.—For erection of a school to accommodate 157 children, near Steelworks Houses, with out-offices, boundaries and playgrounds. Mr. George Rosser, architect, Victoria Buildings, Abercarn.

**ELLAND.**—April 14.—For building a brick chimney, 65 yards high, at Ash Grove Brickworks. Mr. W. H. D. Horsfall, architect, 9 Harrison Road, Halifax.

**ELLAND.**—April 17.—For erection of foundry, shed and offices at Perseverance Works. Mr. W. H. D. Horsfall, architect, 9 Harrison Road, Halifax.

**ESSEX.**—April 19.—For erection of an infirmary on the ground adjoining the school at Witham. Mr. F. Whitmore, architect, Chelmsford.



**FAILSWORTH.**—For erection of business premises and dwelling-houses in Old Lane. Mr. Fredk. W. Dixon, architect, Trevelyan Buildings, Manchester.

**GREENOCK.**—April 12.—For constructing outfall sewer. Town Clerk, Municipal Buildings, Greenock.

**GUIDE BRIDGE.**—For alterations to the Railway Hotel. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

**HALIFAX.**—April 15.—For erection of two bridges (32 feet by 13 feet and 28 feet by 13 feet) in the People's Park. Mr. Edward R. S. Escott, borough engineer, Town Hall, Halifax.

**HALIFAX.**—April 15.—For erection of a mill chimney, Haley Hill. Messrs. George Buckley & Son, architects, Tower Chambers, Halifax.

**HALIFAX.**—For erection of a tower at Copley Mills for sprinkler tank; also for making and fixing over 330 windows in same mill, and for the painters' work required in the painting of the whole of the mill premises, over 160 cottages, with shops and school, &c. Mr. Arthur George Dalzell, architect and surveyor, 15 Commercial Street, Halifax.

**HALIFAX.**—April 23.—For erection of a store and fourteen houses on the Newstead Estate, Gibbet Street. Mr. W. Clement Williams, architect and surveyor, 29 Southgate, Halifax.

**HALIFAX.**—April 27.—For taking down the Barrack Tavern and other buildings, &c., in Charles Street and Causeway, in the borough of Halifax, and erecting upon the site additions to the premises of the Automatic Standard Screw Company. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

**HALIFAX.**—April 20.—For erection of two dwelling-houses. Mr. Medley Hall, architect, 29 Northgate, Halifax.

**HARROW ROAD.**—April 13.—For erection of casual wards in Woodfield Road. Mr. F. J. Smith, architect, 17B Great George Street, Westminster.

**HEATON.**—For erection of four through houses. Mr. John Jackson, architect, Barry Street, Bradford.

**HEBDEN BRIDGE.**—April 15.—For erection of fourteen houses in Melbourne Street. Mr. G. Habbergham, builder, Melbourne Street, Hebdon Bridge.

**HEBDEN BRIDGE.**—April 15.—For erection of a dwelling-house in Old Gate. Messrs. George Buckley & Son, architects, Tower Chambers, Halifax.

**HEYWOOD.**—For erection of houses in Derby Street and Wham Lane. The Secretary, Millbank Brick and Terra-Cotta Company, Limited, Heywood.

**HUDDERSFIELD.**—April 14.—For erection of four dwelling-houses at High Royd, Moldgreen. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

**HUDDERSFIELD.**—April 22.—For erection of shed, raising the packing shop and other extensive alterations at Meltham Mills. Messrs. John Kirk & Sons, architects, Huddersfield.

**HYTHE.**—April 20.—For erection of a Wesleyan church and schools. Rev. C. Norman, Holmlea, Hythe.

**IPSWICH.**—April 13.—For alterations and additions to Tower House, for the School Board. Mr. J. S. Corder, architect, Tower Street, Ipswich.

**IRELAND.**—April 10.—For erection of creamery at Bunkey Bridge, within easy distance of Castleconnell and Lisnagry railway stations. Mr. W. L. Stokes, Mulgrave Street, Limerick.

**IRELAND.**—April 17.—For erection of house and offices at Carlton premises, Enniskillen. Mr. Thomas Elliott, architect, Enniskillen.

**IRELAND.**—April 14.—For erection of a schoolhouse at Riverstown. The Rev. Andrew Quinn, P.P.

**IRELAND.**—April 15.—For completing the tower and spire of Stranorlar Church, co. Donegal. Mr. William H. Byrne, architect, 20 Suffolk Street, Dublin.

**KEIGHLEY.**—April 12.—For additions to warehouse, &c., New Road Side. Mr. John Haggas, architect, North Street, Keighley.

**KENDAL.**—April 14.—For erection of a fire-brigade station. Mr. John Thompson, architect, 1 Finkle Street, Kendal.

**KENDAL.**—April 17.—For pulling down 18 Wildman Street, Kendal, and for building a new shop and dwelling-house. Mr. John Stalker, architect.

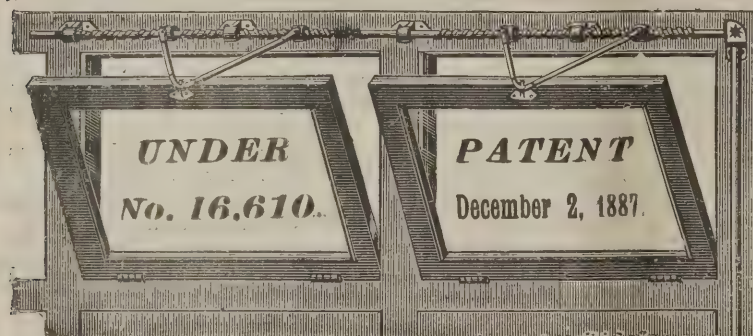
**KETTERING.**—April 14.—For erection of a covered bandstand, circular or octagonal in plan, about 25 feet diameter. Mr. Thos. Reader Smith, engineer and surveyor, Market Place, Kettering.

**LEEDS.**—April 14.—For erection of clubhouse, Roundhay Road. Mr. Chas. D. Swale, architect, 98 Albion Street, Leeds.

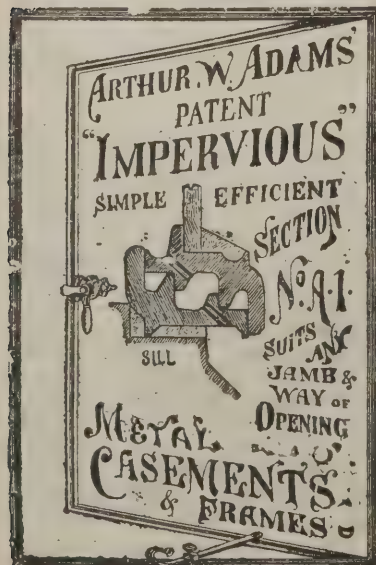
**LEEDS.**—For erection of five through houses and alterations to four adjoining houses, situated in Cross Field Lane. Mr. F. J. Butler, Shannon Street, Leeds.

**LEEDS.**—April 21.—For erection of stone abutments and wing walls for steel bridge over the river near Rodley. Town clerk.

**LERWICK.**—April 14.—For constructing waterworks. Mr. A. Sanderson, 72A George Street, Edinburgh.



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**LEICESTER.**—April 30.—For the construction of a concrete and stone bridge over the Leicestershire and Northamptonshire Union Canal and Flood Course, and for the formation of a new road from the Newark to the Western Boulevard, together with a storm overflow, foul and storm-water sewers, and other works in connection therewith. Mr. E. Geo. Mawbey, C.E., borough surveyor, Town Hall, Leicester.

**LIMERICK.**—April 10.—For erection of a gate lodge at Fern Bank. Messrs. J. P. Evans & Co., 131 George Street, Limerick.

**LIVERSEDGE.**—April 13.—For erection of four scullery houses in Granville Street, off Union Road, Berry Hill. Mr. W. Lister, 20 Halifax Road, Dewsbury.

**LLANELLY.**—April 10.—For rebuilding and extending Libanus Independent Chapel, Pwll. Mr. D. L. Jones, architect, West-end, Llanelly.

**LLANGOLLEN.**—April 26.—For erection of County School. Mr. H. Feather, architect, Andrew's Buildings, Queen Street, Cardiff.

**LLANWONNO.**—April 15.—For rebuilding St. David's Church, Gyeillon. Mr. E. M. Bruce Vaughan, architect, Cardiff.

**LEWISHAM.**—April 12.—For repairs at the union workhouse and relief station. Mr. H. C. Mott, clerk, High Street, Lewisham.

**LONDON.**—April 15.—For building casual wards, Harrow Road. Mr. Henry F. Aveling, 289 Harrow Road, W.

**LONDONDERRY.**—April 12.—For erection of five houses at Park Avenue. Mr. E. J. Toye, architect, Strand, Derry.

**LURGAN and BELFAST.**—April 12.—For erection of a new station building in brick on the up-platform at Lurgan, also station building in timber at Adelaide Avenue, Belfast, for the Great Northern Railway Company (Ireland). Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

**MANCHESTER.**—April 14.—For erection of a police-station at Stretford, near Manchester. Mr. Henry Littler, architect, 21 Pitt Street, Preston.

**MANNINGHAM.**—April 15.—For erection of two semi-detached villas in Selborne Grove. Mr. T. C. Hope, architect, Old Bank Chambers, Bradford.

**MASBOROUGH.**—April 16.—For erection of six dwelling-houses in Wortley Road. Mr. J. Axleby, architect and surveyor, Wilton Lane, Masborough.

**MIDDLESBROUGH.**—April 12.—For erection of Sunday schools and assembly hall. Mr. Walter G. Roberts, architect, 61 Albert Road, Middlesbrough.

**MIDDLESBROUGH.**—April 14.—For alterations and new shop front to 24 Garnet Street. Mr. Walter G. Roberts, architect, 61 Albert Road, Middlesbrough.

**MITCHAM.**—April 21.—For erection of laundry, laundry-maid's house, baths for boys and infants' lavatories, at schools. Mr. C. E. Vaughan, architect, 25 Lowther Arcade, London, W.C.

**MONMOUTH.**—April 12.—For building engine and boiler houses, pump chamber, &c. Messrs. Bramwell & Harris, 5 Great George Street, Westminster, S.W.

**MONMOUTH.**—April 12.—For erection of engine-house, boiler-house, boiler seatings, flues, chimney shaft and concrete races for the turbines at the generating station, the collecting tanks and pump-chamber at the sewage pumping station, &c. Messrs. Bramwell & Harris, engineers, Great George Street, Westminster, S.W.

**MORTLAKE.**—April 12.—For erection of stables, steam-roller house and cart-sheds at the Mortlake dépôt. Mr. G. Bruce Tones, engineer and surveyor, Council Offices, High Street, Mortlake.

**MORLEY.**—April 14.—For erection of stable and alterations to cottage in High Street. Mr. T. A. Buttery, architect, Queen Street, Morley.

**MOUNTAIN ASH.**—April 12.—For building workmen's hall and institute. Alderman William Jones, Oakwood, Aberfrwd Road, Mountain Ash.

**NEWQUAY.**—April 30.—For erection of the Headland Hotel. Mr. Silvanus Tremain, Truro.

**NORTH ORMESBY.**—April 12.—For enlargement of store, High Street. Mr. Robert Moore, architect, 7 Albert Road, Middlesbrough.

**NOTTINGHAM.**—For erection of villa residence. Mr. H. Sulley, architect, Albert Chambers, Albert Street, Nottingham.

**OBAN.**—April 15.—For municipal buildings. Mr. Alexander Shairp, architect, Oban.

**PADDINGTON.**—April 13.—For erection of casual wards in Woodfield Road, Harrow Road. Mr. F. J. Smith, architect, 17B Great George Street, Westminster.

**REDDITCH.**—April 15.—For erection of Baptist church, also for schools and classrooms. Mr. E. A. Hodges, 1 Evesham Street, Redditch.

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REDRUTH.—April 14.—For building infirmary. Mr. Sampson Hill, architect, Redruth.

REDRUTH.—April 24.—For erecting winding engine at the Basset Mines. Mr. Nicholas Trestrail, Redruth.

REDRUTH.—April 19.—For erection of laboratory and sundry other work. Mr. S. Hill, architect, Redruth.

SCOTLAND.—For erection of ten workmen's houses. Balvicar Slateworks Office, Balvicar.

SCOTLAND.—April 19.—For additions and alterations at the Combination Poorhouse, Eskbank. Mr. James Gray, banker, Dalkeith.

SCOTLAND.—April 13.—For erection of police-station buildings at Kemnay. Messrs. Wm. Henderson & Son, architects, 124 Union Street.

SLIGO.—April 13.—For building walls, &c., round the burial grounds at Carrownanty, Ballymote and Carrigeens, near Carney. Mr. Nixon Parke, Board-room, Sligo.

SOUTHAMPTON.—April 13.—For constructing brick and concrete and stoneware pipe sewers. Mr. W. B. G. Bennett, Municipal Offices, Southampton.

SOWERBY BRIDGE.—April 27.—For erection of Sowerby Bridge West-end new Sunday school. Mr. S. Wilkinson, architect, Sowerby Bridge.

STAFFORD.—April 12.—For alterations at the guildhall and additions to the pumping station at Milford. Mr. W. Blackshaw, borough engineer and surveyor, Borough Hall, Stafford.

ST. PANCRAS.—April 19.—For construction of a block of underground conveniences in Mansfield Road. Mr. William Nisbet Blair, surveyor, Vestry Hall.

SWANSEA.—April 17.—For construction of masonry, tanks, and other works at Gowerton. Mr. John Thomas, surveyor, 32 Fisher Street, Swansea.

SWINDON.—April 17.—For alterations and additions at the Kingshill Co-operative Society's premises. The Secretary, Beulah House, Victoria Road.

TEWKESBURY.—April 20.—For erection of an isolation hospital, with roads and fencing, on a piece of ground near Tredington. Mr. James Villar, architect, 1A Cambray, Cheltenham.

THWING.—April 14.—For erection of additional farm buildings at Thwing, in the East Riding of York. Messrs. H. O. and F. O. Piercy, The Elms, Lowthorpe.

WAKEFIELD.—April 14.—For erection of laundry buildings, engine and boiler-houses, chimney stack, &c. Mr. William Watson, architect, Barstow Square, Wakefield.

WAKEFIELD.—April 23.—For erection of a dwelling-house in Stanley Road. Mr. Willie Wrigley, architect, 10 Wood Street, Wakefield.

WEST HAM.—April 13.—For erection of sewage pumping engine and boiler-houses and electric-lighting buildings at the Abbey Wharf, Stratford. Mr. Lewis Angell, engineer to the Corporation, Town Hall, Stratford, E.

WEST HAM.—April 13.—For building sewage pumping engine, boiler and electric lighting houses. Mr. F. E. Hilleary, Town Hall, West Ham, E.

WEST HARTLEPOOL.—April 12.—For rebuilding large business premises in Church Street. Mr. John J. Wilson, architect, West Hartlepool.

WOKING.—April 22.—For constructing cast-iron, concrete and stoneware sewers. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, S.W.

YORKSHIRE.—April 14.—For erection of additional farm buildings at Thwing, in the East Riding. Messrs. H. O. & F. O. Piercy, The Elms, Lowthorpe.

## TENDERS.

### ARMAGH.

For erection of a bandstand on the Mall. Mr. H. C. PARKINSON, architect, Armagh.

R. J. ROBB, Abbey Street (accepted).

### BARNESLEY.

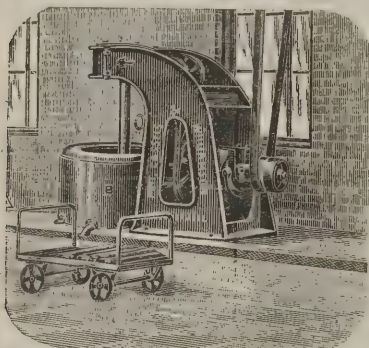
For laying of a section of a main sewer in School Street Darfield. Mr. HAMMERTON, surveyor.

C. Broadbent	£133 0 0
W. Johnson	85 0 0
W. BROADBENT, Wombwell (accepted)	80 9 0

For widening of Coal Pit Lane, Darfield. Mr. HAMMERTON, surveyor.

J. Carr	£190 0 0
W. Johnson	186 10 0
Wilson Bros.	172 0 0
C. BROADBENT, Broomhill (accepted)	163 0 0

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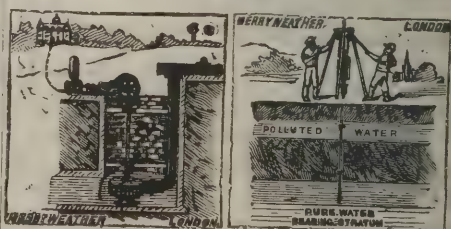
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D. FORG, Ballincollig, Cork (accepted) . . . . .	1,173	0	0

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For erection of central Board school at Wrangle.

J. Langley . . . . .	£1,798	0	0
S. Sherwin . . . . .	1,765	0	0
J. Pogson . . . . .	1,655	0	0
J. RICHARDSON, Boston (accepted) . . . . .	1,650	0	0

**BOURNE END.**

For additions and alterations to the Platt, Bourne End, for Mr. F. C. Frye. Mr. ARTHUR VERNON, architect, 29 Cockspur Street, London, S.W.

Cox, Maidenhead . . . . .	£875	0	0
Silver, Maidenhead . . . . .	782	0	0
Lovell, Great Marlow . . . . .	774	0	0
GIBSON, High Wycombe (accepted) . . . . .	724	10	0

**BRADFORD.**

For erection of business premises, North Parade. Mr. JAS. LEDINGHAM, architect, District Bank Chambers, Bradford.

J. Pratt, mason.  
Toothill & Balmforth, Bradford, joiner.  
R. S. Abbott & Son, Bradford, plumber.  
T. Nelson, Bradford, slater.  
J. Throp, Bradford, plasterer.  
J. W. Walton, Bradford, painter.

**BRIDLINGTON QUAY.**

For alterations and additions to Glassmoor, Victoria Road. Mr. J. EARNSHAW, architect.

R. Bailey . . . . .	£696	7	0
A. GARDAM, Bridlington Quay (accepted) . . . . .	648	14	0

For erection of a warehouse and coach-house. Mr. SAMUEL DYER, architect, Bridlington Quay.

J. Rennard . . . . .	£553	19	11
W. BARNES (accepted) . . . . .	448	8	0

**BRISTOL.**

For relaying footpath in Church Road, St. George. Mr. T. L. LEWIS, surveyor.

W. Galbraith . . . . .	£524	19	7
W. Woodey . . . . .	389	10	7
Thomas & Webb . . . . .	379	18	9
F. Martin . . . . .	364	13	0
G. T. Phipps . . . . .	352	1	1
W. G. THATCHER (accepted) . . . . .	349	3	8
Surveyor's estimate . . . . .	349	15	2

**BURNLEY.**

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W. UNDERWOOD & BROS., Dunkinfield (accepted) . . . . .	£7,871	0	0
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Fry Bros. . . . .	5,526	0	0
J. Jackson . . . . .	5,400	0	0
W. WOODHAM, 3 Holmshaw Road, Lower Sydenham (accepted) . . . . .	4,861	0	0

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For alterations and improvements in workhouse infirmary and fever hospital.

J. Burnett . . . . .	£190	0	0
J. Whally . . . . .	184	0	0
J. DONNOLLY, Cookstown (accepted) . . . . .	176	0	0

**CORNWALL.**

For erection of a parsonage house on a site adjoining St. Catherine's Lane, St. Thomas-by-Launceston. Mr. CTHO B. PETER, architect, Launceston.

W. BURT, St. Thomas-by-Launceston (accepted) . . . . .			
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J. Gowett . . . . .	£47 15 9
H. Chapman, jun. . . . .	42 15 0
H. A. Cutter . . . . .	42 3 4
T. GLOVER & SON, Blaby (accepted) . . . . .	39 1 1

## CRICCIETH.

For construction of a timber groyne, resetting, coping and improvements in connection with Esplanade. Messrs. T. ROBERTS & SON, engineers, Portmadoc.

J. HUNTER, Pwllheli (accepted) . . . . .	£578 0 0
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## DEVONPORT.

For structural alterations at workhouse infirmary, Ford.

W. J. OLIVER, Acre Place (accepted) . . . . .	£197 18 0
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## DONAGHADEE.

For erection of a manse. Mr. THOMAS PENTLAND, architect, 35 High Street, Belfast.

W. CURRAGH, Donaghadee (accepted) . . . . .	£810 0 0
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## DOVER.

For erection of a car-shed at Maxton. Mr. HENRY E. STILGOE, borough engineer, Town Hall, Dover.

G. F. Keeler . . . . .	£1,180 8 0
W. H. Grigg . . . . .	1,039 0 0
G. MUNRO, Albert Road (accepted) . . . . .	1,000 0 0

## EPSOM.

For erection of a laundry building and engine-house at the workhouse. Mr. H. D. SEARLES WOOD, architect, 157 Wool Exchange, E.C.

Balchin & Shopland . . . . .	£3,727 0 0
N. Dashwood & Sons . . . . .	3,593 0 0
W. & F. Pearce . . . . .	3,450 0 0
H. Brown . . . . .	3,190 0 0
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Thomas & Edge . . . . .	3,035 0 0
E. Burnand . . . . .	3,024 0 0
J. R. Burrage . . . . .	2,987 0 0

## FARNHAM.

For alterations to buildings at the workhouse. Mr. S. STAPLEY, architect, West Street, Farnham.

Kemp . . . . .	£395 0 0
Tompsett & Co. . . . .	343 0 0
Lee . . . . .	340 0 0
Garland . . . . .	325 0 0
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FIGG, Farnham (accepted) . . . . .	277 0 0

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H. Roberts . . . . .	4,803 11 10
S. Ambrose . . . . .	4,698 2 9
W. L. MEREDITH, Gloucester (accepted) . . . . .	4,341 0 0

## GREAT YARMOUTH.

For erection of two houses on the cliffs at Gorleston. Mr. H. DUDLEY ARNOTT, architect, High Street, Gorleston.

Carter & Wright . . . . .	£2,160 0 0
T. HOWES, Great Yarmouth (accepted) . . . . .	2,095 0 0
J. Ward . . . . .	1,450 0 0

For erection of shop and house, High Street, Gorleston. Mr. H. DUDLEY ARNOTT, architect, Gorleston.

Jones & Eastaugh . . . . .	£1,753 12 3
F. Grimble . . . . .	1,106 10 0
Moore & Son . . . . .	1,064 0 0
J. WARD, Great Yarmouth (accepted) . . . . .	1,059 10 0

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J. Dare . . . . .	239 0 0
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G. Hedges . . . . .	194 6 10
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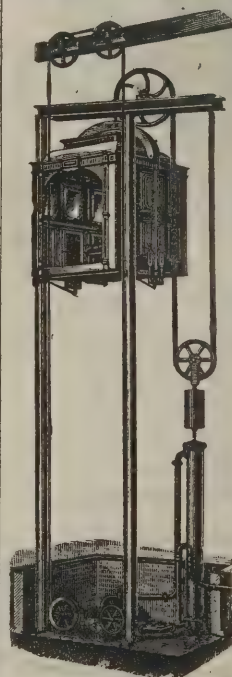
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For erection of a store in Ashton Grove and Ashton View,  
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E. Triggs . . . . .	1,767	10	0	40 5 0
E. T. Folley . . . . .	1,737	0	0	40 0 0
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W. & H. Castle . . . . .	1,200	0	0
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E. Triggs * . . . .	1,110	0	0

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E. P. Bulled & Co.	2,392 0 0	50 0 0
Holliday & Greenwood	2,335 0 0	45 0 0
G. E. Wallis & Sons	2,307 10 0	35 0 0
J. Longley & Co.	2,278 0 0	45 0 0
J. & C. Bowyer	2,247 0 0	49 0 0
Lathey Bros.	2,228 0 0	39 0 0
J. Smith & Sons *	2,202 0 0	45 0 0

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J. Metcalf	605 0 0
J. C. & J. S. Ellis, Limited	595 0 0
W. G. Cannon & Sons	524 0 0
J. F. Clarke & Sons	474 0 0
G. Davis *	448 0 0

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A. Extra for brickwork in cement.

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For erection of an hotel at Carlton Colville. Mr. CHAS. CROZIER, architect, Victoria Chambers, Lowestoft. Quantities by the architect.

F. C. Allen's exors.	£2,227 18 0
J. Blunderfield	2,125 0 0
W. Knights	2,107 15 0
Swatman Bros.	2,100 0 0
J. YOUNGS & SON, Norwich (accepted)	2,096 0 0
G. Elsey	2,092 0 0
C. R. Cole *	2,064 0 0

\* Could not execute the work in the time stated.

**SANDBACH.**

For erection of branch shop at the Hill. Mr. ALFRED PRICE, architect, Elworth, Sandbach.

T. Leicester	£829 15 0
J. STRINGER, Sandbach (accepted)	744 0 0
Architect's estimate	705 0 0

**MODBURY.**

For building a large tank and making drains, &amp;c., alterations to the closets, urinals, &amp;c., at the schools, for the Modbury School Board.

J. Pearce	£195 0 0
A. Andrews	180 0 0
CROCKER BROS., Modbury (accepted)	175 10 0

**STOKE-ON-TRENT.**

For erection of Methodist New Connexion chapel and schools, Shelton Road, near the boundary of Newcastle-under-Lyme. Mr. AMBROSE WOOD, architect, Regent House, Hanley.

L. Price	£1,505 0 0
H. Howlett	1,446 10 0
S. Wilton, jun.	1,319 0 0
J. Bagnall	1,227 9 0
T. Godwin	1,199 0 0
C. CORNES & SONS, Hanley (accepted)	1,195 0 0

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For macadamising, paving and channelling of new street. Mr. GEORGE MURDOCH, burgh surveyor.

J. McPetrie	£210 10 0
J. Leith, jun.	190 15 6
P. Tawse	173 7 0
W. Smith, jun.	167 7 6
A. MASSON, Stonehaven (accepted)	157 9 2

**WANSTEAD.**

For road works, for the Wanstead Urban District Council.

<i>Kerbing.</i>	
W. Wadey	£514 3 0
H. Burnham	497 6 6
W. GRIFFITHS, 283 Kingsland Road, N.E.	
(accepted)	450 3 0
Surveyor's estimate	423 13 2
<i>Tar-paving.</i>	
Brunswick Rock Asphalte Paving Co.	1,290 2 3
B. S. Jones	1,278 18 3
H. Burnham	1,242 0 0
J. Smart	930 13 0
ASPHALTIC LIMESTONE CONCRETE CO. (accepted)	890 7 2
J. Ford	877 18 8
Surveyor's estimate	848 8 4

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## WALES.

For erection of a chapel at Spelter, Maesteg.

I. Rees . . . . .	£1,264	0	0
Thos & Jones . . . . .	1,163	0	0
RATTRAY & JENKINS, Pontycymmer (accepted)	1,065	0	0

## WELLINGBOROUGH.

For covering-in gateway and forming a flour chamber, for Mr. A. J. Hefford, Knox Road. Mr. H. H. PACKER, architect, Silver Street, Wellingborough.

T. H. Dorman, Wellingborough . . . . .	£67	15	0
C. Ruff, Wellingborough . . . . .	67	0	0
R. Marriott, Wellingborough . . . . .	66	0	0
C. W. ABBOTT, Wellingborough (accepted) . . . . .	61	10	0

## WHITEHAVEN.

For enclosing and laying-out a new burial ground, comprising boundary walls, roads, footpaths, &amp;c. Mr. GEO. BOYD, surveyor, 33 Queen Street, Whitehaven.

T. DAVIDSON, Parton, Whitehaven (accepted) .£404 19 7

## BUILDING AND BUILDERS.

A CHAPEL is to be erected at Burley, the cost of which is estimated at 6,000l.

THE memorial-stone of the new senior Public School for West Calder was made the occasion of an imposing ceremony. The stone was laid on the 2nd inst. The school, which has been erected to meet the growing requirements of the district, is estimated to cost about 5,000l., and will accommodate 460 scholars, and have a hall for the tuition of secondary education. It is situated to the south-west of the village, and is in proximity to the junior school.

THE interesting old church at Austerfield is to be forthwith restored. The quaint old fabric, near Bawtry, Yorks, not only bears traces of great antiquity, but is in some sense an historical landmark. Here was baptized William Bradford, "the first American citizen of the English race who bore rule by free choice of his brethren." The Norman font at which the holy rite was performed 300 years ago may still be seen, and the parish register shows the original record of that event. It is

not a large amount that American sympathisers have so far subscribed to the fund, but it appears there is a prospect of a substantial sum being raised in Massachusetts and elsewhere if Bradford's descendants are permitted to erect a brass plate in the church to the memory of the renowned Governor. The authorities have gladly given that permission. The work of renovation is estimated at about 1,550l., towards which something like 1,150l. has been either subscribed or promised, including a sum of 38l. from America. The cost of the north aisle would be probably about 250l.

## TRADE NOTES.

THE special train which is being built by the Great Western Railway Company, to convey the Queen from Windsor to London on the occasion of the Diamond Jubilee proceedings, is so far completed as to be ready to receive the internal fittings, and we understand that the Longford Wire, Iron and Steel Company, Limited, have been honoured with instructions to construct the whole of the seating of the coaches, on the Wood's patent galvanised woven-wire principle.

THE new Board schools, Loughborough, are being warmed and ventilated by means of Shorland's patent Manchester grates, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MR. FREDERICK BRITTON, builder and contractor, late of Leconfield Road, N., has removed to larger and more commodious premises at 469 Caledonian Road, N.

## VARIETIES.

A NEW post-office has been opened at Aberfeldy.

AN additional doorway is to be constructed to give access to the terrace from the House of Commons, to supplement the present one, which in the season often proves inadequate.

THE new station at Kelvinside, in the west end of Glasgow, in connection with the Lanarkshire and Dumbartonshire and Central Railways, was opened for passenger traffic on the 1st inst.

THE memorial window which it was proposed to erect to Oliver Goldsmith in the church near "Sweet Auburn" has

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been subscribed for mostly, we note, by literary men, and the necessary work has been put in hand.

WHILE excavating in Silent Street, Ipswich, in order to lay down new water-pipes, some workmen found the bones of seven men. The skulls were in excellent preservation and as hard as flint, but the remaining portions of the skeletons broke during disinterment. The site of the discovery is near where the old priory stood, and Cardinal Wolsey is said to have lived there.

New premises, comprising a chapel, hall and a number of commodious rooms, have just been opened by the Unitarian London Domestic Mission in Bell Street, West Marylebone, for the mission until recently successfully carried on in Capland Street. The organ, which was the property of Professor Stanley Jevons, has been presented by his widow. The removal from Capland Street took place owing to the premises being required for railway extension.

THE new ostrich house which has recently been erected at the Zoological Gardens, if not quite so ornate as some of the other houses, is nevertheless a somewhat imposing structure some 164 feet in length, with a central tower 30 feet high. The cages have a long paddock attached to each, and a special warming apparatus, by means of which the temperature in the various cages can be regulated to suit the requirements of their various tenants. The building has cost 4,000*l*.

THE new jetty at the entrance to the Prince's Dock, Liverpool, was opened for traffic on the 2nd inst. The first vessel to make use of it was the Belfast steamer *Optic*, from which a large number of horses intended for the French army were landed. The passengers disembarked at the jetty, and the cargo was also discharged there, aided by the powerful cranes on the new piece of work. Everything worked extremely satisfactorily, and the great advantage the jetty will prove in relieving the congestion on the Prince's Landing-stage was amply demonstrated by the fact that at the time the *Optic* was landing her passengers, live stock and cargo, the Cunard liner *Campania* was alongside the stage disembarking her passengers from New York.

THE "Municipal Year Book" for 1897—a new annual—will be published in the course of a few days. The object of the book is to describe the municipal work in the towns of the United Kingdom. Besides general sketches of local government in all the larger towns, it contains statistics and information concerning public baths, free public libraries, municipal

markets, technical education, public slaughter-houses, &c., while the more important municipal undertakings, the supply of water, gas, electric light, the management of tramways and the erection of artisans' dwellings receive special treatment in separate sections. Statistics regarding rates and the cost of local expenditure, as well as much other information concerning municipal institutions, are included. The revision of the proof-sheets, as regards the facts and statistics, by the town clerks throughout the country has caused this, the first issue of the Year Book, to be somewhat late, but has insured accuracy, which is essential in a reference book of this character. An introductory chapter reviews the enormous development in municipal government which has taken place during the Queen's reign. The book is the work of Mr. Robert Donald, the editor of *London*, and is published at the office of that journal. It contains over 450 pages, and the price is 2*s*. 6*d*.

KILRUSH HOUSE, one of the finest mansions in co. Clare, was almost entirely destroyed by fire on the night of the 26th ult., the only portion which remains being the billiard-room. The place was in charge of a housekeeper and housemaid, as the Vandeleur family, who own Kiltrush House, are at present living at their London residence in Cadogan Square, S.W. Scarcely a piece of the costly furniture or one of the many heirlooms was saved from the general destruction. The building was insured for 1,980*l*., but no insurance was effected on the plate, library or general contents of the mansion.

At a special meeting of the Paisley Town Council the following contracts for electric lighting were agreed to:—Babcock & Wilcox to supply boilers, 2,415*l*.; Messrs. Callender, London, cables, 6,154*l*.; Ferranti, Limited, London, steam alternators, switch-gear, rectifiers and transformers, 10,603*l*. 10*s*. This installation is for the central area of Paisley, and is to be erected in five and a half months. The Council have borrowing powers for 35,000*l*. for the extended scheme.

### ILLUSTRATIONS.

CATHEDRAL SERIES.—SALISBURY: WEST DOOR—PRESBYTERY ALTAR AND HEREDOS—VIEW IN LADY CHAPEL—CHAPTER HOUSE—THE NORTH PORCH.

STAFFORD HOUSE, ST. JAMES'S.—BOUDOIR CEILING.

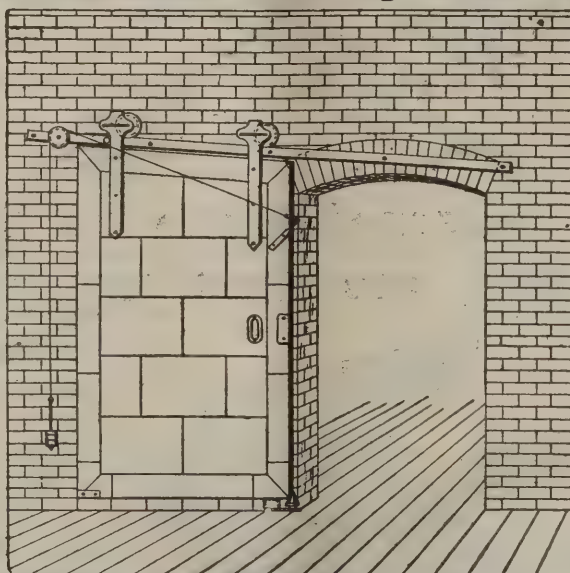
COOMBE CROFT, NORBITON.—NEW PORCH AND BOUDOIR BAY—MUSIC ROOM BAY.

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### ELECTRIC NOTES.

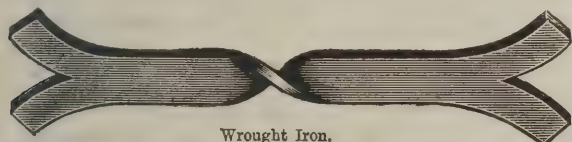
PROFESSOR FORBES, the electrician, after a visit to Wady Halfa, expresses a highly favourable opinion about utilising the power of the cataracts for generating electricity, and considers the general circumstances of Egypt exceptionally well adapted for its use as motive power.

A new electric lighting scheme has been sanctioned by the Aberdeen Corporation for increasing the capacity of the electricity mains to the extent of 20,000 lamps. The extension, which has been adopted on the recommendation of Professor Kennedy, will cost 3,754*l*.

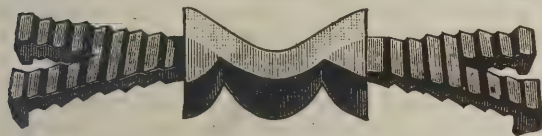
At a recent meeting of the Worcester Council, the mayor (Mr. W. C. Dyson Perrins) presiding, the report of the electrical engineer upon the past year's work was considered, and his recommendations were adopted. They include the expenditure of upwards of 9,000*l*. upon additional plant at the generating station at Powick, and an alteration of the system of payment from 5*d*. per unit to 6*d*. per unit for the first hour's daily average use, and 2½*d*. per unit for all current consumed in excess of this amount.

### NEW CATALOGUES.

MESSRS. NOYES & CO., of 76 Old Street, E.C., are sending out their new catalogue, and may be complimented on the manner in which they have got it up and its general all-round completeness. It contains nearly 300 pages, all of which have



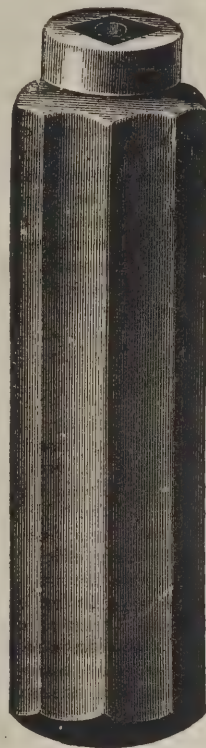
Wrought Iron.



Cast Iron.

numerous illustrations of the various specialties of the firm, comprising building and sanitary ironwork of every description. The wall ties, for bonding hollow walls, deserve special men-

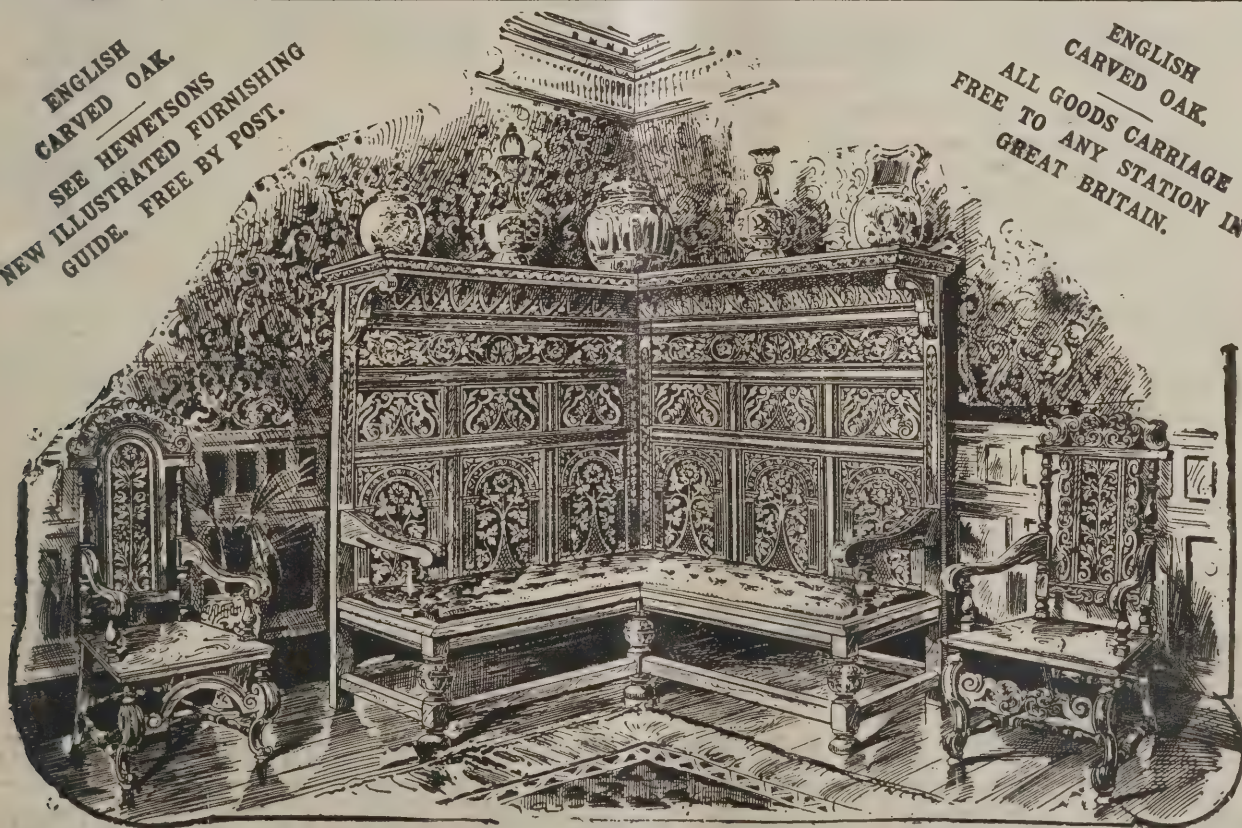
tion. These are made both in wrought and cast-iron, and in various shapes, weights and sizes. The sketches show one of each kind, and they are supplied either galvanised or coated with Dr. Angus Smith's solution. For special jobs they can also be made in copper. Any pattern can be made to order, or any of the stock patterns can be altered as required. Another of their specialties is their "everlasting" patent file and chisel handles,



which are made of a specially prepared pulp and are soft and comfortable to the touch, will not split, and the ferrules of which cannot fall off. They are durable, and, moreover, inexpensive. That they are slightly will be seen from the larger

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sketch, which shows the handle's actual size, and the smaller one shows a handle subjected to a severe test of its toughness.

MESSRS. LUMBY, SON & WOOD, of Halifax, have sent us their new list of specialties for 1897, among which special prominence is given to their new "Southern" boiler with 6-inch waterway, fitted with three mudholes and bridges for the easy removal of incrustation without disturbing the brickwork; a useful boiler for supplying hot water and for heating purposes in districts where the water contains a large amount of lime, &c. The waterway is extended 6 inches below the fire-doors, thus allowing the sediment to fall below the fire, where it is not liable to cause damage to the boiler. "Edge's Patent Saddle Boiler," which is particularly suitable for situations where depth of stoke hole does not admit of many other forms of boiler. The shape of the boiler is such as enables it to stand a greater amount of pressure than the ordinary saddle boiler would be capable of doing. The "Marlor" boiler, the design of which is entirely new and original, combines points of merit and utility which at once stamp it one of the most efficient and economical boilers in the market. Any sediment contained in the water falls below the fire bars, where it cannot injure the boiler, and is collected by the special shaped bottom, which together with the draw-off arrangement attached to the same (which is of large size), enables the boiler to be flushed out daily if required, and if this is done regularly when the boiler is new, the liability of failure from the deposit of sediment is greatly reduced. The "Standard" dome-top boiler, with new registered doors, slide ventilators to fire and ashes doors, patent nickeled non-radiating handles which never get hot. The "Twelve Hours" boiler, the "Caloni" double cylinder boiler and the "Majestic" steam heater are arranged with vertical and drop flue tubes, which in actual use have been proved to be very efficient and economical. The fuel space and steam space are ample, and the arrangement of chimney enables a large fire to be quickly lighted. The dampers and automatic arrangement can be regulated so that the minimum amount of attention is required. Messrs. Lumby, Son & Wood have made the question of low-pressure steam heating a practical study, and are now constructing a number of boilers for this purpose. They make a large number of calorifers or steam heaters with coils, and also with iron, steel or copper tubes, and their patent round manhole cover has proved itself most successful. The safes manufactured by the firm have recently undergone revision in construction, so as to keep pace with modern requirements, and are now well up to date.

## COMPLIMENTARY DINNER TO THE MANAGERS OF THE BUILDING TRADES EXHIBITION.

AT the close of the recent Building Trades Exhibition, held at the Agricultural Hall, it was felt by many exhibitors that it would be fitting to testify in some way the high appreciation in which the services of the gentlemen who were primarily the promoters of the display, Messrs. H. Greville Montgomery and A. M. Callender, were held. A meeting of exhibitors was accordingly convened, at which it was decided to give a complimentary dinner to these gentlemen, to be held at the Midland Grand Hotel, St. Pancras, on Wednesday evening, April 7, and a committee of five was appointed to make the arrangements—viz. Mr. C. J. Bailey (Messrs. G. S. Key & Co., Limited), Mr. H. J. Harding (Messrs. W. H. Martin & Co.), Mr. G. Marlow Reed (Messrs. John Knowles & Co.), Mr. W. Ward (Granite Plaster Company) and Mr. W. A. Cameron Waller (Waller's Grip-fast Tile Company).

Some forty to fifty gentlemen connected with the building trades sat down to an excellent dinner in the Venetian Room at the Grand Midland Hotel on Wednesday evening last. Mr. W. Ward occupied the chair, being supported on his right and left by the guests of the evening. Among those present were Messrs. John P. Seddon, F.R.I.B.A., Harold Rathbone, C. J. Bailey Broad, E. T. Chaplin, G. Davenport, H. Heyman, Mark Gentry, H. J. Harding, E. Holwill, W. H. Marlin, P. A. Randall, G. Marlow-Reed, Lawrence, Seager, H. B. Tarry, G. Tucker, H. Turner, W. A. Cameron Waller, P. A. Gilbert Wood (*The Architect*), &c. The after-dinner proceedings were informal in character, the speeches being commendably brief and varied with sentimental and humorous songs. The remarks led up to a discussion on the practicability and desirability of seeking to establish a builders' exchange for London.

When the royal toast had been honoured, the Chairman then gave the toast of the evening. He remarked that he had the pleasure of seeing around the table a large body of gentlemen connected with the most important industry in the kingdom, and he thought that their honoured guests, Messrs. Montgomery and Callender, ought to feel very proud that such a numerous and representative gathering had come together of those who had taken part in the recent Building Trades Exhibition. This banquet was a gratifying testimonial to the success of that exhibition. Personally he should have wished to have seen still more of the exhibitors present; but at the same time they must bear in mind that they were scattered far and

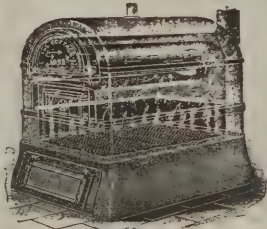
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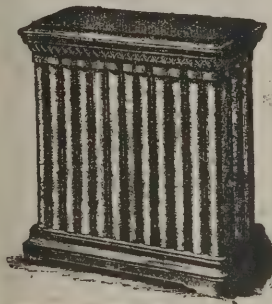
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157 STRAND, W.C. (Four Doors from Somerset House), LONDON.



wide all over the kingdom. He had sent out over 240 invitations for that evening, and had received responses from nearly everybody, and the majority of those who were not able to be present had wished him to convey to their guests their high appreciation of the excellent way in which they had conducted the exhibition. A number of gentlemen who were not present had asked to be allowed to contribute towards the musical, printing and other expenses of the evening. As an exhibitor himself, he went into the display at the Agricultural Hall in a business-like manner, and if all present had reaped the same success as he had enjoyed, they would drink to the continued health and success of Messrs. Montgomery and Callender with the utmost heartiness. It was one thing, as they all recognised, to render an exhibition financially profitable as a show, and quite another matter to make it a success from the exhibitors' point of view, and as this touched the interests of all, they ought to appreciate the excellent and most satisfactory manner in which it had been accomplished. There had been a marked absence of the side shows and outside exhibits which had so greatly impaired the unity and business-like character of previous exhibitions, and he would ask them to drink very heartily to the good health and continued prosperity of their guests.

Mr. Broad, in supporting the toast, said he had had considerable experience of exhibitions, but he had never seen one conducted with so much (might he use the vulgar word?) "class" as the one that had just closed. Everyone would recognise that Messrs. Montgomery & Callender had elevated the exhibition into something more than a mere money-making display, and they had indeed done their level best to make it thoroughly satisfactory to all connected with the building trades. Such a venture had involved an enormous amount of labour, and must have been attended with some disappointments and anxieties; but, judging by its results, they could not say too much of the way in which it had been conducted. He could not sit down without referring to the action of these gentlemen in organising the clay-working industry. This movement was started on a modest scale a very few years ago, and had been the means of welding together the entire trade, while the Journal was of great service to the members. On one point he feared that he differed from Mr. Montgomery, and that was on the frequency with which such exhibitions should be repeated. Because it was so great a success, it ought not, he strongly felt, to be held too often. That was one of the causes which led to the failure of previous enterprises of the kind.

The toast having been drunk with musical honours, Mr. Montgomery responded. He said he felt somewhat in a position of a member of Parliament who had been returned about a week and was asked to come down and address his constituents. He could only say he was obliged to them for electing him; that he should continue to endeavour to retain their confidence, and wished to keep his seat as long as possible. He was, as they all recognised, a Radical, and was ever on the look-out for means of securing further improvements. There was no such thing as finality in exhibitions, but he was conservative enough to wish to retain all his constituents. It had been a great pleasure to Mr. Callender and himself to see that their efforts had been so successful. They had not heard a single complaint from any exhibitor that they had not kept their promises, nor had any said that they were disgusted with the arrangements, and many who had come to scoff had remained to pray. There had been a certain number of objections raised; but these came not from the exhibitors, but from a section of the Press who had ever treated them most unfairly, and had damned them with faint praise. They had been told that the policy of holding the exhibitions in alternate years was wrong, and that they ought only to take place every five years. That would be absurd, for if the present management decided not to engage the Agricultural Hall for five years, they might depend upon it a syndicate of Jews would spring up who would run a show simply for the gate-money, with the failure as in the case of two previous managers. The same critics told them that they ought only to show novelties; but if the exhibition were only opened once in five years, it was clear that many things which were new inventions in the earlier years after the show closed would cease to be such before the doors were again opened. The fact was, the exhibition had to be run on business principles, and when this was done, architects, surveyors and others were there to see what was going on. So long as architects, builders, builders' merchants, and others specially interested visited the exhibition and took notes of what was there to be seen, he was well satisfied. It had been said that the exhibition was not sufficiently advertised. He had his own ideas about that point; but he would tell them what they had done. They distributed and caused to be exhibited 3,000 large bills, and issued over 6,000 invitations to architects, municipal engineers and surveyors, builders' merchants and builders. After the success of the exhibition was certain, he might say that they expended over 200% more in making assurance doubly sure. They could easily have packed the hall

with the general public, but not one-tenth of the amount of business would then have been done.

Mr. Callender also briefly responded, observing that it was a very great pleasure to meet again, under such happy circumstances, so many of the people with whom they had associated at the Agricultural Hall; to feel that those whom they had to meet in business relations had become old friends who appreciated their efforts to render the exhibition a mutual success. As Mr. Montgomery had indicated, they had done a great deal of work which did not show prominently—preliminary labour which extended over not weeks merely, but many months. The credit of organising and carrying it through was due to Mr. Montgomery; as for himself, he was merely the "calendar" for the year, and he trusted that they would exhibit as satisfactory a "calendar" for 1898 or 1899, and that whenever they reopened a building trades display, the exhibitors would be animated by the same kindly feelings that they had evinced that evening.

Mr. G. Marlow Reed proposed "Prosperity to the Building Trades of England," and coupled with it the name of Mr. W. A. Cameron Waller, remarking that, while his firm had to do with the drain-pipes, his friend dealt with the roofs of buildings. He urged that masters of the building trades should bear in mind that when they harmed one another they injured themselves; it was better for everyone that they should work harmoniously together, and not to go for each other's lives, and such a gathering as that tended to promote this good feeling and mutual sympathy.

Mr. W. A. Cameron Waller, in response, said the recent successful Building Trades Exhibition had been the means of bringing together those who were competitors. He wished to make a suggestion that had long been on his mind, and that was that the time had come for the formation of a Builders' Exchange for London. As many of them were aware, there was a flourishing Builders' Exchange in Glasgow, and the same idea had just been taken up in Edinburgh. London might justly claim to be the most important city in the kingdom, and surely if these could be made successful (undertakings in the Northern cities), there was room for such a movement in London. Not only so, but the timber and iron trades already had their Metropolitan exchanges, and it seemed a strange thing that there was nothing of the kind in London for the representatives of bricks and mortar. He should like to hear the opinions of others on the subject, and would promise that if the idea were adopted he would render all the support in his power.

In reply to a call from the Chairman, Mr. Montgomery said the suggestion of a Builders' Exchange for London was by no means a novel idea to him, for the formation of such a body had been proposed a good many times of late years, but so far the scheme had not taken any tangible form. The Institute of Clayworkers, to which Mr. Broad had alluded in such appreciative terms, had thus far proved a great success; in its offices they had provided a museum, where architects could freely inspect the various products of different districts, and could inform themselves where a particular kind of brick could be obtained. If such a Builders' Exchange were established in the Metropolis, it would have to be done on a very large scale, or it would not be worth while to undertake it. The promoters of such an Exchange would have to face the problem of the provision of a building sufficiently central, and of the size and importance which such an undertaking would merit; but should such a scheme be organised, he would do his utmost to support it.

The Chairman said similar Builders' Exchanges had been established in New York, Pittsburgh and Chicago, and if Glasgow and Edinburgh could support such institutions he could not see why it should not successfully be carried out in London. It meant, of course, buying a considerable property, for not only offices and conference rooms, but an enormous amount of space would be required for exhibits. The idea was, however, a good one, and should it commend itself to the trades he knew of no one better able to carry it out than Messrs. Montgomery and Callender.

Mr. Mark Gentry suggested that the co-operation and financial support of some of the City Companies should be sought in working such a scheme.

Mr. Broad said the question had occupied his attention for years. He thought it was most desirable that the various trades connected with building should be brought together in one institution to work in co-operation, for although they were competitors, their interests were identical. As had been hinted, if carried out, such an exchange must be a very big affair. It needed to be backed up and energetically pushed forward by some one who was head and shoulders above any suspicion, and who would not arouse the jealousy of any one trade. They had founded of later years associations of clayworkers, lime merchants and brickmakers, besides plasterers and other trades, and why could not all be amalgamated and fused into one body representing the largest industry in Great Britain? If Messrs. Montgomery and Callender would take the matter in hand, he was convinced that this would be done,



and the exchange would become an accomplished fact—one that must be of use and benefit to all.

Mr. John P. Seddon said if the exchange was to succeed there must be no selfishness or jealousy manifested. From the architect's standpoint, he thought it might be workable, but the arts of building must not exhibit the jealousy that was too often to be found in art.

Mr. Harold Rathbone thought the proposals as sketched out were on too large a scale, and would impose too heavy a responsibility, financial and otherwise, on the initiators. The idea was excellent, but he would urge that they inaugurate the movement in a modest and elemental character, and further, that from the very first the aim should be to render it self-supporting. If possible branch offices should be formed in various districts, claiming London as their centre.

Mr. Callender said he was told at Glasgow that a local builders' exchange was very well in its way, but it ought to be centred in London. If it was left to provincial cities to organise such a movement no good would be done, but if the Metropolis took the lead they would follow.

Mr. Heyman also supported the proposal, but pleaded, amid some laughter, that it should be established on an international basis. We exported more building manufactures abroad than we received, and when it was remembered how largely Lincrusta Walton was used in his native land, there ought not to be prejudice evinced against goods simply because, like himself, they had been "made in Germany."

Mr. P. A. Gilbert Wood said the proposal to found a Builders' Exchange was one that demanded grave consideration of ways and means before being adopted; but if it were decided upon by the trades, it must be carried into effect with a vigorous will and a determination to make it a success.

The closing toast was "The Chairman," proposed by Mr. Percy A. Randall, and in replying, he said while this gathering had primarily been intended as a compliment to the promoters of the exhibition, it had promoted good fellowship among exhibitors and had led to a practical discussion that he hoped would eventuate in the establishment of a Builders' Exchange.

Before leaving the party united in singing "Auld Lang Syne" and the National Anthem.

MRS. MATTHEW GRAY has undertaken to erect a church in West Hartlepool at a cost of 12,000/., as a memorial of her late husband and of the Queen's reign.

## SOUTHEND PIER.

A DISPUTE has been pending in the High Court of Justice for some time between Messrs. Murdoch & Cameron, Limited, of London and Glasgow, engineers and contractors for public works, and the Corporation of Southend-on-Sea, over the erection of a promenade pier there, the contract price of which is about 20,000/., and in consequence work has been suspended during the last five or six weeks. Sir William Arrol, M.P., of Forth Bridge, Tay Bridge and Tower Bridge fame, with Mr. John Waugh, C.E., and Mr. William Jaffrey, M.I.C.E., having visited and inspected the pier and reported favourably as to the state of the work and the probability of the pier being ready for the ensuing season's traffic, terms have been arranged between the Corporation and the contractors, who are to receive 2,000/., bonus in addition to their original contract price. The action has been taken out of Court, and work on the pier has been resumed under the direction of Mr. John Wolfe Barry, C.B., the newly-appointed engineer to the Corporation.

## ELECTRIC LIFTS AND CRANES.

At the ordinary meeting of the Institution of Civil Engineers on Tuesday, March 30, Mr. John Wolfe Barry, C.B., F.R.S., the president, in the chair, the paper read was "Electric Lifts and Cranes," by Mr. Henry W. Ravenshaw, Assoc. M.Inst.C.E.

This communication referred to the application of the electric motor to the working of lifts and cranes. Where hydraulic power was available, its simplicity afforded many advantages, although in the ordinary form of hydraulic motor as great an amount of water was used with a light load as with a heavy one. The electric motor, however, only absorbed current in proportion to the work developed, and this fact alone justified its application in certain cases. The chief requirements of the motor were sparkless commutation, self-adjusting brushes and automatic lubrication. Shunt machines were generally used on account of their regular speed with varying loads; a few turns of series winding were, however, sometimes added to give prompt starting. Worm-gearing was employed, and gave compactness and silent running, with a quick pitch for the worm; ball-bearings and an oil bath were recommended. To

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give good results, however, the ball-races must be of high-class steel, and be ground perfectly true after hardening. A special form of rope-drum made by Messrs. Easton, Anderson & Gooldeen, Limited, and the Sprague screw elevator with ball-nut were described.

The regulating-gear should provide prompt and accurate control, absence of jerks, small current consumption and regular speed. Resistance was necessary in the circuit of the motor at starting to prevent a great rush of current; and this should be controlled automatically, as it was impossible for the attendant to tell the position of the switch when a hand-rope was used. The automatic controller used by the Otis Company was described, as well as an arrangement controlled by a centrifugal governor which had been designed and used by the author. Magnetic brakes were advocated, the cage being automatically stopped when the current was accidentally broken. The magnet should be fitted with non-conductive resistances to prevent sparking on breaking the circuit. Tests of an Otis elevator and a curve showing the energy consumed under varying loads were given, the cost per return trip with four persons to a height of 36.5 feet being 0.101 pence at 4d. per Board of Trade unit. The cost of an average trip with two persons to a height of 24.75 feet was 0.060 pence at 4d. per unit.

Electric cranes presented several marked advantages over those driven mechanically, owing to the flexibility of the control of the motor and the simplicity of the conductors for transmitting the power. The relative advantages of the use of a separate motor for each motion, and of a single motor and friction-clutches were discussed, the mechanical simplicity in the one case and the electrical simplicity in the other enabling either system to be used with good results. Tests were given of a 20-ton electric crane, at Woolwich Arsenal, arranged on the single motor principle, friction-clutches being used to actuate the various movements. The collectors for the current with the method used for insulating them were described. Owing to the special requirements of this crane much gearing was necessary, and a heavy chain-block weighing nearly 2 tons was fitted. The efficiency was thus reduced, especially at light loads, and the horse-power delivered to the load, as well as that delivered to the block, was given to enable the mechanical losses to be more readily obtained. A total efficiency of 53.42 per cent. was obtained when the load on the hook only was considered, and of 58.28 per cent. when the weight of the block was included in the load. To drive the outer carriage

at the rate of 54 feet per minute 8.4 electrical horse-power was required, and 10.2 electrical horse-power to traverse the load radially at the rate of 32.4 feet per minute, both with a load of 20 tons.

The paper was illustrated by drawings of the lifts and cranes described.

### THE COUNTY COUNCIL WORKS DEPARTMENT.

THE special committee of the London County Council that was appointed to inquire into the management and financial position of the Works Department since its inception and as to its future prospects have completed their report, which was presented at the meeting on Tuesday, the 6th inst.

The report contains an extract from the statement of Mr. Waterhouse, one of the assessors, who considered the best means of avoiding in the future any recurrence of such falsification of accounts as that which led to the inquiry. Mr. Waterhouse says:—

"The total amount of the fabricated entries, as stated by the comptroller in his report, amounted to 7,229l. 11s. 10d. None of the cash outlay of the department, except the petty cash and the wages, the payment of which is entrusted to guaranteed pay clerks, is in the hands of officers of the Works Department, and these entries had no reference to any misappropriation of money, nor did they conceal any action whereby any employé of the department was pecuniarily advantaged. They resulted simply in a false statement as to the cost of various works, the apparent cost of some being decreased by amounts which were included in the cost of others. It is for me to point out any defects in the office arrangements which rendered the fabrication of these vouchers and entries possible, and prevented their immediate detection. It may be well, however, here to refer to the evidence of Mr. Fullwood. The allegations with regard to false entries in the books contained in his letter to Mr. White of November 21, 1896, were, in cross-examination, found to relate to some entries—of which he instanced two for amounts of 1l. 2s. 9d. and 1l. 3s. 1d. occurring in the month of June, 1893—in the books of his own department of gasfitting, in respect of foremen's time, which he said was evidently false, inasmuch as no foremen were employed. I find that these entries were posted from the time-sheets in the same way as all other wages, and that the amount represented a proportion of the wages of the foremen engaged in generally superintending

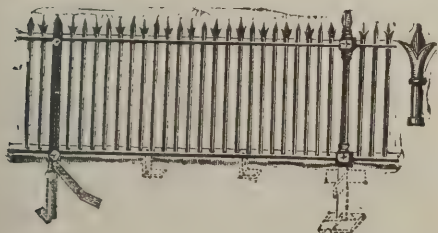
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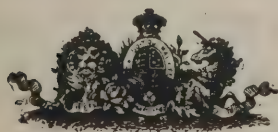
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the work at some lodging-houses of which some gasfittings under Mr. Fullwood formed some part. There does not appear to have been in this case any attempt or intention to misrepresent facts."

The committee say they have nothing to add to the remarks in Mr. Waterhouse's report. They concur with the recommendation of both the assessors—that, with a view to preventing similar practices in the future, the bookkeeper should be independent of the manager.

It is admitted that the department was from the first connected with the labour policy of the Council. The committee also say that after a careful review of the operations of the works committee in comparison with the practice of provincial municipalities and railway companies, while it seems probable that the execution of works without the intervention of a contractor prevails in regard to municipal bodies and railway companies to a degree much larger than is generally supposed, the tendency to dispense with or even to abolish the contracting system altogether has been much stronger in the London County Council than in any case that has come under their notice. The department was formed in circumstances of great exigency and disadvantage, and while there had been considerable conflict as to the cost of this and that particular work, they think it safer to form an opinion upon the general operations and upon the statements of all parties, both opponents and admirers of the department, than to enter upon any minute examination of the outcome of each particular operation. The experience of the Council, the practice of other municipal bodies, of railway companies and of large manufacturers and estate proprietors, had led them to a firm conviction that some definite organisation for the direct employment of labour and the direct execution of public works by the Council under the superintendence of its own officers was desirable and beneficial. This opinion brought them to the special matters of difference between the policy of the Council and that of provincial municipalities in regard to this subject, which were perhaps most prominently to be found in connection with the central works in Belvedere Road. There the Council had acquired and improved a wharf which was probably worth 50,000*l.*, and had expended in the erection of offices, clerks' offices, workshops, stables, &c., about as much more. The works committee had accumulated there and in other dépôts plant and stock and stores, which, together with working capital, made a total investment of about 170,000*l.*, the stock of timber alone amounting to about 20,000*l.* The committee think that such offices are not necessary for the

construction of sewers or for laying down foundations, but they are a necessary equipment when the Council have to be prepared to undertake the erection of workmen's dwellings upon sites cleared under the Housing of the Working Classes Act, the jobbing works in all parts of London, and the erection of architectural buildings in connection with the various obligations of the Council. Even if the operations of the Works Department were limited to engineering works the Council would still require a central station and works and dépôts of some description. These central offices, of course, involved a standing charge of considerable magnitude, which could only be reimbursed by the profitable undertaking of public works, and they had received estimates varying from 200,000*l.* to 250,000*l.* of the amount of the gross value of work necessary to keep these central offices in profitable occupation. The possession of these offices gave to the Council in the execution of architectural works an independence with regard to contractors which could not be obtained in any other way.

After stating that inquiries made of the larger corporations tended to show that work of a structural character was carried out, as a rule, by contractors, the committee say that in the business of the Council, except for machinery or wrought-iron or steel-work, the intervention of a contractor had been practically discarded in the engineering department, and the evidence they received was not unfavourable to a continuance of that system. The cases in which the department had executed works most largely within the respective estimates had been of that character. There was much more contention as to the dealing of the department with architectural construction, but there was no substantial remarkable difference of opinion as to the general quality and character of the work. Upon this subject the committee say:—

"There has been excess of cost, but we are unable to say that in the aggregate this would not have been far greater had the Council been left to deal only with those contractors who would accept their terms and conditions of contract. Latterly, with a more settled plan of operation, the Works Department has been more successful, and in regard to recent works, even of architectural character, the good quality has been maintained, and the cost does not appear to have been in excess of that which would have been paid to a contractor. A period of at least two years was necessary for the economic arrangement of such a new department. In architectural work there is not the same risk to be insured against as in the underground operations of engineering work; there is not the same

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uncertainty with regard to estimates nor the same margin of possible profit. It is unlikely that architectural buildings will, owing to the numerous details and intricacies, be executed by a Works Department at less than the prime cost to a contractor; but, on the whole, it appears that the Works Department can execute architectural works of equal quality, without loss, and with no greater charge than the Council would pay to contractors. This inquiry has not, however, led us to believe that the full average of builders' profit upon architectural work can be obtained by the direct employment of labour, though there can be no doubt that the power of the employer to do the work himself is a valuable check upon builders who might otherwise think the employer was wholly in their hands."

The committee concur in the general opinion of witnesses that there should be no universal exclusion of the contractor. With reference to the form of contract which states that contractors shall pay the wages "in practice obtained by the various trade unions in London," they consider that the objection of contractors to those words can be removed by inserting a mention of the unions of employers where such exist, and the extent to which such exist, together with the trade unions which are exclusively organisations of workmen. The committee cannot see their way to recommending any alteration of the standing orders, such as would be required to admit of competition in tendering between the department and contractors. Nor do they recommend the making of a selected list of contractors or the abandonment of the customary mode of open tendering. They regard the employment of contractors as beneficial if considered only as strengthening the resources of the Council for the undertaking of public works and keeping the officials concerned in the preparation of estimates and supervision of works closely in touch with the prices of work and of materials. They think it advisable that the works manager should never be overloaded, and that, especially as to architectural works, whenever he is sufficiently occupied tenders should be invited. If there were two works of a similar nature to be executed, there would be advantage by way of comparison in giving one to the works manager and the other to a contractor. The committee do not think any alteration should be made in the present system of executing jobbing works, at all events for another year, and that then there should be a further report upon its operation and results. The present system is that if the work is small it is done by some one sent from the central offices; but if it is considerable it is carried out by local labour collected on the spot.

Generally, as to the future of the department, the committee say:—

"No witness that has appeared before us has advocated the abolition of the Works Department. On the contrary, even those who have criticised the work of that department most keenly have, at the same time, advised its retention. One witness stated that he did not propose to abolish the Works Department, that he thought the department was a very useful provision for the Council to have at its disposal; that he thought there were a large number of works that could be done quite as well by the Council as by a contractor, but that he was not certain that building works could be included in that list. Another witness said that he would not contemplate abolishing the Works Department as a department, and that in his opinion it was better that it should be a separate department. With reference, however, to the works committee, there has appeared a general concurrence of opinion as to its unsatisfactory constitution. Under the standing order of the Council this committee consists of from sixteen to twenty members, with three *ex-officio* members, making twenty-three in all. We have had suggestions for the reduction and for abolition of this committee. The chairman thinks it too large, and that the method of selection is thoroughly bad. He describes it as composed of ten members sympathetic toward its work and ten members whom he describes as "not so sympathetic." He says it is equivalent to partners in business who do not agree, with the result that their business does not succeed. The subject appears in the evidence in many different forms, and in view of its importance we have given it the fullest possible consideration. Our conclusion is that it is for many reasons expedient that fresh arrangements should be made."

After a brief reference to some of their proposed alterations, the committee conclude by stating that they have received a memorandum from four members of the committee which under the special circumstances attending the appointment of the committee they think should be presented as an appendix.

The following are the committee's recommendations:—

"(a) That in the opinion of the Council some definite organisation for the direct employment of labour and the direct execution of public works by the Council under the superintendence of its own officers is desirable and beneficial.

"(b) That a works board be substituted for the works committee, such board to be elected forthwith, one member to be nominated by and from each of the following committees:—

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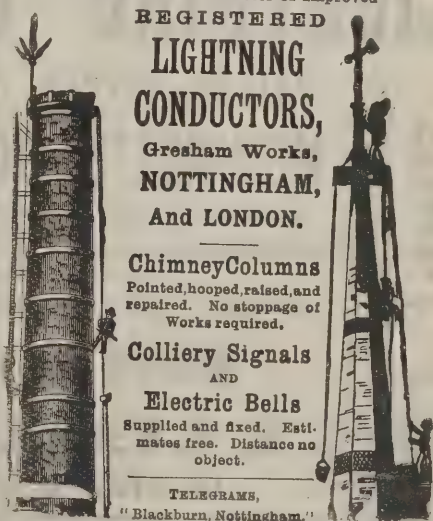
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"(c) That any committee desiring to propose to the Council the carrying out of any works without the intervention of a contractor shall, in the first instance, obtain an estimate from the proper officer, and then refer such estimate to the works board for their consideration before reporting to the Council.

"(d) That the works manager shall, unless in any case otherwise ordered, carry into execution all works which the Council resolves to execute without the intervention of a contractor.

"(e) That when the Council wishes to execute any works without the intervention of a contractor the plans, specification and estimate shall, unless otherwise ordered by the Council, be thereupon referred to the works manager.

"(f) That the works manager shall be responsible to the works board, and the board shall report from time to time to the Council.

"(g) That this report be referred to the general purposes committee, and that it be an instruction to that committee to amend the standing orders in accordance with the foregoing recommendations.

"(h) That it be referred to the general purposes committee to make further amendment of the standing orders by the insertion of words coupling the unions of employers where such exist with the trade unions, in reference to the rates of wages and hours of labour.

"(i) That it be referred to the general purposes committee to make further amendment of the standing orders by omitting provisions giving powers to the Clerk of the Council to direct examination of the books of anyone contracting with the Council for the execution of works other than the time-sheets or books, or wages-sheets or books.

"(j) That the statement of Mr. Edwin Waterhouse be referred to the comptroller for report upon each and all of his suggestions with reference to the accounts, and that the comptroller's report be referred to the general purposes committee with a view to the adoption of Mr. Waterhouse's recommendations."

#### Report of Minority.

A report signed by Messrs. Beachcroft, Fletcher, Longstaff and Sir Godfrey Lushington is also submitted. They say that,

as it is certain the Council will need to have recourse to contractors, it is to the interest of the ratepayers that the best class of contractors should be induced to come forward. They therefore recommend that an early opportunity should be taken to revise the standing orders which prescribe the form of contracts, so as to get rid of anything which could be interpreted by contractors as indicating a spirit of unjustifiable distrust, or as placing them in a humiliating position. In particular they are strongly in favour of the Council reserving to itself freedom either to direct the tendering to be open, or to confine it to selected firms, as may seem expedient. They trust that by the exercise of this discretion the Council may give a full trial to the system of limited tendering, and, if it is found to answer, may adopt it as the general, though not necessarily the invariable, procedure in putting works out to contract. Upon the subject of the cost of estimated works the minority say:—

"The question of cost is not whether the Works Department might have executed the works more economically than they have done, but whether it is cheaper to the Council to employ the Works Department than to have recourse to contractors. The theory of the Council executing its own work is that the Works Department, if it can work as cheaply as a contractor, will save to the Council the whole of the contractors' profit, whatever that may be; and even if it cannot, still so long as the excess of cost is within the margin of that profit the work is less expensive to the Council than it would be if done by a contractor. The only complete test of the cost of the two systems would have been if the Works Department had tendered in competition with contractors. That, however, has not been done, and we feel sure, for the reasons stated by Mr. Gruning, that if the experiment were attempted it would prove abortive. In the absence of competition we have to fall back upon comparative statistics of the financial results of the two systems, as shown in what may be considered similar works."

As to engineering works the minority accept Mr. Binnie's view, who, while admitting that he had not the means of judging with exactitude, had formed the general impression that the Works Department had executed the work at a lower rate than contractors had done. According to the best calculations they had been able to make, there had been a saving of more than half the contractors' profit, say more than 6,000*l.* upon work costing 130,000*l.* As to architectural works there had been a "loss" which they could not put at less than 10,000*l.* upon a total of 220,000*l.* Mr. Gruning's conclusion, it is pointed out from the figures as analysed by him, is that the Works

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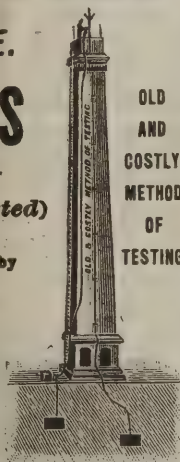
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Department has succeeded better in work under the engineer than under the architect, but has not attained the requisite measure of success. Mr. Waterhouse in turn said that if, as he thought, the estimates, especially the architect's estimates, had as a rule been high, any small apparent saving on a comparison of total cost with total estimate might be illusory. On consideration of the statistics and of the reports of the assessors it seems to the minority duly proved that in the case of architectural works executed by the Works Department, so far from any part of the contractor's profit being saved to the Council, there is substantial loss. The minority also consider that the Council should cease to undertake the execution of architectural works. Engineering works stand on a different footing. It is agreed on all hands, by builders and contractors no less than by others, that there are works of that kind that can profitably be undertaken by a municipality, and it is no doubt an advantage that the Council should not be wholly dependent on contractors, especially where it is a question of underground work. The report continues:—

"It remains, however, to be considered what is the best administrative machinery for the Council to use for this purpose. At present the Council employs the works committee. That committee appears to us to be open to the following observations:—

"(1) It is the only one of the committees which is not unanimously recognised as necessary for the administration of the affairs of the Council. It does not possess the confidence of more than a bare majority of the Council. By a very large minority it is looked upon as the experiment of a party policy to which they are opposed—the policy of municipalisation of labour under trade union auspices, and the setting up of the London County Council as a model employer to the exclusion, as far as possible, of contractors, who are to be viewed with distrust. Accordingly every question relating to the works committee is inevitably treated by both sides as a party issue. From the works come dissensions in the Council, dissensions in the works committee, dissensions in the spending committees from which work for the works committee is supplied.

"(2) The works committee personally carry on the business of builders, and for this they do not possess the necessary qualifications. A builder's business is intricate and difficult, and requires skill and everyday attention. The committee are a body of gentlemen with a limited amount of expert knowledge and a limited command of time, and must be looked upon as amateurs. They have the services of a manager. But the

execution of works by the committee through the manager as their subordinate is a totally different thing from the execution by the architect or engineer for a spending committee, as for instance was done in the case of the Crossness schools and the York Road sewer. In this respect also the works committee is different from the other committees, which leave the actual conduct of their business to a qualified and responsible officer. When the works committee personally select the materials to be purchased for works it is much as if the asylums committee were to prescribe for the lunatic patients.

"(3) The Works Department being treated as a contractor, the engineer and architect and their departments on the one hand and the works committee and the staff of their department on the other find themselves in a relation of mutual antagonism with respect to the estimates, with respect to the supervision of the work, and with respect to the settling up of accounts. All parties are thus placed in a false position. The engineer and architect, who would naturally be the expert advisers of the committee, are forced to act as censors of those whose salaried officers they are. In like manner the departments which should co-operate stand from each other at arm's length. So far as the engineer and architect are concerned these difficulties have been minimised by their good sense and fairness. But between the Architect's Department and the Works Department there have been constant dissensions which have been much aggravated by party comments in the open debates of the Council and in the public press. Again, the manager of the works committee does not submit to the rulings of the architect as a contractor is obliged to do, and so great have been the difficulties of settling accounts that the Council has found it necessary to provide for these disputes—disputes on mere matters of opinion and between its own officers—to be referred to arbitration. Lastly, this faulty organisation goes far to explain what otherwise might appear inexplicable, the recent falsifications of the appropriation accounts, which in transferring items of cost from one job to another so as to bring the cost of each nearer to equality with the estimate, had for their object to prevent unpleasant questions being raised between the departments. If the late manager and assistant manager were prompted by a desire to maintain their credit for keeping the cost within the estimate, it was anxiety to avoid friction and departmental jealousy which induced the clerical staff to be parties to malpractices from which they personally had nothing to gain. If existing arrangements are left unaltered the staff of the Works Department will be in future subjected to the same

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strain as that which led to the commission of the recent falsifications. We have been informed that the Council of West Ham, which followed the example of the London County Council in establishing a works committee, have already found themselves obliged to discontinue it for the like reasons, viz. the departmental discords which it inevitably created and allegations as to the unfairness of the estimates of the engineer of the Corporation.

"The objections which we have mentioned are, it is obvious, inherent to the existence of the works committee, and cannot be removed by any reduction in the number of that committee or by any change in its composition. We are, therefore, of opinion that, in the public interest, the continuance of the works committee is indefensible." In conclusion the minority recommend:

"1. That the Works Department be placed under the chief engineer. 2. That no works, whether estimated or 'jobbing,' be undertaken which come within the definition of architectural works. 3. That the works committee be abolished. 4. That the chief engineer be responsible to the spending committee for the execution of all works undertaken by the Council. 5. That for the purpose of financial control a sub-committee of the finance committee be formed to be styled 'The Works Branch of the Finance Committee.' 6. That all materials be purchased by the chief engineer, who shall be responsible to the finance sub-committee for the same and also for the custody of all stores. 7. That the central works so far as they are not required be disposed of. 8. That the system of tendering by selected firms be adopted wherever practicable. 9. That the form of contract be revised so as to remove the main objections raised before the committee on behalf of the contractors. 10. That the above recommendations be not held to restrict the parks committee from undertaking, with the sanction of the Council, such works as have hitherto been carried out by that committee."

The Clerk of the Council reports that communications were received from the town clerks of Birmingham, Glasgow, Liverpool and Manchester, and from some of the principal railway companies giving information about the system adopted by those bodies in carrying out works. Very little work of a structural character is carried out by the corporations referred to without the intervention of a contractor. These bodies appear, however, to undertake by direct labour all works affecting the laying-out, maintenance and repairs of streets. As regards the railway companies, the work carried out without the intervention of a contractor con-

sists of the maintenance of line works, and in some cases of the building and painting of bridges. The reply from Bristol stated that the Corporation undertake constructive works without the intervention of a contractor, and that there can be little doubt that the quality of the work so executed would compare favourably with that of contractors. The reply from West Ham stated that all large works are now put out to tender, the works department having been discontinued as a separate organisation.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

7493. Herbert Prentice Crane, for "Improvements in floor drains."

7500. Herbert Roberts, for "An improved means of covering water-closet seats when in use."

7505. John Roberts, for "Improvements in window fasteners."

7540. Heinrich Erhard Junghans, for "New or improved wood-stain."

7546. Lionel Dove, for "Improvements in locks and fastenings."

7561. Archibald Ansell, for "Improvements in and relating to casements."

7567. Lyman Ferguson and Robert Hughes Pollock, for "Improvements in extension step ladders."

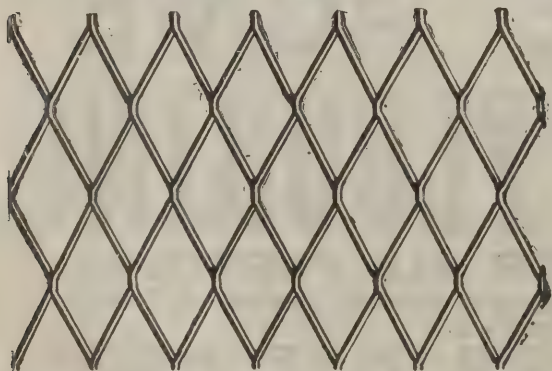
7575. Frank Starace, for "Improvements in windows."

7592. John Thomas Hales, for "Improvements in letter plates for doors, letter-boxes and the like."

7694. Richard Cunliffe, for "Improvements in window-sash fasteners."

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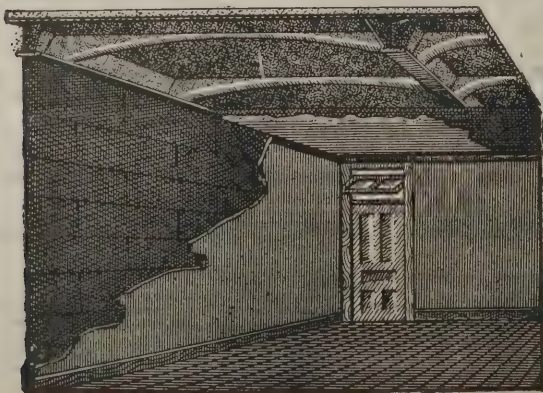
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## EDITORIAL NOTICES.

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*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

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*For Advertisement Scale, see page xv.*

## CONTRACTS OPEN.

ADDLESTONE.—April 24.—For alterations and additions to Mountain Ash and 1 Richmond Villas, Station Road. Mr. Albert Veness, architect, Addlestone.

ANDOVER.—April 28.—For erection of buildings at the workhouse at Andover. Mr. A. Purkess, 16 Junction Road, Andover.

ASHFORD.—May 7.—For new administrative block, addition to infirmary, new chapel and alterations to existing buildings, &c. Mr. Horace Hamilton, clerk, 11 Bank Street, Ashford.

BANGOR.—May 1.—For completion of the tower of St. Congall's parish church. Mr. Stephens, building surveyor, Donegall Square Buildings.

BEESTON.—April 30.—For erection of Council offices. Mr. Hedley J. Price, architect and surveyor, 24 Low Pavement, Nottingham.

BELFAST.—April 16.—For extensions to shop premises, corner of Bridge Street and High Street. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue, Belfast.

BELPER.—April 17.—For erection of new isolation hospital on Crich Lane. Mr. Maurice Hunter, architect, Bridge Street, Belper.

BIRKENHEAD.—April 21.—For erection of twenty-five cottages at Hinderton Road. Mr. A. E. Bolter, secretary to

L. & N.-W. & G.W. Railway Companies Joint Committee, Paddington Station, London.

BLACKBURN.—April 24.—For erection of a chimney 150 feet high, at the electricity works, Jubilee Street. Mr. E. M. Lacey, consulting engineer to the Corporation, 10 Delahay Street, Westminster.

BODMIN.—April 17.—For erection of a single residence near the Great Western Railway Station. Mr. William J. Jenkins, architect, Bodmin.

BRADFORD.—April 22.—For erection of stabling for twenty-five horses, Manchester Road. Mr. Abm. Sharp, architect, Albany Buildings, Market Street, Bradford.

CARDIFF.—April 29.—For taking down the existing chimney-stack, with a portion of the flues, at Cogan Pumping Station, and the rebuilding of the chimney and flues in brickwork. Mr. C. H. Priestley, engineer, Town Hall, Cardiff.

CHATHAM.—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

CUMBERLAND.—April 20.—For erection of a stone bridge over the Camp Beck at Walton Mill Ford, in the parish of Walton. County surveyor and bridgemaster of Cumberland, at the Courts, Carlisle.

DAVENTRY.—April 26.—For erecting six cottages on estate adjoining Warwick Street. Mr. J. B. Williams, architect, Moot Hall, Daventry.

ELGIN.—April 24.—For erection of farm steading, Aldroughy. Mr. Alex. Grant, architect, Inverness.

ELLAND.—April 26.—For erection of foundry, shed and offices at Perseverance Works. Mr. W. H. D. Horsfall, architect, &c., 9 Harrison Road, Halifax.

ESSEX.—April 19.—For erection of an infirmary on the ground adjoining the school at Witham. Mr. F. Whitmore, architect, Chelmsford.

FAREHAM.—April 26.—For erection of a chaplain's residence at the Hants County Asylum. Messrs. Cancellor and Hill, architects, 12 Jewry Street, Winchester.

FARNHAM.—April 28.—For erection of men's casual wards upon land adjoining the workhouse. Mr. S. Stapley, architect, West Street, Farnham.

FEATHERSTONE.—April 24.—For erection of two villas. Messrs. Garside & Keyworth, architects and surveyors, Roper-gate, Pontefract.

FERRYBRIDGE.—April 22.—For the completion of three detached residences at Ferrybridge. Messrs. Tennant & Bagley, architects, Pontefract.

FORDINGBRIDGE.—April 24.—For erection of a farmhouse at Burgate. Mr. Reginald Hannen, steward of the manor of Burgate.

HALIFAX.—April 28.—For erection of a Catholic church, &c., at Denholm, Luddenden Foot. Mr. W. Wrigley, architect and surveyor, Crossley Terrace, Hebden Bridge.

HALIFAX.—April 23.—For erection of a store and fourteen houses on the Newstead Estate, Gibbet Street. Mr. W. Clement Williams, architect and surveyor, 29 Southgate, Halifax.

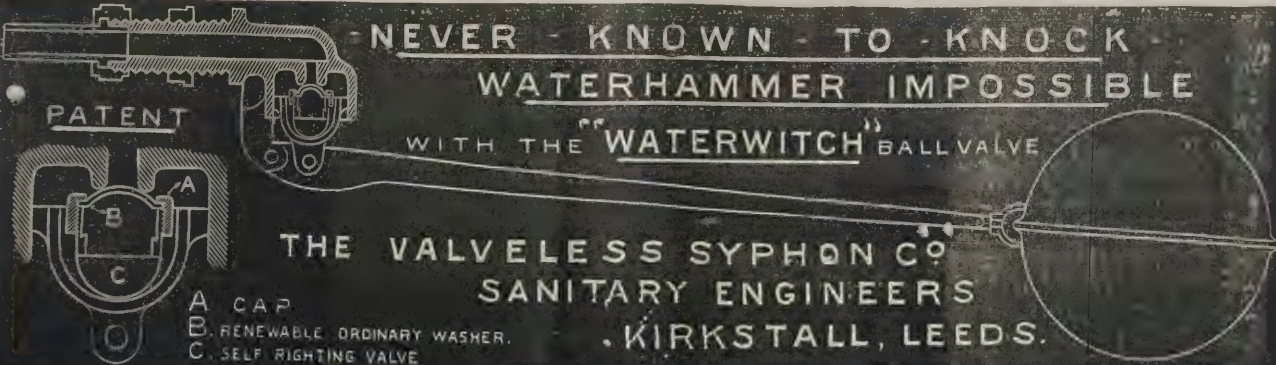
HALIFAX.—April 27.—For taking down the Barrack Tavern and other buildings, &c., in Charles Street and Causeway, in the borough of Halifax, and erecting upon the site additions to the premises of the Automatic Standard Screw Company. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HALIFAX.—April 20.—For erection of two dwelling-houses. Mr. Medley Hall, architect, 29 Northgate, Halifax.

HANWELL.—May 10.—For erection of temporary iron structures at the Asylum. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

HEELEY.—For erection of St. Peter's new mission church and schools and the removal of the present buildings at Heeley. Mr. E. Fitt, 138 Alexandra Road, Heeley.

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HENDON, N.W.—May 10.—For erection of an asylum. Messrs Giles, Gough & Trollope, architects, 28 Craven Street, Strand, W.C.

HIGH SPEN.—April 30.—For erection of twelve two-roomed cottages. Mr. Thomas Ramsay Ramsay, 42 Mosley Street, Newcastle-on-Tyne.

HUDDERSFIELD.—April 22.—For erection of shed, raising the packing shop and other extensive alterations at Meltham Mills. Messrs. John Kirk & Sons, architects, Huddersfield.

HULL.—For drainage works and erection of bath-room, water-closets, &c., at the workhouse, Beverley Road. Mr. T. Beecroft Atkinson, architect, 11 Trinity House Lane, Hull.

HYTHE.—April 20.—For erection of a Wesleyan church and schools. Rev. C. Norman, Holmlea, Hythe.

IRELAND.—April 17.—For erection of house and offices at Carlton premises, Enniskillen. Mr. Thomas Elliott, architect, Enniskillen.

JARROW.—April 28.—For alterations and additions to the higher-grade school. Mr. George Mason, clerk, School Board Offices, Jarrow.

KEIGHLEY.—April 24.—For erection of shop, &c., in Lawholme Lane. Messrs. W. H. & A. Sugden, architects, Cavendish Street, Keighley.

KENDAL.—April 17.—For pulling down 18 Wildman Street, Kendal, and for building a new shop and dwelling-house. Mr. John Stalker, architect.

KIDDERMINSTER.—For erection of six cottages in Leswell Street. Mr. C. A. Downton, architect, Coventry Street.

KIRTON-IN-LINDSEY.—For erection of 60-quarter malting and warehouse; also six cottages. Messrs. Eyre & Southall, Gainsborough.

KNOTTINGLEY.—April 20.—For erection and completion of dining-room and cottage, also eight workmen's dwellings. Mr. William Hurst, architect, Pontefract.

LARNE.—April 29.—For erection of National schools, Kilwaughter. Mr. Samuel P. Close, architect, 53 Waring Street, Belfast.

LEEDS.—April 21.—For erection of stone abutments and wing walls for steel bridge over the river near Rodley. Town clerk.

LEICESTER.—April 30.—For the construction of a concrete and stone bridge over the Leicestershire and Northamptonshire Union Canal and Flood Course, and for the formation of a new road from the Newarke to the Western Boulevard, together with a storm overflow, foul and storm-water sewers, and other works in connection therewith. Mr. E. Geo. Mawbey, C.E., borough surveyor, Town Hall, Leicester.

LLANGOLLEN.—April 26.—For erection of County School. Mr. H. Feather, architect, Andrew's Buildings, Queen Street, Cardiff.

MASBOROUGH.—April 16.—For erection of six dwelling-houses in Wortley Road. Mr. J. Axleby, architect and surveyor, Wilton Lane, Masborough.

MITCHAM.—April 21.—For erection of laundry, laundry-maid's house, baths for boys and infants' lavatories, at schools. Mr. C. E. Vaughan, architect, 25 Lowther Arcade, London, W.C.

NEWQUAY.—April 30.—For erection of the Headland Hotel. Mr. Silvanus Trevail, Truro.

PLYMOUTH.—April 22.—For rebuilding the Noah's Ark Inn, Saltash Street. Mr. B. Priestley Shires, architect, Central Exchange, Plymouth.

PLYMOUTH.—April 23.—For building a caretaker's house at Roborough reservoir. Mr. Edward Sandeman, Municipal Buildings.

PONTYPOOL.—For erection of a house and shop in Crane Street. Mr. Norman M. Brown, architect, Somerton Road, Newport.

PORT TALBOT.—April 26.—For erection of offices, for the Port Talbot Railway and Docks Company. Mr. Frank B. Smith, architect, Port Talbot.

PURSTON.—April 24.—For erection of three villas in Ackworth Road. Messrs. Garside & Keyworth, architects, Roper-gate, Pontefract.

REDRUTH.—April 24.—For erecting winding engine at the Basset Mines. Mr. Nicholas Trestrail, Redruth.

REDRUTH.—April 19.—For erection of laboratory and sundry other work. Mr. S. Hill, architect, Redruth.

RICHMOND.—April 26.—For construction of underground conveniences in George Street. Mr. J. H. Brierley, borough surveyor, Town Hall, Richmond.

RUNCORN.—May 3.—For erection of a new block of buildings in extension of the Victoria Road schools, 170 boys and 170 girls. Messrs. F. & G. Holme, architects, Westminster Chambers, Crosshall Street, Liverpool.

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SCOTLAND.—May 1.—For erection of a block of dwelling-houses in New Street, Dalgrain, Grangemouth. Mr. G. Deas Page, architect, Old Glebe Chambers, Falkirk.

SCOTLAND.—April 19.—For additions and alterations at the Combination Poorhouse, Eskbank. Mr. James Gray, banker, Dalkeith.

SOWERBY BRIDGE.—April 27.—For erection of Sowerby Bridge West-end new Sunday school. Mr. S. Wilkinson, architect, Sowerby Bridge.

ST. PANCRAS.—April 19.—For construction of a block of underground conveniences in Mansfield Road. Mr. William Nisbet Blair, surveyor, Vestry Hall.

SWANSEA.—April 17.—For construction of masonry, tanks, and other works at Gowerton. Mr. John Thomas, surveyor, 32 Fisher Street, Swansea.

SWINDON.—April 17.—For alterations and additions at the Kingshill Co-operative Society's premises. The Secretary, Beulah House, Victoria Road.

TREWESBURY.—April 20.—For erection of an isolation hospital, with roads and fencing, on a piece of ground near Tredington. Mr. James Villar, architect, 1A Cambray, Cheltenham.

WAKEFIELD.—April 23.—For erection of a dwelling-house in Stanley Road. Mr. Willie Wrigley, architect, 10 Wood Street, Wakefield.

WOKING.—April 22.—For constructing cast-iron, concrete and stoneware sewers. Messrs. John Taylor, Sons & Santo Crimp, 27 Great George Street, Westminster, S.W.

THE annual general meeting of the London and Lancashire Fire Insurance Company will be held at 12 o'clock noon on Thursday, April 29, at the Law Association Rooms, Cook Street, Liverpool.

ON the 26th inst. Messrs. Cassell & Co. will publish the first part of their new fine-art work, designed to celebrate Her Majesty's long reign, entitled "The Queen's Empire." The first part will deal with the government and administration of the Empire throughout the world, and subsequent parts will portray in the most realistic manner how the Queen and Her Majesty's subjects travel, "Work and Workers," "Play and Players," "Travel," the "Army and Navy," and every other feature of interest to Her Majesty's subjects all over the globe.

## TENDERS.

### ABERBEEG.

For erection of new offices, stores, &c., and rebuilding the Hanbury Arms Hotel. Messrs. SWASH & BAIN, architects, 3 Friars Chambers, Newport.

A. E. Parfitt . . . . .	£6,576	0	0
N. Bagley . . . . .	6,531	0	0
Williams & Thomas . . . . .	6,090	0	0
Powell & Mansfield . . . . .	6,054	0	0
Lawson & Co. . . . .	6,030	0	0
Turner & Son . . . . .	6,018	0	0
E. Mainwaring . . . . .	5,913	0	0
C. Lock . . . . .	5,825	0	0
W. A. Linton . . . . .	5,800	0	0
C. F. Morgan . . . . .	5,697	0	0
D. Lewis . . . . .	5,633	0	0
Horton & Co. . . . .	5,480	0	0

### ABERDEEN.

For the mason, carpenter, slater, plasterer, plumber and painter's work to epidemic hospital at Alford. Messrs. JAMES DUNCAN & SON, architects, Turriff.

#### Accepted tenders.

A. Grant, mason . . . . .	£467	10	0
A. & W. Hendry, carpenter . . . . .	270	0	0
J. Laing & Sons, plumber . . . . .	92	15	0
S. & W. Christie, slater . . . . .	82	10	0
R. Moir, plasterer . . . . .	61	0	0
Fraser, Hutton & Co., painter . . . . .	29	0	0

### ABERTILLERY.

For intermediate schools. Messrs. SWASH & BAIN, architects, Newport. Quantities by architects.

#### Amended tenders.

Turner & Sons . . . . .	£2,288	0	0
D. LEWIS, Llanhilleth, Mon. (accepted) . . . . .	2,267	0	0

### ASTON MANOR.

For works, &c., for the Urban District Council. Mr. H. RICHARDSON, surveyor.

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W. Heaps, improvement of Witton Lane, £885.  
G. Trentham, Handsworth, construction of drainage works.  
Fowler & Co., Leeds, 12-ton steam-roller and scarifier.  
Browett & Lindley, new engine and dynamo.  
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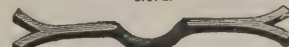
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J. Shaw, plasterer.  
H. Ashworth, plumber and glazier.  
C. Bridge, painter.

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T. Rowbotham	3,580	0	0
Sapcote & Sons	3,498	0	0
J. Webb & Co.	3,447	0	0
W. Robinson	3,350	0	0
W. Hopkins	3,195	0	0

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For erection of a Welsh Independent chapel. Messrs. GRIFFITH & JONES, architects, Pontypridd and Tony-pandy.

RATTRAY & JENKINS, Pontycymmer (accepted) £1,698 0 0

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For additions and alterations to The Platt. Mr. ARTHUR VERNON, architect, 29 Cockspur Street, London.

Cox	£875	0	0
Silver	782	0	0
Lovell	774	0	0
GIBSON, High Wycombe (accepted)	724	10	0

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For completing Ashmore House. Messrs. CORFUT & BOULDING, architects.

Read	£1,697	0	0
Grist	1,618	0	0
Mitchell	1,478	0	0
Walker	1,448	0	0
E. Houghton & Son, Stroud Green	1,364	0	0

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For erection of new entrance gates, notice board, and other work at the public bathing place, Colne Bank Road. Mr. HERBERT GOODYEAR, borough surveyor.

S. Start	£36	16	3
A. Diss	33	12	0
G. FARREN, Osborne Street (accepted)	28	0	0

For erection of an additional kitchen and bedroom at the superintendent's lodge, Colchester Cemetery. Mr. HERBERT GOODYEAR, borough surveyor.

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G. Farren	122	0	5
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G. Sansom	109	0	0
A. DISS, Stanwell Street (accepted)	103	7	6

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J. & J. Bell, Coniston, joiner.

H. B. Armstrong, Windermere, plasterer.  
Redhead, Coniston, plumber and painter.

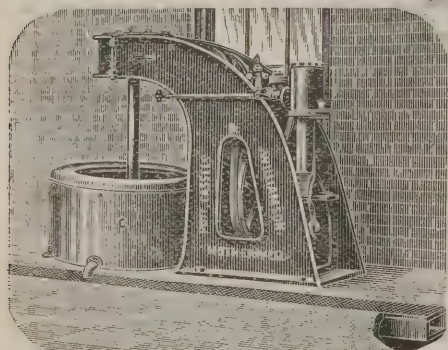
### DEWSBURY.

For erection of six houses in North Park Street. Messrs. C. H. MARRIOTT & SON, surveyors, West Park Street, Dewsbury.

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W. H. Clegg, Dewsbury, carpenter and joiner	£490	0	0
J. Snowden & Son, Ossett, plumber and glazier	225	0	0
J. Lockwood, Staincliffe, plasterer	130	0	0
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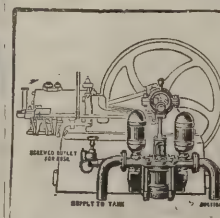
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For the erection of a detached residence, London Road. Mr. THOMAS J. HILL, architect, Church Street, Stoke Newington.	
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## KINGSTON-ON-THAMES.

For erecting laboratory, lecture-room, &c., at the Kingston Grammar School for Boys. Mr. E. CARTER, architect, Kingston.

G. F. Howell, Kingston-on-Thames	£698	0	0
Oldridge & Sons, Kingston-on-Thames	679	0	0
W. H. Gaze, Kingston-on-Thames	647	0	0

## KIRKBY STEPHEN.

For erection of model farm buildings. Mr. ROBERT WALKER, architect, Windermere.

T. Brockbank, mason.  
Smith & Bonner, joiner.  
Brunskill & Nicholson, plumbing and painting.

## LEEK.

For additions and alterations to 2 and 3 Market Place. Mr. J. MYATT, town surveyor.

G. Hine	£363	0	0
T. Grace	350	0	0
J. & J. Mathews	347	0	0
J. Fielding	345	0	0
J. Heath	329	10	0
Heath & Lowe	303	10	0
Bayley & Morris	302	16	0
S. Salt	302	0	0
T. MACKRELL (accepted)	293	0	0

## LONDON.

For iron workshop, for Kensington Institute for Blind.

KILLEP & Co. (accepted)	£173	0	0
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## LONDON SCHOOL BOARD.

For supply of tray cupboards on a running contract, Thomas Street.

E. Spencer & Co.	each £11	0	0
G. M. Hammer & Co.	7	10	6
Illingworth, Ingham & Co.	6	17	0
Rice & Son	6	16	0
H. Bouneau	5	18	0
J. Garvie & Sons	5	17	10
H. ADDISON & Co. (accepted)	5	0	0

For interior painting, Divisional Offices, Richard Street.

T. Nicholson	£135	0	0
F. Newton	124	5	7
G. S. S. Williams & Son	114	0	0
W. Irwin	113	10	0
R. E. Clarke	105	0	0
Stevens Bros.	104	0	0
Marchant & Hirst	99	10	0
Staines & Son	89	0	0
H. EADY (accepted)	79	0	0

For exterior painting and interior cleaning, Brentwood Industrial School.

S. H. Corfield	£308	0	0
Hammond & Son	299	5	0
J. T. ROBEY (accepted)	290	0	0

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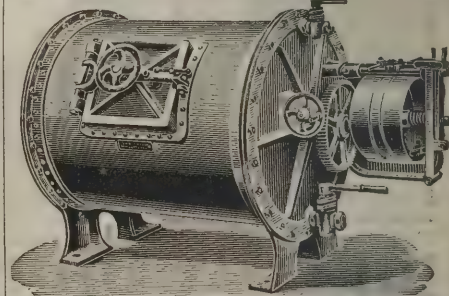
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For supply of slow combustion stoves, Thomas Street.

Coalbrookdale Company . . . . .	£1 14 0
Ashton & Green . . . . .	1 7 5
HOPE FOUNDRY COMPANY (accepted) . . . . .	1 6 3
O'Brien, Thomas & Co. . . . .	1 5 6
G. Portway & Son . . . . .	1 4 6
G. Wright & Co. . . . .	1 2 6
Falkirk Iron Company . . . . .	0 18 9
McDowall, Stevens & Co. . . . .	0 18 0
Hope Foundry Company . . . . .	0 17 1
Hope Foundry Company . . . . .	0 14 10
Carron Company . . . . .	0 14 5
British Foundry Company . . . . .	0 14 3

## MILL HILL.

For cottage home scheme of the Linen and Woollen Drapers' Institution (first contract). Mr. GEORGE HORNBLOWER, architect, London, W.

WILLIAM TOUT, Hendon (accepted) . . . . . £12,468 0 0

## ST. GEORGE-IN-THE-EAST.

For alterations to laundry at workhouse.

General Builders, Limited . . . . .	£1,280 0 0
J. H. Johnson . . . . .	1,213 0 0
Little & Senecal . . . . .	1,105 0 0
Ransom . . . . .	1,047 0 0
Sparks & Son . . . . .	1,038 0 0
Wall . . . . .	1,022 0 0

## ST. GEORGE-THE-MARTYR.

For erection of a reception house and caretaker's house in King James Street, Southwark, for the Vestry. Mr. OLIVER ERNEST WINTER, surveyor.

J. CARMICHAEL, Wandsworth (accepted) . . . . . £1,714 0 0

## WEETON.

For erection of a farmhouse and outbuildings at Huby, near Weeton Station. Mr. W. H. BEEVERS, architect, 25 Bond Street, Leeds.

## Accepted tenders.

J. & W. Dickinson, mason and brick . . . . .	£372 10 0
H. & A. Thomas, joiner . . . . .	160 0 0
R. Hartley, slater . . . . .	61 0 0
Mountain & Son, plasterer . . . . .	55 0 0
Helmsley, plumber . . . . .	26 0 0
G. Thompson, painter . . . . .	12 10 0

## CRYSTAL PALACE SCHOOL OF ART.

FOR more than a generation past the Crystal Palace Company have done excellent work in the art education of the people, but during that period they have been engaged in a work of education which has not been seen by the public at large, but its value will be appreciated by a perusal of the following report of the Crystal Palace Company's School of Art, Science and Literature (thirty-seventh session), School of Practical Engineering, of which Mr. J. W. Wilson, M.Inst.C.E., M.Inst.M.E., F.R.C.I., is principal. The following is the examiners' report for the Easter term, 1897:—

Mr. J. W. Helps, A.M.I.C.E., F.C.S., says:—

It has given me much pleasure to accept the invitation given me to conduct the examination of the students of this school in mechanical engineering, and to examine the work done by them during the past term, and especially so as it has given me an opportunity of observing the excellent lines upon which the educational system is based. The papers worked by the students give evidence of careful attention to the lecturers, and in some instances of considerable ability. Many of the drawings are executed with great neatness, and give promise of good results. I was especially struck with what was shown me in the pattern shop, several of the students having produced work which would not disgrace a trained pattern maker. The work in the fitting shop, though perhaps not quite so high in class, is in many instances well and carefully executed.

Mr. George James Furness, A.M.I.C.E., M.S.E., says:—I have had the honour of examining the students of the civil engineering section of the Crystal Palace Engineering School. The students made uniformly good answers to all the questions asked in the *visû voce* examination, and expressed themselves clearly, showing the thorough grounding they have had in all matters during the course. The drawings and calculations done both in the examination and during the term are excellent generally, and there is no doubt whatsoever that the training gives students decidedly a great advantage in starting out in actual practice in the profession.

## VARIETIES.

THE Norwich and London Accident Insurance Association will remove into new offices at 13 Waterloo Place, Pall Mall (as their West End offices), as soon as the necessary alterations, decorations, &c., are completed. The electric-lighting installation is being done by Mr. T. King, of 40 Week Street, Maid-

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stone; the fittings by Mr. B. E. Nightingale, of Albert Works, Albert Embankment, Lambeth; the fascia lettering by Messrs. Clarkson Bros., of Charing Cross Road; and builder's work by Mr. H. S. Stephens, of 228 New North Road, under the superintendence of Mr. Alfred E. Nightingale, architect, 52 Queen Victoria Street, E.C.

THE directors of the Metropolitan Railway Company are contemplating the carrying out of a much needed improvement which involves the entire reconstruction of their King's Cross station. The extremely inconvenient arrangement of this station has long been very prejudicial to the traffic on the line, and though nothing has as yet been definitely decided on, the probability is that as great an improvement will be effected at King's Cross as that which has now been practically completed at Moorgate Street. Great changes in many ways have taken place since this important station was planned, and it has become quite out of date and wholly inadequate to the traffic. It will be troublesome and expensive work to carry out so extensive a reconstruction with many hundreds of trains rushing in and out of the station all day long, but it will hardly be more serious an undertaking than Moorgate Street, and sooner or later it will have to be done. Mr. Sherrin, the company's architect, has prepared plans and constructed a model for the consideration of the directors, and it is expected that in a week or two's time their decision will be arrived at.

### TRADE NOTES.

THE National Schools, Tregarth, North Wales, are being warmed and ventilated by means of Shorland's patent Manchester stoves and patent Manchester grates, supplied by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. "CHARLES CARR," of Smethwick, are sending out to members of the clergy a gorgeously illuminated circular drawing attention to the fitness of the present year as an occasion for placing bells in the towers of churches where there are none at present, or for supplementing, recasting or re-hanging existing ones, and they take advantage of the opportunity given by the circular to mention that they have taken into their employ John Buffery (twenty-three years member of St. Martin's Society, Birmingham), the well-known and efficient bell-hanger of the Midland and Northern Counties and North and South Wales.

### BUILDING AND BUILDERS.

A NEW Congregational church is to be erected in Radnor Park, Folkestone, on a site presented by the Earl of Radnor.

THE Duchess of Teck on the 10th inst. laid the foundation-stone of the permanent church of St. Michael's, Southfields, Wandsworth.

MEMORIAL-STONES of the new Liberal club at Ovenden were laid on the 10th inst.

LEXDEN PARK HOUSE is undergoing repairs and redecoration, &c., for Sir A. E. Grant Duff. Messrs. H. & J. Joslin have secured the contract. Messrs. Baker & May, of Colchester, are the architects.

IT has been decided to accept the tender of Mr. George Duncan, 47 Dixon Avenue, Glasgow, for rebuilding and widening Howford Bridge, near Paisley, the amount being 2,574*l.* 17*s.* 3*d.*

MR. ALFRED SHUTTLEWORTH has given a site, valued at over 1,100*l.*, for a new mission church at Lincoln, and 500*l.* towards a mission hall to be used until a permanent church can be built.

AT Mundesley-on-Sea, in the North Walsham and Cromer circuit, the Wesleyan Methodists have decided to erect a new chapel to seat 250 persons, at a cost of 850*l.*, to meet the needs of this rapidly rising east coast watering-place.

ON Saturday afternoon, at the Royal Hospital, Chelsea, the Duke of Cambridge unveiled a tablet to the memory of the late Field-Marshal Sir Patrick Grant, which has been placed in the corridor south of the hospital chapel. The tablet is in a very prominent position in the corridor, and under the bust is a record of the many actions in which General Grant took part.

THE restoration of the exterior of Thirsk parish church has been commenced on the south aisle. The restoration, which is calculated to cost 2,000*l.*, is expected to extend over two years. The interior was restored in 1876 and 1877, and reopened for service in October 1878. Mr. Carnforth, who has for many years been engaged on the exterior of York Minster, is the clerk of the works.

THE memorial-stone of the Hamilton Young Men's Christian Association Institute was laid on Saturday afternoon. The building, which has been designed by Mr. Alexander Cullen, F.S.A., architect, is situated in Gateside Street, and will consist of a structure three storeys high, the first two floors being devoted to the uses of the Association, while the upper flat

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**MESSRS. B. FINCH & CO., Ltd.,** 82 Belvedere Road, Lambeth, S.E., Manufacturing Sanitary Engineers, beg to remind Architects, Surveyors, and Builders that they undertake High-class Plumbing. They are prepared to Estimate on a schedule of prices, and they can refer the profession and others to large Plumbing Contracts recently executed by them both in London and the Provinces, amongst others to the Trocadero Restaurant, Piccadilly Circus. Messrs. FINCH & Co. have in their constant employ a large staff of registered plumbers. Architects and others can rely upon the work being executed with efficiency and despatch.

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will be let as dwelling-houses. The complete design shows a gymnasium and large hall to the rear.

THE foundation stone of a Liberal club, which is in course of erection at Halifax, was laid on the 10th inst. The plans of the new premises, which are to comprise a billiard-room for three tables, news-room, committee-rooms and an assembly-room, the assembly-room to afford accommodation for 400 persons, were prepared by Mr. M. Hall, architect, of Halifax. The estimated cost is 1,600*l.*, and to this is to be added about 400*l.*, which will be necessary to meet the expenses of furnishing, making a total of 2,000*l.*

THE Nottingham Constitutional Club, the foundation stone of which was laid on the 7th inst. with considerable pomp and circumstance, will be, when completed, of a comprehensive and comfortable character. The principal entrance will be in Market Street, and will lead to a large central hall, from which will be entered a fine smoking-room and billiard-room for three tables. From the hall a stone staircase gives access to a large dining-room, capable of dining about eighty people, with an imposing circular oriel window and balconies commanding a view the full length of Market Street. A private dining-room, committee-room, card-rooms, reading-room, with writing-room adjoining, are also to be provided on the first floor. The second floor will contain bedrooms for members, bath, stewards' rooms, the necessary culinary departments and other offices. A skittle alley is to be provided. Facing Rigley's Yard, and on the ground floor, will be placed a large assembly hall to accommodate from 350 to 400 people, with the necessary retiring-rooms. Although entered from the central hall of the building the assembly-room may be used quite independently of the club by an entrance from Rigley's Yard. The registration offices are also to be approached from Rigley's Yard. It is intended to construct the building of fireproof materials, and to light the premises throughout with electricity. The Market Street front is to be entirely of stone, and the style of architecture adopted is Renaissance. The principal feature will be the large gable and the circular oriel window and balconies of the large dining-room. The architect is Mr. A. R. Calvert, 18 Low Pavement, Nottingham, who obtained the work in competition.

A BRASS memorial tablet to the memory of the late Canon Harper has been fixed on the west wall of the north transept of Selby Abbey.

## MESSRS. WATSON & SONS.

WE recently had an opportunity to pay a very interesting visit to the works of Messrs. Watson & Sons, opticians to H.M. Government, and manufacturers of all that pertains to photography, of 313 High Holborn, W.C., and 9 to 17 Fulwood's Rents, where their premises provide 24,000 square feet of space, and where they have laid down the most modern and approved machinery for wood-working and for the successful carrying out of the various details of their large and comprehensive trade. One of the latest novelties introduced by this enterprising firm, and one of which they have the exclusive rights, is their Motorgraph, which has all the efficacy of the apparatus known as the Cinematograph or Animatograph, and can be produced at infinitely less expense. In fact, it fulfils all the requisite conditions at an exceedingly moderate cost, and will yield effects equal in every way to those produced by the most costly apparatus, and is in many respects, especially in freedom from vibration and simplicity combined with strength of construction, superior to the majority of them.

The motorgraph can be arranged for use as a photographic machine without interfering with its efficiency for projection, and it is then one of the most compact instruments yet designed. It is only necessary that certain light-tight partitions be placed inside the case, a box carrying the film to be exposed fitted to the top of the casing of the apparatus, and a receptacle in which the exposed film may be wound upon a spool after exposure attached to the under portion of the box, so that the amateur can take photographs of any scenes which may interest him, and, having developed them, or, if he prefers it, having got them developed by Messrs. Watson & Sons, can show them to his friends by means of an ordinary magic-lantern. Messrs. Watson & Sons have also devoted considerable attention to the perfection of their apparatus for producing effects with Röntgen's X rays. In this connection we may perhaps mention that, in addition to the manufacture and sale of all the instruments necessary to this interesting branch of science, Messrs. Watson & Sons are acting as radiographers to two large London hospitals, and naturally the extensive experience thus gained, coupled with the suggestions of many of the most successful workers, place them in an unique position in being qualified to advise customers as to their choice of apparatus for various classes of work, and in being able to test in the most thorough manner and to absolutely guarantee all

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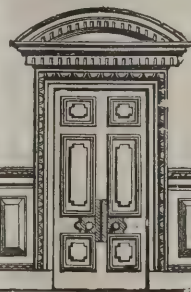
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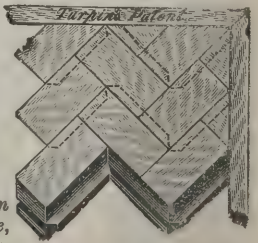
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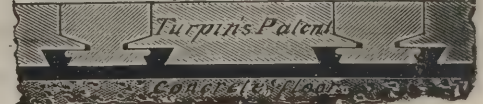
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"I think I am justified in asking you to kindly give me an answer upon the above points before I reply definitely to the request contained in your letter of January 11, 1897."

On January 16 the clerk wrote intimating that the special committee had nothing to add upon the matter, as they understood Mr. Holloway did not desire to avail himself of the opportunity of appearing before them. After an answer from Mr. Holloway pointing out that he was desirous of offering every explanation which the committee might require, providing the terms contained in his former letter were conceded, the clerk wrote on behalf of the special committee:—"I am directed by the special committee to inform you that while the committee do not require your evidence, they are willing to give you the opportunity of attending should you desire to do so, and in such case access to books and other documents will be afforded you."

On January 25 Mr. Holloway wrote:—"I am extremely desirous that all the true facts in connection with the operations of the Works Department should be laid before the committee and should be quite willing to attend for such purpose, but I do not find it possible or advisable to do so without being properly legally represented and without first receiving the assurance asked for by me in my letter to you of the 14th inst. Up to the present moment the various topics dealt with by me in such letter have never been answered or even referred to by you or anyone acting on behalf of the Council."

On January 28 the clerk of the Council wrote:—"I have been directed to inform you that the committee is willing to receive from you any evidence you desire to give, but that inasmuch as you are no longer in the Council's service, the committee is not in a position to require your attendance. Should you desire to avail yourself of the opportunity afforded to you to attend, the committee will place no obstacle in the way of your being legally represented, although it does not appear to the committee that such legal representation is necessary."

"The only other observation the committee has to make with regard to the assurances for which you ask is as to your being indemnified against all reasonable costs and expenses which you might have to bear by reason of your attendance. The committee do not agree as to the necessity for such an assurance, but they have requested me to remind you that power has been given to the committee to make an allowance to witnesses to meet expenses incurred by them in attending to give evidence."

To this Mr. Holloway answered:—

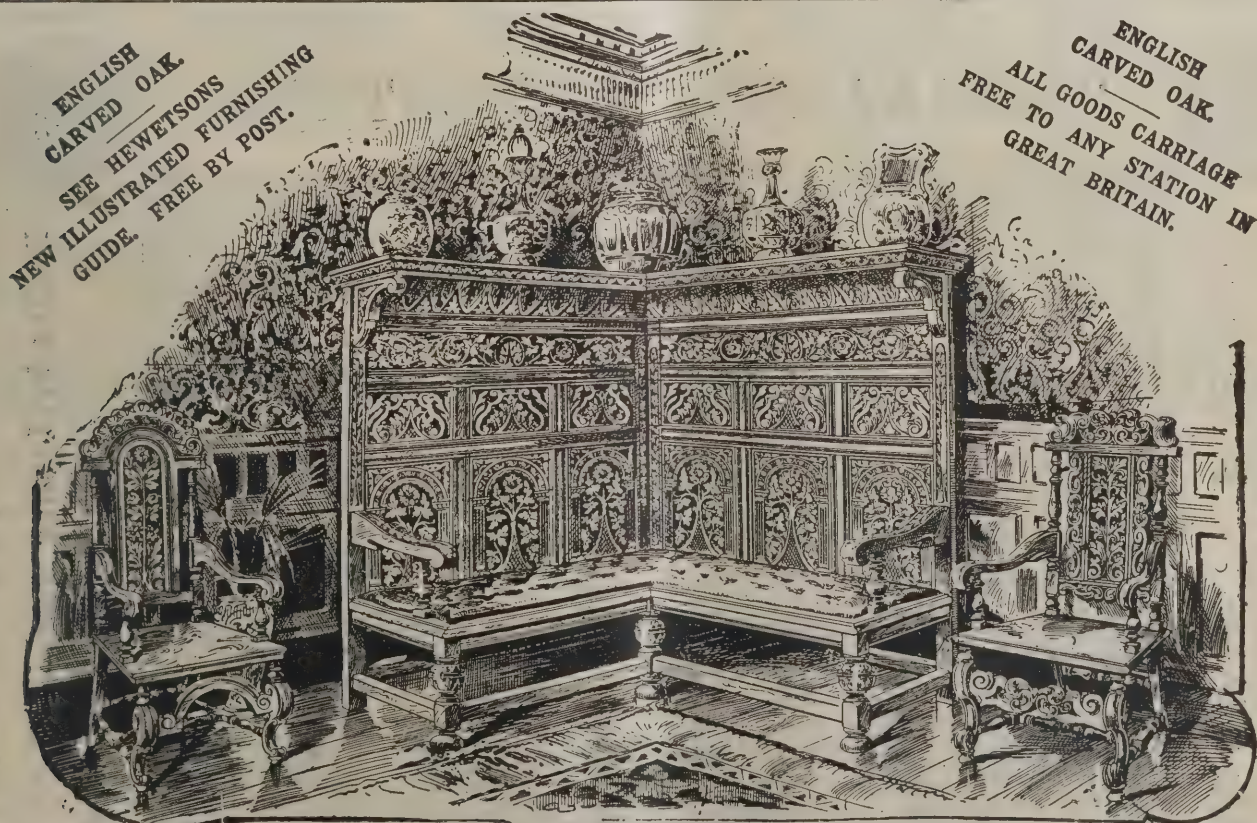
"I am in receipt of your letter of January 28, 1897, for which I thank you, and shall be glad to call upon you with reference to the allowance which the Council will be prepared to make to me to cover loss of time and reasonable legal expenses. Before, however, doing so I should be glad if you would inform me whether my legal representative would be permitted by the Council to cross-examine on my behalf such witnesses as I may think necessary to submit to cross-examination. In stipulating that I should be legally represented my principal object was that the witnesses who have already given evidence before the sub-committee and the present committee, and those who are to give evidence before the present committee affecting me, should be thoroughly cross-examined on my behalf with a view to eliciting the truth."

On February 4 the clerk wrote declining, on behalf of the committee, to accede to Mr. Holloway's request with reference to the cross-examination of witnesses, and the correspondence closed with a letter from Mr. Holloway dated February 8, in which he says:—

"I am in receipt of your letter of the 4th inst., in which you inform me that the special committee refuses to allow witnesses to be cross-examined on my behalf before the committee. My principal object in offering to attend before the committee and stipulating that I should be legally represented was that the true facts might be elicited as to the past operations of the Works Department and my conduct as its manager. Seeing, however, that my legal representative is to be prohibited from rendering any professional assistance in such direction, his attendance before the special committee would be futile, and would simply be reduced to an expensive and useless formality. Under these circumstances I have no alternative left to me but to respectfully decline to attend before the special committee under the conditions laid down by your letter of February 4."

### A NEW ELECTRIC ACCUMULATOR.

WITHIN the last few years there have been many new accumulator cells introduced, more particularly for the running of tram-cars, and, later, motor-cars. The older forms of accumulator, although good for stationary work, will not withstand the very severe conditions of tramway working, and the still worse conditions in motor-cars. The object of inventors has been,



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and is, to reduce the weight, increase the discharge rate and the capacity per pound weight of cell, and to construct an accumulator which will stand the heavy strains while starting the cars, also the vibration and washing action. The accumulator under discussion is the invention of Herr Paul Ribbe, and it is designed chiefly for tramway working.

An invitation was received by several engineers and representatives of the press to witness the trial of a tramcar fitted with these accumulators, at the dépôt of the London, Deptford and Greenwich Tramway Company, at Lower Road, Deptford, on Tuesday, April 6.

The car, which has been brought from Germany, is a very finely appointed one, arranged for inside passengers only. It is fitted with the electric light, and is most comfortable in every way. The car could not be run on the roads, it was explained, because the County Council had not yet sanctioned it, but it was hoped that it would be running very soon.

However, about 20 yards of straight track in the tramway shed was utilised and the car ran along this. It is to be regretted that a more extensive trial was not possible, as very little idea could be obtained of its behaviour under working conditions with curves and gradients. It was also explained that the car is constructed for a track with slight curves only, and as the curves on the London, Deptford, and Greenwich Tramway are very severe, this is, no doubt, the real reason why the car was not run on the road.

The electrodes are constructed in the following manner:—The grid or conducting support is of lead, which appears to be about  $\frac{3}{4}$  to 1 lb. weight to the square foot. This grid is perforated by vertical slits which are about  $1\frac{1}{2}$  inches long, and there are cross pieces of solid lead at distances of roughly about  $1\frac{3}{4}$  inches. The grid is covered on both sides with flat vertical ribs of celluloid of about  $\frac{1}{15}$  inch in breadth, which have trapezoidal or conical cross sections, so as to divide the surface of the plate into long thin rectangles. The whole is then pasted on both sides, the paste being level with the vertical ribs of celluloid. The object of these ribs, together with the perforations in the grid, is to keep the paste in contact with the conducting grid. To provide, however, against the possibility of the ribs not being sufficient, a thin perforated sheet is cemented to the free surfaces, for the purpose of keeping the paste in contact with the grid should it become loose. It is, however, well recognised amongst accumulator experts that when the active material of the plates becomes loose, or even partially detached, there is a bad contact between it and the grid, and it is worse than useless.

Every time the battery is charged these partially detached pieces are not charged fully, and consequently if the cell is allowed to stand, a local current is set up between the fully-charged and the imperfectly-charged material; thus the plate is in the course of a day or two discharged to some extent by local action, and the efficiency and capacity is reduced. The high resistance between the grid and the detached piece will not prevent a small local current flowing for several hours. The inventor of this plate appears, however, to think that the vertical ribs will keep the paste on the grid, and that if they do not the perforated celluloid will do so.

A piece of celluloid is not stiff enough to resist molecular forces, and it cannot exert sufficient pressure to make a good contact between the detached paste and the grid.

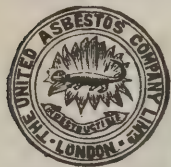
As far as the shedding of the material in the form of powder is concerned, the perforated celluloid will not prevent this, although it will keep large pieces of detached material from short-circuiting the plates. This is done in other plates by placing sheets of perforated celluloid on the faces of one of the plates, say the positive.

A weak point in this cell is the very thin lead sheet used as the grid or support for the positive plate. It is claimed that as the grid is completely covered by paste and the celluloid ribs, that there can be no local action on the grid, and that it will not be eaten away. Past experience has shown that by reducing the thickness of grid the capacity per pound is undoubtedly raised, but in that case the life of a battery cannot be long. It is also to be noticed that no mention of the life of the plate is made in the descriptive circular that was distributed, but a statement to the effect that the action upon the grid is less in this than in other plates.

There is a large amount of celluloid in these accumulators, even the containing-box being of that material; but there is no objection to its use if specially prepared, although the present cost is high.

The battery in the car consists of 140 cells, each having seven negative and six positive plates 8 inches broad and 12 inches high, and it is stated to have a capacity of 81 kilowatt hours (at what rate of discharge was not mentioned). The battery is supposed to run the car 20 hours, i.e. 4 horse-power average on the motor for 20 hours. The motor was said to be of 40 horse-power, but this seems high. The weight of the battery was given as 2 tons 15 cwt., and it is charged in position underneath the seats of the car. It was to be regretted that almost everyone connected with the battery had a very

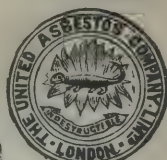
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limited command of the English language, and information was only attainable under difficulties, but these gentlemen spared no pains to give information, and were remarkably courteous under very trying circumstances.

Mr. Carruthers Wain (chairman of the Tramways Institute) proposed the success of the battery and the inventors.

The tramway shed was tastefully decorated, and the visitors were very well received and provided for.

### PRACTICAL PLUMBERS' WORK.

MR. J. WRIGHT CLARKE prefaced his lecture on this subject at the Carpenters' Hall on the 24th ult. by stating that the impossibility of doing several examples of plumbers' work within a reasonable time prevented a practical demonstration of work being actually done in the hall. Most lectures on plumbing were confined to sanitary matters. This lecture would deal chiefly with other details of plumbing work in connection with buildings, beginning with the ridge of the roof, which in olden times was simply covered by a piece of lead fastened on as a saddle-piece. The wind got under this, and now a roll of wood is used, undercut in such a way that the lead can be clasped on to it. If the wooden roll is fixed too low down the lead has no proper grip, and in dressing the lead the slates are unduly pressed in at the top, and more liable to be broken. In fixing the ridge, it should look straight. Where the lead laps occur the wood of the roll must be cut away and the lead recessed, or the lap will form a bump. Flashing is the term applied to the lead let into walls where roofs or gutters join them. It is not enough merely to rake out the joint where the lead is to go, but every joint should then have a little cement put in sloping outward. The flashing is then fixed in the joint by means of wedges, which should always be of lead. Wooden wedges should never be used. Rain swells the wood and loosens the work, and when dry the wedges fall out. In using flashing with a tiled or slated roof the commonest way is to have the lead over the slates or tiles, but this permits the wind to turn up the lead or blow water under. As the slates have a fillet of wood or tilting piece to throw the water off, there is also a greater probability of a plumber breaking the slates when dressing the lead. When the flashing is fixed under the slates what is termed a "secret gutter" is generally formed. The lead is dressed down into a hollow in the wood,

and inside the secret gutter so formed the lead has a fold or "welt" on the edge under the slates. This method is not nearly so good as that of fixing with each row of slates a piece of lead termed a soaker, which is turned up the side of the wall. It is usual to put over these soakers a strip of lead or "cover flashing." The best method, and one which many architects prefer, is to have the soakers large enough to permit of each soaker being step-flashed into the wall. A similar provision can be used for hip roofs. For tiled roofs purpose made tile hips can be used, but with slates lead or some other metal is necessary. When a roll is used for hips the lead should be in short lengths, in order to avoid having too great a weight depending from one fixing point. If it is desired to hide the lead on the hips this can be done by using soakers worked over the hips with each row of slates.

Owing to the expansion and contraction of lead by changes of temperature it cannot be fixed in indefinite lengths. The expansion produced by even one degree of heat is considerable, and if laid in great lengths lead would become warped, distorted and torn away from its original position. No lead gutters or flats should have more than 7 or 8 feet in one length. Where these lengths join it is customary to have a so-called "drip," or change from a higher to a lower level. This drip is generally far too shallow. In a great number of cases if you turn up the upper lead, or "over-cloak," the wood underneath will be found rotten. This is caused by the water drawn in by capillary attraction. Water near to any two surfaces which nearly touch is drawn up a certain distance, as in the case of the laps in the glass of a skylight, and if the lap is too narrow leaks into the house. To prevent this in the case of roofs and gutters there should be a standing rule to have no drips less than 2 inches deep. It would be still better to make them 2½ inches. The seam roll used in old roofs and the various methods of dealing with "torus" and other wooden rolls in modern roofing were illustrated by the aid of diagrams. "Cesspool" is a curious term in connection with a roof; but, technically, it is the term applied to where the rain-water is collected. To prevent the outgo of this cesspool being choked with leaves, it is usual to have a small circular grating which fits into the outgo. Such a grating means money ill-spent. Either it gets swept away or it does more harm than good by becoming easily choked and causing the house to be flooded. A proper grating should be the full size of the cesspool, and strong enough for a sweep to walk upon. In dormer windows the lead is sometimes fixed to the cill. This is wrong. The lead

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should be under the cill, fixed before the window-frame, and turned up inside. This is also the proper method with a lantern light, but in this case the lead turned up inside is made to form a condensation-gutter. Channels are provided to carry off the moisture, but these channels must not be large enough to admit snow in winter or blacks in summer. The sides of dormers are sometimes fixed by "solder dots," that is, a dot of solder covering the head of a screw or nail. This is a poor, wretched way of doing, and sooner or later the pull and thrust of the lead will break the dots. It can be fixed firmly enough without dots. With trap-doors or skylights care should be taken to have the upper side forming an acute angle with the roof. If the angle is too easy the rain rushing down runs up under the skylight or trap-door and into the house.

Referring to the various qualities of lead as indicated by the number of pounds each square foot weighs, the lecturer said the quality insisted on by sanitary authorities must only be regarded as the minimum quality. Good engineers and architects use heavier qualities. Ten pounds lead is used for 3-inch, 3½-inch or 4-inch soil-pipes; that is, nearly half as thick again as the 7 lbs. required by London County Council regulations. A copper bit-joint is never made by a plumber; a wiped joint is the right one. Square junctions are bad; all junctions should have an easy bend in the direction of the flow. Soil-pipes must have adequate fixing to carry the weight. In some cases three-quarters of an hundredweight of lead is found hanging on two nails. If the soil-pipe slips down it drags the trap out of shape, it no longer acts as a seal and poisonous gas may escape into the house. In joining lead soil-pipes to stoneware or iron drain-pipes a brass ferrule or thimble is soldered on to the lead. This is fixed to the stoneware by a cement joint, or to the iron by a caulked lead joint.

The bottoms of sinks should have a fall towards the outlet, which should be as near to the waste-pipe as possible, and the trap should be close to the sink. The sink should be fixed on cantilevers in order to keep the space under as clear and clean as possible. Cases, however, occur when a client who resolves to be decidedly sanitary in his first arrangements subsequently calls in a man round the corner to make an enclosure under the sink, which becomes a receptacle for very unsanitary oddments. To meet the wishes of those who dislike the appearance of round soil-pipes on their façades square pipes have been introduced having internal rounded angles. Round pipes are, however, the best, because they are more thoroughly cleansed by the scouring action of the flow.

Alderman Sir Stuart Knill, in moving the usual vote of thanks, said he had probably been asked to preside on this occasion because of his connection with the Plumbers' Company and with the work of that Company in endeavouring to restore the reputation of the plumber's craft to what it was in olden times, when every craftsman was an artist and took a delight in his work. The craft of the plumber holds a creditable place in history, and once included working in tin under the term "Plumbing album." Phœnicians and Romans came to this country for both lead and tin. Pigs of lead are found bearing the names of Roman emperors, and in hypocausts and other ancient works we have leadwork beautifully ornamented. Lead has been treated so artistically as to earn the name of golden work. Like most badges, that of the Plumbers' Company is gold, but the fine Tudor rose worked upon it is lead. It will be remembered, too, that Shakespeare, in the "Merchant of Venice," exalts the caskets of lead above the caskets of gold and silver. In these lectures the Carpenters' Company were endeavouring to make every artisan take a real interest in his trade, and to show him that true craftsmanship was a valuable acquisition, of which the owner might be justifiably proud.

### RAILWAY CONSTRUCTION IN NEW ZEALAND.

THE following standard specification is used for co-operative contracts on Government railways, New Zealand.

#### *Materials and Workmanship.*

1. Except where otherwise specified all the workmanship and all materials used under this contract, when supplied by the co-operative contractors, shall be of the following kinds and descriptions:—

Sand for mortar and concrete shall be clean, sharp, washed sand, free from soil, clay or vegetable matter. Shingle for concrete shall be fine, clean-washed shingle free from soil or clay; no piece shall be larger than 2½ inches in any dimensions, and it shall not contain more than 5 per cent. of its bulk of sand. Broken stone for concrete shall be of hard tough stone, clean and broken to 2½-inch gauge.

Metal shall be hard tough broken stone, of approved quality; no piece to be larger than will pass through a 2½-inch ring.

Concrete shall be composed of one part of cement to six parts of shingle or broken stone and two parts of sand, gauged by measure in a box of approved shape, and turned twice



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together while dry and once wet before being deposited. The concrete shall be used immediately upon being mixed, and kept wet until set. Concrete shall be deposited in layers not exceeding 12 inches in thickness, and well rammed. No layer shall be deposited before the preceding one has properly set. When laid in water such precautions as the resident engineer may approve shall be taken to prevent the cement washing out.

All concrete face-work shall be finished off with a  $\frac{1}{4}$ -inch coat of cement mortar, laid smoothly and evenly.

Mortar shall be of three parts of sand to one of cement, gauged by measure.

The components of mortar and concrete shall be gauged and mixed in the presence of the overseer.

Brickwork shall be laid to English bond, joints not to exceed  $\frac{1}{4}$  inch in thickness; it shall be set in cement mortar and neatly pointed. Bricks shall be properly bedded in mortar, and not laid dry under the plea of being afterwards grouted; they shall be kept properly wetted during laying.

Rubble masonry shall be set in mortar; it shall be well bonded and levelled every 12 inches or 18 inches in height. Walls 2 feet 6 inches thick and under shall have one through header for every superficial yard of face, header not to exceed 12 inches in height; walls over 2 feet 6 inches thick to have one 2 feet 6 inch header, not more than 12 inches high, to each superficial yard of face and back.

Ashlar masonry shall be axe-dressed, or sawn on beds and joints and rock-faced in front. The beds and joints shall be truly square to each other and to the face. The work shall be laid in courses and truly level. The courses shall be at least 12 inches thick. Walls 2 feet 6 inches thick and under to have one through header to each superficial yard of face; walls over 2 feet 6 inches thick to have one header at least 2 feet 6 inches long to each superficial yard of face and back. No stone to be greater in height than in breadth. All face-stones to have  $\frac{1}{2}$ -inch chisel-draft around the angles.

Culverts, drains and other structure of every kind shall be founded on firm and sound strata, and excavations shall be made to such depths and of such dimensions as the resident engineer may consider necessary to obtain the proper stability and sufficient bearing-area. Excavated materials shall be filled in and well rammed around the foundations when laid; the surplus shall be removed as directed.

Arch-face stones for rubble masonry shall be axe-dressed or sawn on the beds and joints, with rustic face and chisel-drafts

around all the angles. The arch-face stones to be the full depth of the arch, and properly bonded with the inner work. All beds and joints shall be truly square or radial, as may be required. Coping shall consist of flat stones on edge set in cement mortar, and shall be finished off in a workmanlike manner to such form as the resident engineer may direct.

All stone used in masonry shall be laid on its natural bed; it shall be of a kind and quality approved by the resident engineer.

The joints in rubble masonry shall be raked out and neatly pointed.

The 12-inch and other drain-pipes will be supplied by the Government and delivered to the contractors along the road at points as nearly as possible opposite to where they are required to be inserted. The contractors will require to convey them from the points of delivery to where required along the works.

All work shall be carried out and be finished off in every way as directed by the resident engineer.

#### *Felling, Clearing and Grubbing.*

2. The whole of the timber within at least a chain and a half of the centre-line on each side shall be felled, and in no case for a less distance than half a chain beyond the foot of the slopes of the embankment or the top of the slopes of the cuttings.

All logs, underbrush, scrub and other vegetation shall be removed and cleared away for a distance of at least half a chain on each side of centre-line, and in no case for a less distance than 10 feet beyond the foot of slopes of embankments or the top of slopes of cuttings; and no such matter shall be left under any part of the embankments, or mixed with the materials which form the embankment.

In cuttings and along formation on the surface all stumps and roots shall be grubbed out and removed; in embankments no stump shall be left within 3 feet of formation-level, or within 2 feet of the surface in slopes.

All scrub shall be burned when and as directed by the resident engineer.

#### *Earthworks.*

3. Except where otherwise directed by the resident engineer, all vegetation growing on the line of railway shall be cleared off to the full width of bottom of bank.

*Cuttings.*—The cuttings are to have a base at formation-level of 12 feet in solid rock and 13 feet elsewhere, and are to be made in accordance with plan and section. The slopes

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shall be  $\frac{1}{2}$  to 1 in solid rock, and 1 to 1 in all other material. It is, however, specially provided that the resident engineer shall be sole judge as to what class the material in the cuttings belongs, and any alteration of the widths or slopes of cuttings will be ordered in writing.

The material obtained from the cuttings and side drains shall be used in making the embankments, and should it be insufficient for the purpose the contractors shall obtain the balance by widening cuttings or from side cuttings, as may be directed by the resident engineer, but no side cutting shall under any circumstances be made within the area of station ground. All slopes shall be neatly and uniformly trimmed off from top to bottom to the inclination shown or specified.

During the execution of the works the formation and slopes shall be properly drained, so as to prevent any lodgment of water.

A drain is to be cut along the bottom of slopes of cuttings, as shown in drawings, and in all cases must be provided with a proper outfall of at least the same size. Catchwater drains shall be dug above the top of one slope of all cuttings and where necessary above banks, at a distance not exceeding a chain from the top and foot of slopes. These ditches shall average 5 cubic feet per lineal yard, and shall be true and regular to the inclinations directed. No stumps or roots to be left in them. They shall be made at the commencement of the work with proper outfalls, and shall be cleared out from time to time as may be necessary or ordered.

**Embankments.**—The embankments must be carried forward uniformly of the proper shape, with such an addition to the heights and widths, to allow for subsidence and shrinkage, as the resident engineer may consider necessary, so as to avoid as far as practicable the necessity for making subsequent additions either to the heights or widths of the embankments to bring them to the correct levels and dimensions. When not otherwise directed, the allowance for shrinkage alone is to be not less than 1 inch to every foot in height.

Whenever the foundation of an embankment is on sloping ground, steps and benches must be cut under the base of the embankment; and should the seat of the embankment be of soft material, the contractors shall remove the same.

No vegetable substance or other material objected to by the resident engineer shall be put into any embankment.

The top of the ordinary single-line embankment shall have a width at formation-level of not less than 6 feet on each side of centre, with slopes trimmed off to an inclination of not less

than  $1\frac{1}{2}$  horizontal to 1 vertical, and to be maintained full and true until the completion of the contract.

Whenever any change is made in the inclination of any or the slopes it must be done gradually, and in not less than 20 yards in length.

The contractors shall not in any way interfere with or divert the existing drainage areas, unless otherwise directed, and shall leave such stops or stanks in the side cuttings, and take such other precautions as the resident engineer may think necessary for that purpose. The side cuttings for bank material must be made in a regular and approved manner, and, unless specially authorised, not less than 10 feet from the foot of any embankment, nor less than 5 feet from any fence, and where they have to act as drains shall be taken out clear and to a uniform inclination. No material shall be run to spoil except with the written sanction of the resident engineer. When material is run to spoil it must be done in such a way and in such places as shall be approved by the resident engineer.

Behind and around abutments, culverts, walls, piles, struts and all structures of masonry or timber of what kind soever, the embankments shall be wheeled in and carefully rammed. Any injury done to such culverts or other structures by movement of the embankment shall be repaired and made good by the contractors.

The station yards shall be formed throughout to the formation-levels indicated for the railway adjoining.

#### *Stream Diversions and Ditches.*

4. Stream diversions shall be cut where and as directed. The bottom of the cut shall have a uniform inclination throughout, and shall be made at a level commencing at the bottom of the stream at the lower end, and terminating at the bottom of the stream at the upper end of the diversion. The base of the cutting shall be equal to the base of the stream diverted, and the slopes shall be as specified for cuttings.

#### *Culverts and Drains.*

5. Walls of culverts shall be of rubble or ashlar masonry in cement or concrete. The arches and inverts shall be of brickwork turned-in rings, or rubble masonry in cement, or concrete, as ordered by the resident engineer; and the walls, arches and inverts for each class of work are to be of such thickness as he shall direct. Arches shall be built on centres and in approved frames, and in accordance with instructions.

The frames of timber culverts shall be mortised and tenoned

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and pinned; the planking shall be securely spiked to the frames. The edges of the planking must fit truly for the whole thickness, and the planks must extend over at least two panels and break joint as much as possible.

Dry stone culverts shall be constructed as shown upon the drawings.

All culverts shall be covered with a 9-inch layer of well-wrought clay puddle.

The foundations for culverts shall in all cases be carried down to solid ground and prepared for upper work to the satisfaction of the resident engineer.

Sufficient inlet and outfall drains shall be dug at each culvert, and all rocks and stumps in them shall be removed.

Such drains shall extend at least  $\frac{1}{2}$  chain from each end of the culverts.

All stoneware pipes or box-drains shall be laid in trenches in all cases to be cut in the solid, and the pipes or box-drains shall be bedded and encased in well-wrought clay puddle. The joints of the pipes are to be set with cement mortar, and their ends protected with concrete, rubble or brickwork, as shown.

### BLACKWALL TUNNEL.

At the ordinary meeting of the Institution of Civil Engineers on Tuesday, April 6, Mr. John Wolfe Barry, C.B., F.R.S., the president, in the chair, the paper read was on "The Blackwall Tunnel," by Mr. David Hay, M.Inst.C.E., and Mr. Maurice Fitzmaurice, B.A., B.E., M.Inst.C.E.

Communication between the north and south banks of the Thames below London Bridge was very poor, and many attempts had been made during the last hundred years to give greater facilities for crossing. Tunnels had been begun between Tilbury and Gravesend in 1798 and between Limehouse and Rotherhithe in 1805, while Brunel's great tunnel between Wapping and Rotherhithe was begun in 1825 and finished in 1842. Various other schemes for tunnels had been brought forward, but that at Blackwall was the only one which had been commenced. The contract for the work was let in 1891 for 871,000*l.*, and operations were started early in 1892. The entrance to the tunnel on the north side of the river was in the East India Dock Road, close to the East India Dock gates, while at the south side the entrance was in East Greenwich. The total length of the tunnel was 6,200 feet, of which about one-half was "cast-iron lined," the remainder being "cut-and-

cover" and "open approach." A considerable amount of work was necessary for the diversion and reconstruction of main and branch sewers which were interfered with by the tunnel. The open approach at each extremity of the tunnel was constructed with concrete and brick retaining-walls, with a facing of white glazed bricks and a concrete invert. A layer of asphalt was carried round it to insure watertightness. The cut-and-cover work consisted of four or five rings of brickwork in cement, and was circular in section; it was backed with a minimum of 2 feet of concrete, and a layer of asphalt was interposed between the brickwork and concrete. There were four shafts on the line of the tunnel, and these were placed at the horizontal or vertical changes of direction. They were constructed of steel and iron double-skinned caissons, of 58 feet external and 48 feet internal diameter. They had also an internal lining of white glazed brickwork. Two openings for the tunnel were provided in each caisson, which were closed when sinking by easily removable iron plugs. Air-tight floors were placed above the tunnel openings, so that compressed air could be used either while sinking or while the tunnel was being driven through. Two of the shafts had been sunk by keeping the water pumped down and excavating inside in the ordinary way, one by excavating the material (gravel) by a grab worked from a crane on the top, and the fourth partly by grab and partly by manual excavation. In both the latter cases, however, the concrete and iron floors at the bottom of the shafts had to be inserted under compressed air.

The "iron-lined" portion of the tunnel was constructed by means of a shield, and compressed air had been used for nearly the whole length, the pressure varying between a few pounds and about 27 lbs. above the atmospheric pressure. The external diameter of the cast-iron lining was 27 feet and the internal diameter 25 feet and 25 feet 4 inches, each ring of lining forming a length of 2 feet 6 inches of tunnel. There were fourteen segments and one key-piece in each ring; all the sides of the segments were planed and all the joints caulked. The internal lining consisted of 4 to 1 concrete with glazed-tile facing. The tunnel was driven through materials of a very mixed nature, varying between hard water-tight clay and coarse ballast in direct communication with the river. Near the centre of the river the tunnel passed within 5 feet of the river-bed, but for some distance on each side of this point a layer of clay 10 feet thick had been shot from hopper barges to facilitate operations. On two occasions the tunnel was flooded by sudden "blow-outs" and the consequent inrush of water.

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The shield used was 27 feet 8 inches in external diameter and 19 feet 6 inches long. It was shoved forward by hydraulic jacks which exerted at times a total pressure of over 5,000 tons. It carried two hydraulic erectors for placing the cast-iron segments. Every precaution was taken in the construction of the shield to minimise the result of accident from a sudden inrush of water, and provision was made for working with either a closed or open face. A very large air-compressing plant was required to maintain the supply of air, and at times as much as 10,000 cubic feet per minute was pumped into the tunnel.

The roadway, which was 16 feet wide, was carried on a brick arch which formed the roof of a subway for pipes, electric-light wires, &c., and a footpath 3 feet wide was provided on either side.

An electric-light installation had been erected for the permanent illumination of the tunnel and the supply of current for working the drainage-pumps, &c.

### GOVERNMENT BUILDING IN NEW SOUTH WALES.

THE following is the latest report of the Government architect, Mr. Vernon, to the Legislative Assembly of New South Wales :—

I have the honour to present my report upon the work carried out in this branch for the eighteen months ending June 30, 1895, in the erection and completion of new public buildings, and in repairing and furnishing and improving existing ones, and also in carrying out other miscellaneous services.

The expenditure is detailed in the schedule attached, and, as compared with that of the previous years 1893-94, is as follows :—

	1894-95 (18 months).			1893-94.		
	£	s.	d.	£	s.	d.
Buildings and services . . .	192,109	7	7	215,395	19	8
Furniture . . . . .	14,878	8	9	6,751	16	9
Officers' expenses, including travelling and contingencies	23,607	16	3	17,175	11	3

This expenditure has been incurred in connection with 630 buildings, of which nine are buildings completed or entirely erected within the period.

Uniform care has been exercised in dealing with these several expenditures, and notwithstanding that during the

period considerable alterations have been effected in the office management, and the "General Conditions of Contract" entirely revised, no litigation has taken place, but, on the contrary, proper settlements have in all cases been arrived at.

The amount expended, it will be seen, is considerably smaller than that of previous years, and this is accounted for by the fact that the Government has, during the period under review, pursued a policy of the strictest retrenchment and economy, so that the erection of no new building was undertaken except where absolutely necessary for the proper performance of the public service, a large number of schemes already more or less dealt with in the office being postponed until the circumstances of the Colony altered for the better.

In addition to these, it may be noted that owing to the generally depressed condition of the building trade work was done at greatly reduced cost, amounting to as much, probably, as 25 per cent., and therefore the expenditure covers a comparatively greater amount of work than that done in previous years.

I attached to the annual report of 1892 a complete schedule to date of the buildings in charge of this branch, setting forth the estimated value of the sites and the actual cost of erection, or, where this is not possible, the estimated value of the buildings. Correcting this schedule to date of the period of the present report, the results are as follows :—

List as per return 1893-94 . . . . .	£8,248,211
" " 1894-95 . . . . .	162,411
Total . . . . .	£9,410,622
Total number of buildings and establishments . . . . .	947

The above is, of course, exclusive of the considerable sums that are annually expended on minor additions and improvements and general repairs, which are all disbursed from revenue. Since this schedule was originally prepared, it is well known that real property in the Colony has suffered a most serious depreciation, and, therefore, the above figures must not be taken as any guide to present values.

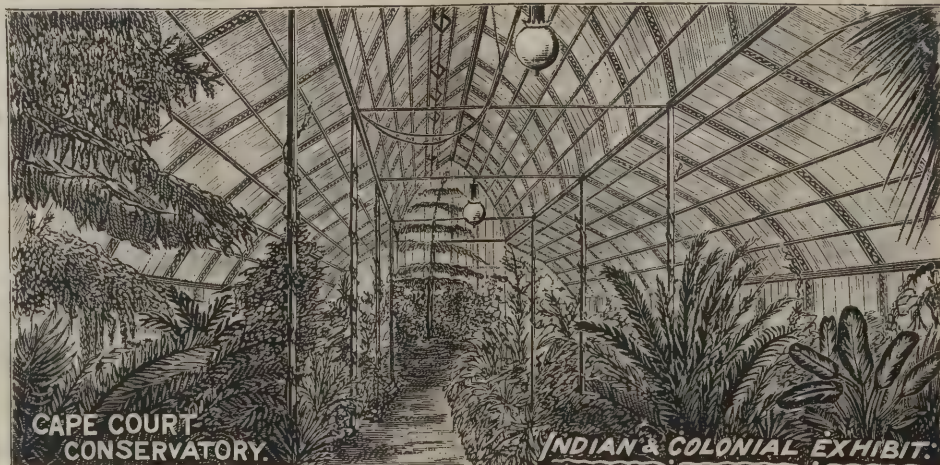
I am able to report that the country buildings are being gradually brought up into a better state of repair, but I would again invite attention to the inadequacy of the service votes which are appropriated for this purpose. In the report of 1893 I ventured to show the great diminution in the amount voted, the same decreasing from 82,000*l.* in 1889 to 27,400*l.* in 1893, the amount voted for the period covered by this report being

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46,000%, or 30,666% per annum. Allowing 8,250,000% as the capital cost of the buildings new, it may be taken that depreciation takes place at the rate of at least 1.25 per annum, giving the average life of a building at about ninety years. The sum at my disposal, namely 30,666%, represents .37 per cent. only, and when it is taken into consideration that this percentage has to cover not only annual repairs, but numerous minor improvements and additions, it will be seen that the service is to a degree below the point of efficiency.

To put this matter in another way—the average sum available to be expended under these heads on each building amounts to 32l. 7s. 8d., and it must be recollected that not only is a small country post office included, but such large establishments as Callan Park Hospital for the Insane, Parliament House, Government House, &c. It is therefore apparent that many buildings must necessarily remain year after year without proper attention. I have before stated that a large portion of this sum has been appropriated from perpetual loans to meet the capital cost of these buildings, and it is a matter for serious consideration, therefore, whether a larger percentage on this amount should not be expended upon the buildings, otherwise the value of the security must be yearly diminishing.

The important buildings of the Sydney Hospital have been erected at a cost of 80,810l. 16s. 9d., so far as the second and completing portion is concerned, under the supervision of Mr. J. Kirkpatrick. A commencement was made with the scheme for the erection of the Kenmore Hospital for the Insane, and the sum of 17,245l. expended in the partial erection of the Administrative Buildings which it is intended shall temporarily accommodate patients, pending the erection of the patients' wards. In July, 1894, a fire occurred in the roof of the Public Works Offices, doing damage to the extent of about 1,100l., and in considering the rebuilding that became necessary, the Minister thought it advisable to add an extensive mansard roof and central dome, thus giving a large amount of additional accommodation and adding considerably to the architectural completeness of the building. After deliberation he deemed it desirable to depart, in this case, from the usual method of inviting tenders in public competition, and instructed that the work should be carried out by the direct employment of workmen and the purchase of the necessary plant and material.

Towards the end of 1894 the Government saw its way to institute a season of greater activity, and the erection of many buildings in the country, which had previously been deferred

for reasons already given, it was now found desirable to proceed with; accordingly Parliament voted in December the sum of 136,635l. towards that object, and I then received instructions from the Minister to proceed with the preparation of the plans and the inviting of tenders for upwards of eighty-three buildings distributed in different parts of the country.

The staff was then much reduced, and it became necessary to engage a number of temporary draughtsmen. With the Minister's permission I instituted a competitive examination, with the result that out of seventy-two applicants for employment fifty underwent the test examination. This enabled me on merit alone to recommend the engagement of the six draughtsmen required and the result has proved satisfactory.

During the period covered by this report it was found that the number of private buildings rented by the various Government departments was entailing a very large and increasing annual rental, and steps were taken to see what could possibly be done in re-arrangement of the Government departments, so that as the various outside leases fell in these could be more fully occupied and the rented premises given up. As opportunities occurred, therefore, arrangements were made which I am confident will show eventually that very large savings have been effected, in addition to greater efficiency and centralisation of the Government offices generally.

In January last a Royal Commission to inquire into the Civil Service was sitting, and I was called upon to give evidence before it, both as regards the duties and salaries of the various officers, the general organisation of the office, and the procedure relative to the erection of new public buildings. My evidence will be found in the report of the Commission issued April 8, 1895. The professional staff at the end of the period reported on (with the exception of the employment of the temporary draughtsmen already referred to) consists of the same personnel as during the previous year and at the same salaries.

The clerical staff underwent considerable alteration consequent on the reorganisation of the clerical and accountancy branches of the Public Works Department generally. This change involved the retirement of two officers of long standing and of proved zeal and ability, Mr. G. B. Stack, accountant, on twelve months' leave of absence, at the expiration of which period he will have completed thirty-three years and three months in the service, and Mr. L. J. Marks, record clerk, on nine months' leave of absence, at the expiration of which period he will have completed twenty-five years and three months'

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service, also the transfer of all other officers (including Mr. S. Steel, chief clerk) to the Public Works establishment, with the exception of Mr. Forsythe, secretary, Mr. Cooper, shorthand writer and correspondence clerk and two specification clerks, without whom it would have been impossible to have conducted the clerical work pertaining to the professional side of the office.

The staff at the close of June 1895 was as follows:—Government architect, principal assistant architect, two assistant architects, three assistant architects (acting), building surveyor, sanitary engineer, six district inspectors, five draughtsmen, nine draughtsmen (temporarily engaged), eleven clerks of works, plan-mounter, &c., secretary, shorthand and correspondence clerks, two specification clerks (chief clerks and seven clerks transferred during period).

The total office expenses, including contingencies, travelling expenses, &c., amount to 23,607*l.* 16*s.* 3*d.*, of which the sum of 4,430 *7s.* 1*d.* was provided for in the clerical division of the Public Works Department. No staff appointments were made during the period.

In former reports I have endeavoured, as correctly as possible, to give approximate statements as to the percentage costs on the expenditure under the following heads:—Professional; superintendence of works; clerical; contingencies, travelling expenses, &c.; but inasmuch as a large amount of office work, particularly in the professional branch, has been constantly performed, which has no reference to expenditure whatever, it has always been somewhat difficult to ascertain the percentage with an absolute degree of accuracy.

A return was asked for in the House for the expenditure and cost of carrying out works during the twelve months ending August 31, 1894—a period in which, it must be observed, the strictest economy was being exercised, and the money expended was devoted almost entirely to general repairs and small additions on buildings scattered throughout the Colony, in which the maximum of services were required for the minimum of result. Under these somewhat disadvantageous circumstances the return came out as follows:—

Professional.	.	.	.	.	2'50 per cent.
Superintendence	.	.	.	.	2'50 "
Clerical	.	.	.	.	1'50 "
Contingencies	.	.	.	.	1'00 "

The above rate is the average taken over works of every character, including a small repairing contract for £25 in a

country township, perhaps 500 miles from Sydney, as well as on the larger works near the city, amounting, as in the case of additions to the Hospital for the Insane, Rydalmere, to £15,000.

In conclusion, I have again great pleasure in bearing testimony to the zeal, skill and industry displayed throughout the whole of the period by the staff under my direction.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

8002. John Pinnington, for "The Imperial patent sash frame."

8047. John Brayton, for "Improvements in window catches or fasteners."

8102. Aaron Wise, for "An improvement in fixing blinds to window-rollers, dispensing with tacks."

8116. Henry Gardiner Lloyd, for "London improvements in or relating to sewers, drains and the like."

8154. Frank Sheppard Holton and Thomas Smith Morley, for "An improved window frame and sashes."

8224. Frederick Elijah Blaisdell, for "An improved suspended platform or balcony for use on houses and other buildings."

8228. James Allen Haskett, for "Anti-rattling devices for windows."

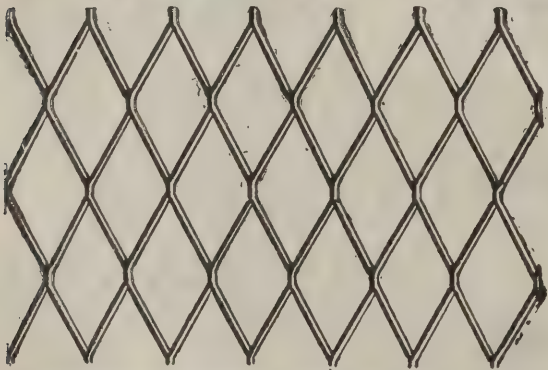
8322. Alfred Julius Boulton, for "Improvements in or relating to chamber water-closet apparatus or commodes."

8339. John Bunt Willcock, Henry Curtis and William Stokes, for "Improvements in fire and other brick blocks."

8361. John Young and William Young, for "Ships' under-line pedestal water-closet."

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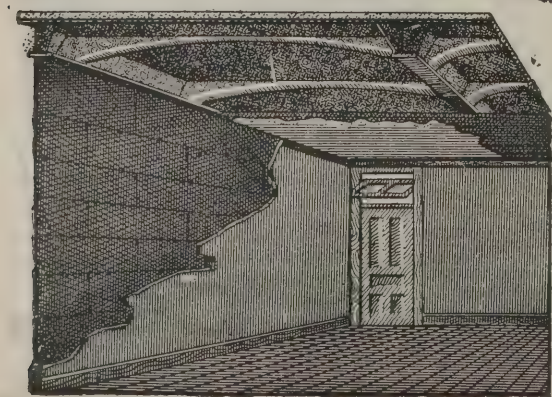
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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*.\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xiii.*

## COMPETITION OPEN.

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## CONTRACTS OPEN.

ABERDEEN.—April 29.—For additions at the Manse of Udney. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ADDLESTONE.—April 24.—For alterations and additions to Mountain Ash and 1 Richmond Villas, Station Road. Mr. Albert Veness, architect, Addlestone.

ANDOVER.—April 28.—For erection of buildings at the workhouse at Andover. Mr. A. Purkess, 16 Junction Road, Andover.

ARMAGH.—April 27.—For building Presbyterian church at Markethill. Messrs. J. J. Phillips & Son, architects, 61 Royal Avenue, Belfast.

ASHFORD.—May 7.—For new administrative block, addition to infirmary, new chapel and alterations to existing buildings, &c. Mr. Horace Hamilton, clerk, 11 Bank Street, Ashford.

BANGOR.—May 1.—For completion of the tower of St. Comgall's parish church. Mr. Stephens, building surveyor, Donegall Square Buildings.

BANSTEAD.—May 7.—For enlargement of the schoolrooms. Mr. Cecil Sharp, architect, 59 Fenchurch Street.

BARNESLEY.—April 29.—For alterations and additions to premises, Sheffield Road. Mr. Herbert Crawshaw, architect, 13 Regent Street, Barnesley.

BEESTON.—April 30.—For erection of Council offices. Mr. Hedley J. Price, architect and surveyor, 24 Low Pavement, Nottingham.

BISHOPS STORTFORD.—For plastering two eight-roomed houses. Messrs. J. L. Glasscock & Son, builders, Bishops Stortford.

BLACKBURN.—April 24.—For erection of a chimney 150 feet high, at the electricity works, Jubilee Street. Mr. E. M. Lacey, consulting engineer to the Corporation, 10 Delahay Street, Westminster.

BRADFORD.—April 27.—For erection of boundary-walls and clinker-crushing shed, including some millwright's work, at Cliffe Road destructor. Mr. George McGuire, town clerk, Bradford.

BRADFORD.—May 1.—For erection of two villas near Manningham Park. Mr. T. C. Hope, architect, Old Bank Chambers, Bradford.

BRISTOL.—April 26.—For building the Cabot memorial tower. Mr. Wm. V. Gough, architect, 24 Bridge Street, Bristol.

BUCHAREST.—May 18.—For construction of an industrial school at Jassy. Application to the Roumanian Ministry of Agriculture at Bucharest.

BURTON-UPON-TRENT.—April 27.—For extension of the borough accountant's department at the Town Hall. Mr. J. E. Swindlehurst, borough engineer and surveyor, Town Hall.

CARDIFF.—April 29.—For taking down the existing chimney-stack, with a portion of the flues, at Cogan Pumping Station, and the rebuilding of the chimney and flues in brickwork. Mr. C. H. Priestley, engineer, Town Hall, Cardiff.

CARDIFF.—May 3.—For the extension of Albany Road Board School. Mr. S. Rooney, architect, Cefn Mably Chambers, Quay Street, Cardiff.

CARLISLE.—For extensions and alterations at property of the South End Co-operative Society, Limited, Botchergate. Mr. T. Taylor Scott, architect, 43 Lowther Street, Carlisle.

CARLISLE.—For erection of six houses at Currock. Mr. J. B. Whitfield, Station Road, Workington.

CARNARVON.—April 26.—For erection of new chapel and schoolroom, for the committee of Siloh Independent Chapel, Chwillog. Mr. Elias Lloyd Jones, Post Office, Chwillog, R.S.O.

CARNARVON.—April 28.—For erection of Sunday school, classrooms and dwelling-house, &c. Mr. Robert O. Jones, Bryn Pistyll, Waenfawr.

CASTLEFORD.—April 28.—For erection of three terrace houses at Normanton Common. Mr. George F. Pennington, architect and surveyor, Bridge Street, Castleford.

CHARLTON.—May 4.—For erecting a shelter in gymnasium at Maryon Park, for the London County Council. Architect's Department, County Hall, Spring Gardens, S.W.

CHATHAM.—April 26.—For building town hall and municipal offices. Mr. G. E. Bond, architect, High Street, Rochester.

CHILWELL.—For erection of four shops at Chilwell. Mr. Ernest R. Ridgway, architect, Long Eaton.

CORNWALL.—April 28.—For erection of premises, for Messrs. Vivian Bros., at Market Place, Camborne. The proprietors, as above.

DARLINGTON.—May 3.—For science and art fittings for the technical college now in course of erection. Mr. F. T. Steavenson, town clerk, Houndgate, Darlington.

DARLINGTON.—April 26.—For erection of a Wesleyan Methodist Sunday school and other alterations at Gainford. Mr. Frank Martin, architect, West End Buildings, Skinnergate, Darlington.

DAVENTRY.—April 26.—For erecting six cottages on estate adjoining Warwick Street. Mr. J. B. Williams, architect, Moot Hall, Daventry.

DUNDEE.—April 26.—For erecting a brick building for the sanitary conveniences, Newport Pier. Mr. Geo. C. Buchanan, harbour engineer, Works Office, Harbour Chambers, Dundee.

ELGIN.—April 24.—For erection of farm steading, Aldroughy. Mr. Alex. Grant, architect, Inverness.

ELLAND.—April 26.—For erection of foundry, shed and offices at Perseverance Works. Mr. W. H. D. Horsfall, architect, &c., 9 Harrison Road, Halifax.

ESSEX.—April 24.—For erection of a detached eight-roomed house, small coachhouse and stable, near railway station, Wickford. Apply at Croft House, Wickford.

FAREHAM.—April 26.—For erection of a chaplain's residence at the Hants County Asylum. Messrs. Cancellor and Hill, architects, 12 Jewry Street, Winchester.

FARNHAM.—April 28.—For erection of men's casual wards upon land adjoining the workhouse. Mr. S. Stapley, architect West Street, Farnham.

FEATHERSTONE.—April 24.—For erection of two villas Messrs. Garside & Keyworth, architects and surveyors, Roper-gate, Pontefract.

FORDINGBRIDGE.—April 24.—For erection of a farmhouse at Burgate. Mr. Reginald Hannen, steward of the manor of Burgate.

GATESHEAD.—April 30.—For erection of shops and houses in High Street. Mr. Armour, West Street, Gateshead.

GILDERSOME.—April 26.—For erection of fence-walls to Park Field Villa. Mr. T. A. Buttery, architect, Queen Street, Morley.



GLOUCESTER.—May 4.—For erection of a cottage at Barber's Bridge Station. Mr. G. K. Mills, secretary, G.W.R., Paddington Station, London.

GREAT YARMOUTH.—May 4.—For alterations at the Free Library, for the Free Library committee. Mr. J. Wm. Cockrill, borough surveyor, Town Hall, Great Yarmouth.

HALIFAX.—May 12.—For erection of stables, cart-sheds, &c., at Washer Lane Dyeworks. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

HALIFAX.—April 28.—For the various works required in erection of a Catholic church, &c., at Denholm, Luddenden Foot. Mr. W. Wrigley, architect and surveyor, Crossley Terrace, Hebden Bridge.

HALIFAX.—April 28.—For erection of a Catholic church, &c., at Denholm, Luddenden Foot. Mr. W. Wrigley, architect and surveyor, Crossley Terrace, Hebden Bridge.

HALIFAX.—April 27.—For taking down the Barrack Tavern and other buildings, &c., in Charles Street and Causeway, in the borough of Halifax, and erecting upon the site additions to the premises of the Automatic Standard Screw Company. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HANWELL.—May 10.—For erection of temporary iron structures at the Asylum. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

HARTING.—May 15.—For enlargement of schools. Mr. C. Taylor, South Harting.

HARTLEPOOL.—May 11.—For conversion into coastguard dwellings, battery, &c., of buildings formerly used as militia barracks. R.N.R. Battery, West Hartlepool.

HENDON, N.W.—May 10.—For erection of an asylum. Messrs. Giles, Gough & Trollope, architects, 28 Craven Street, Strand, W.C.

HIGH SPEN.—April 30.—For erection of twelve two-roomed cottages. Mr. Thomas Ramsay Ramsay, 42 Mosley Street, Newcastle-on-Tyne.

HUDDERSFIELD.—May 6.—For erection of a villa residence, with surgery attached, near Riding Wood, Clayton West. Messrs. John Kirk & Sons, architects, Huddersfield.

ILLINGWORTH.—May 4.—For erection of a detached house in Raw Lane. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

IRELAND.—For building of walls of addition to store at Ballinacurra. Mr. John H. Bennett, The Maltings, Ballinacurra.

JARROW.—April 28.—For alterations and additions to the higher-grade school. Mr. George Mason, clerk, School Board Offices, Jarrow.

KEIGHLEY.—April 24.—For erection of shop, &c., in Lawkholme Lane. Messrs. W. H. & A. Sugden, architects, Cavendish Street, Keighley.

KEIGHLEY.—April 27.—For addition to Albert Foundry. Messrs. W. & J. B. Bailey, architects, Bradford and Keighley.

KENDAL.—May 1.—For erection of Victoria mills and offices in Sandes Avenue. Mr. Robert Walker, architect, Windermere.

KIRTON.—April 26.—For works to the nave of Kirton Church, near Boston. Mr. C. Hodgson Fowler, The College, Durham.

LANCASTER.—May 5.—For alterations at the slaughter-houses and cattle auction mart. Mr. T. Cann Hughes, town clerk, Town Hall, Lancaster.

LANCASTER.—May 8.—For erection of a mixed school, with offices, &c., in Bowerham Lane. Mr. Herbert D. Wilson, clerk, 85 Church Street, Lancaster.

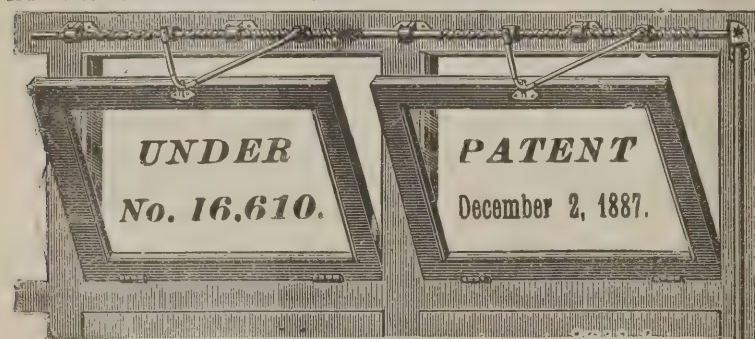
LARNE.—April 29.—For erection of National schools, Kilwaughter. Mr. Samuel P. Close, architect, 53 Waring Street, Belfast.

LEICESTER.—April 30.—For the construction of a concrete and stone bridge over the Leicestershire and Northamptonshire Union Canal and Flood Course, and for the formation of a new road from the Newarke to the Western Boulevard, together with a storm overflow, foul and storm-water sewers, and other works in connection therewith. Mr. E. Geo. Mawbey, C.E., borough surveyor, Town Hall, Leicester.

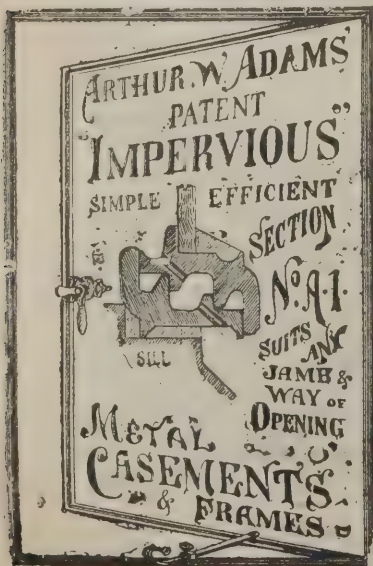
LIVERPOOL.—April 26.—For taking down their present stand and erection of a new grand stand for the Everton Football Club Company, Limited. Mr. Henry Woodhouse, architect, 19 Sir Thomas Street, Liverpool.

LLANGOLLEN.—April 26.—For erection of County School. Mr. H. Feather, architect, Andrew's Buildings, Queen Street, Cardiff.

LONDON.—May 10.—For erection of temporary iron structures at Hanwell Asylum, W. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.



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**MAIDENHEAD.**—April 26.—For erecting and furnishing a new office for the borough surveyor at the Guildhall. Mr. Percy Johns, borough surveyor, Guildhall, Maidenhead.

**MANCHESTER.**—April 27.—For erection of seventy five artisans' dwellings in Smedley Road. Mr. Henry Sheldermine, architect, Hunt's Bank, Manchester.

**MORLEY.**—May 1.—For erection of eight scullery houses in Bridge Street. Mr. T. A. Buttery, architect, Queen Street, Morley.

**NEWARK.**—April 26.—For construction of cellars on site adjoining brewery, for Messrs. Warwicks & Richardsons, Limited. Messrs. Sheppard & Harrison, architects, 17 Kirkgate, Newark.

**NEWCASTLE-ON-TYNE.**—For pulling-down and shoring the old buildings, 50 and 52 Northumberland Street, and carting the old material to site on West Jesmond Estate. Mr. W. L. Newcombe, architect, Pilgrim Street, Newcastle.

**NEWPORT.**—April 26.—For pulling-down and rebuilding a portion of the Tredegar Arms Hotel, High Street. Messrs. John J. Swallow & H. C. Creighton, architects and surveyors, Steam Packet Chambers, Dock Street, Newport, Mon.

**NEWQUAY.**—April 30.—For erection of the Headland Hotel. Mr. Silvanus Trevail, Truro.

**NEW SWINDON.**—May 4.—For additions to house and shop, 14 Fleet Street. Messrs. William Drew & Sons, architects and surveyors, 22 Victoria Street, Swindon.

**PLYMOUTH.**—April 28.—For alterations at the Royal Exchange Hotel, Vauxhall Street. Mr. Charles Cole, architect, 50 High Street, Exeter.

**PLYMOUTH.**—April 23.—For building a caretaker's house at Roborough reservoir. Mr. Edward Sandeman, Municipal Buildings.

**PONTREFACT.**—For completion of seven villas, at the Priory, Pontefract. Messrs. Tennant & Bagley, architects, surveyors, &c., Pontefract.

**PORTSMOUTH.**—April 30.—For erection of drill hall, for the 2nd Hants V. A. Messrs. Rake & Cogswell, architects, Prudential Buildings, Portsmouth.

**PORT TALBOT.**—April 26.—For erection of offices, for the Port Talbot Railway and Docks Company. Mr. Frank B. Smith, architect, Port Talbot.

**PRESTON.**—April 30.—For erection of stabling for 140 horses, shedding and adjunct works. Messrs. Garlick & Sykes, architects, 33 Winckley Square, Preston.

**PURSTON.**—April 24.—For erection of three villas in Ackworth Road. Messrs. Garside & Keyworth, architects, Roper-gate, Pontefract.

**REDRUTH.**—April 24.—For erecting winding engine at the Basset Mines. Mr. Nicholas Trestrail, Redruth.

**RICHMOND.**—April 26.—For construction of underground conveniences in George Street. Mr. J. H. Brierley, borough surveyor, Town Hall, Richmond.

**RUNCORN.**—May 3.—For erection of a new block of buildings in extension of the Victoria Road schools, 170 boys and 170 girls. Messrs. F. & G. Holme, architects, Westminster Chambers, Crosshall Street, Liverpool.

**SCARBOROUGH.**—May 5.—For enlargement of post office. Mr. J. Flew, 11 Popplewell Chambers, Bradford.

**SCOTLAND.**—April 28.—For additions to bakery premises at Fochabers. Messrs. A. & W. Reid & Wittet, architects, Elgin.

**SCOTLAND.**—April 26.—For erection of house at Buckie. Messrs. D. & J. R. McMillan, architects, 211 Union Street, Aberdeen.

**SCOTLAND.**—April 30.—For erection of house in High Street, Buckie. Mr. James Perry, architect, Buckie.

**SCOTLAND.**—May 1.—For erection of a block of dwelling-houses in New Street, Dalgrain, Grangemouth. Mr. G. Deas Page, architect, Old Glebe Chambers, Falkirk.

**SLEAFORD.**—May 3.—For erection of a minister's house on the site of No. 22 North Gate. Mr. W. H. Mumby, Market Place, Sleaford.

**SOMERSET.**—April 28.—For building Constitutional Club at Clevedon. Mr. Henry Taylor, architect, 16 Lower Queen's Road, Clevedon.

**SOUTHEAST-ON-SEA.**—April 28.—For erection of a 9-inch stock-brick wall, 350 feet long and 6 feet high. Mr. Harold Harlock, borough surveyor, Clarence Road.

**SOUTH MEISTHAM.**—For erection of All Saints Church. Mr. Henry Hall, architect, 19 Doughty Street, W.C.

**SOWERBY BRIDGE.**—April 27.—For erection of Sowerby Bridge West-end new Sunday school. Mr. S. Wilkinson, architect, Sowerby Bridge.

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ST. PANCRAS.—May 5.—For the cleansing and redecoration of the vestry hall and offices, and for the panelling of the ceiling of the large hall. Mr. C. H. F. Barrett, vestry clerk.

SUSSEX.—April 30.—For reshingling and repairing church spire, Bury. Mr. Lacy Ridge, architect, 11 Verulam Buildings, Gray's Inn, W.C.

SUTTON ST. EDMUNDS.—May 5.—For erection of school and teacher's residence at South Eau Bank. Mr. R. H. H. Hand, architect, Spalding.

TILEHURST.—May 4.—For erection of a cottage at Tilehurst Station. Mr. G. K. Mills, secretary, Paddington Station.

TUNBRIDGE WELLS.—April 28.—For erection of swimming and slipper baths. Mr. W. C. Cripps, town clerk, Town Hall, Tunbridge Wells.

WAKEFIELD.—April 23.—For erection of a dwelling-house in Stanley Road. Mr. Willie Wrigley, architect, 10 Wood Street, Wakefield.

WALES.—May 4.—For erection of a chapel at Skewen, Mr. Rees Llewelyn, architect, Birch Grove, Llansamlet Higher.

WALSALL.—For erection of leather factory. Mr. Fred. W. Cross, C.E., architect, 2 The Bridge, Walsall.

WYLVE.—May 4.—For erection of five cottages at Wylve Station, Wiltshire, for the Great Western Railway Company. Mr. G. K. Mills, Secretary, Paddington Station.

## TENDERS.

### ALNWICK.

For taking down the wooden footbridge over the River Aln at Lesbury, and for furnishing and fixing complete a wrought-iron lattice girder footbridge on existing stone pillars, for the Rural District Council.

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For erection of a villa residence at Berry Head. Messrs. E. APPLETON & SON, architects, Torquay. Quantities by Mr. C. SEWELL APPLETON.

WEBBER & SONS, Paignton (accepted).

### CHISLEHURST.

For building branch store for the Bromley Co-operative Society, Limited. Messrs. WADMORE, WADMORE & MALLETT, architects, 35 Great St. Helen's, E.C.

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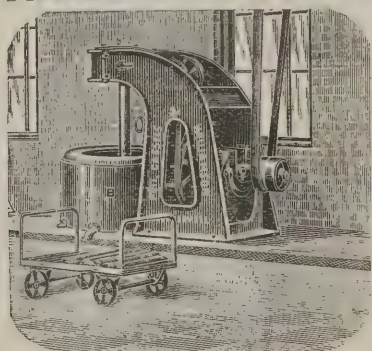
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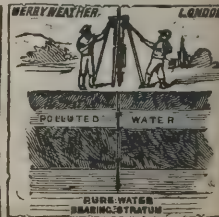
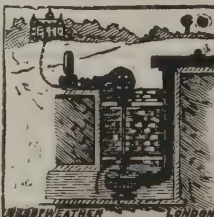


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J. Watson & Son, Glasgow . . . . .	701	5	5
W. Pollock, Glasgow . . . . .	647	12	9

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For iron and steel work required in the erection of two bridges (32 feet by 13 feet and 28 feet by 13 feet) in the People's Park. Mr. EDWARD R. S. ESCOTT, borough engineer.

C. Bailey . . . . .	£486	15	2
J. Hitchen . . . . .	413	17	0
J. BERRY, New Bank Foundry (accepted) . . . . .	373	0	0
Engineer's estimate . . . . .	380	0	0

For alterations and additions and the formation of patent spring dancing floor to West and Pellon Wards Liberal Club. Mr. MEDLEY HALL, architect, 29 Northgate, Halifax.

*Accepted tenders.*

C. Robinson, Halifax, mason.

H. Bancroft &amp; Son, Halifax, joiner.

T. Boocock, Halifax, plumber.

J. Marshall, Hipperholme, near Halifax, slater.

**HEREFORD.**

For erection of new offices for boys and masters at the Herefordshire and District Working Boys' Home. Mr. G. H. GODSELL, architect, Hereford.

Bowers & Co. . . . .	£265	17	0
W. P. Lewis & Co. . . . .	256	5	0
Beavan & Hodges . . . . .	250	0	0
James Davies . . . . .	250	0	0
ANDREWS & SON, Hereford (accepted) . . . . .	248	10	0

**HUNSTANTON.**

For kerbing and making-up Church Street. Mr. J. C. WALKER, surveyor, Council Offices, Hunstanton.

L. Leach . . . . .	£530	0	0
J. NELSON, Hunstanton (accepted) . . . . .	522	10	0

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For metalling, levelling, paving, sewerage, flagging, making good and surface-water draining a portion of Morland and Wellesley Roads, and for metalling, levelling, paving, flagging and making good a portion of Granville Road. Mr. H. SHAW, surveyor.

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**KENSINGTON.**

For electric-lighting and decorative works at 14 Neven Square. Messrs. MORLEY &amp; LETTS, surveyors, 185 Earl's Court Road, S.W.

Rugg & Son . . . . .	£350	8	0
H. Smith & Son . . . . .	343	5	0
Simmonds Bros. . . . .	321	0	0
J. Whitaker . . . . .	313	0	0
F. HOLDSTOCK, Earl's Court (accepted) . . . . .	299	0	0

**LEDGBURY.**

For erection of new villa residence and outbuildings for Mr. George Bennett. Mr. G. H. GODSELL, architect, Hereford.

Reuben Taylor . . . . .	£883	0	0
James Davies . . . . .	865	0	0
George Hill . . . . .	835	19	2
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**LEEDS.**

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W. R. & A. Hide	115 10 0
F. T. Chinchin	112 15 0
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W. Hornett	145 16 0
Marchant & Hirst	139 0 0
G. S. S. WILLIAMS & SON (accepted)	134 0 0

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G. Barker	165 0 0
T. Cruwys	151 0 0
McCormick & Sons	142 0 0
G. Foxley	137 0 0
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J. & A. Oldman	£115 0 0
J. & C. Bowyer	112 0 0
W. Banks	103 19 6
C. Gurling	103 10 0
W. V. Goad	99 0 0
Jones & Groves	88 18 0
J. F. Ford	86 10 0
H. LENEY (accepted)	83 17 0

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W. Martin	203 0 0
T. Nicholson	193 0 0
W. Silk & Son	187 0 0
McCormick & Sons	181 0 0
J. Grover & Son	177 0 0
J. MORRISON (accepted)	134 0 0

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A. J. Acworth	£290 0 0
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Rice & Son	260 0 0
E. Flood	250 0 0
E. Triggs	226 0 0
F. G. Minter	217 0 0
J. Garrett & Son	214 0 0
E. B. Tucker	198 15 0
E. P. Bulled & Co.	195 0 0
HEINEMANN & BROWN (accepted)	186 0 0

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W. & H. Castle	149 0 0
H. J. Williams	147 0 0
Holliday & Greenwood	137 0 0
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S. H. Corfield	136 0 0
W. Banks	134 12 6
JONES & GROVES (accepted)	110 8 0

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R. & E. Evans . . . . .	2,074	0	0

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RAIN GAUGES, &c., &c.

**W. WATSON & SONS, 313 HIGH HOLBORN, LONDON, & 78 SWANSTON STREET, MELBOURNE.**



## ST. ALBANS.

For sewerage, levelling, paving, metalling, flagging, channeling, making good and providing proper means for lighting Grimston Road, West View Road, Cannon Street and Ashwell Street. Mr. GEORGE FORD, city surveyor.

*Grimston Road.*

Williams	£155	0	0
G. CAPPER (accepted)	138	0	0
J. Dickson	134	7	0

*Mount View Road.*

Williams	240	0	0
J. Dickson	190	0	0
G. CAPPER (accepted)	171	0	0

*Cannon Street.*

Williams	342	0	0
J. Dickson	285	0	0
G. CAPPER (accepted)	235	0	0

*Ashwell Street.*

J. Dickson	165	0	0
Williams	150	0	0
G. CAPPER (accepted)	141	0	0

## STOKE GABRIEL.

For erection of house and stables. Mr. W. TAPRELL ALLEN, architect, Kingswear. Quantities by Messrs. NORTHORPE, SON & NEIGHBOUR.

Stephens & Bastow	£3,845	0	0
Rabbich	3,317	0	0
Webber & Maunder	3,287	0	0
Drew	3,281	0	0
Webber & Sons	3,261	0	0
Westlake	3,145	0	0
Pike	2,894	0	0
BROWN, Cockington*	2,440	0	0

\* Accepted subject to reductions.

## STONE.

For works of paving in Gower Street, for the Urban District Council.

S. WILTON, jun. (accepted)	£452	0	0
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## STOWMARKET.

For erection of three cottages in Stricklands Road.

J. Gosling	£539	10	0
W. MURRAY, Tavern Street (accepted)	527	0	0

## SYDENHAM.

For forming and making new road, and laying 12-inch pipe sewer, with manholes, &c., through same at Perry Rise. Messrs. EASTMAN BROS., surveyors, &c., 23 Bucklersbury, E.C.

W. WOODHAM (accepted)	£1,441	0	0
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## TOTNES.

For providing and laying 750 feet or thereabouts of 1½-inch lead water-pipe and fittings, building collecting-tank, &c., at Bittaford, in the parish of Ugborough. Mr. C. G. S. ACOCK surveyor, Bridgetown, Totnes.

Foal	£52	3	0
Curzon	50	0	0
A. S. DISTIN, Totnes (accepted)	37	5	0

## TODMORDEN.

For erection of new roofing and alterations to weaving shed, Castle Street. Mr. W. WRIGLEY, architect, Crossley Terrace, Hebden Bridge.

*Accepted tenders.*

Halsstead Bros., Eastwood, joiner.  
Wrigley & Sons, Hebden Bridge, slater and plasterer.  
Astin & Barker, Todmorden, ironfounder.  
Heywood & Co., Huddersfield, patent glazing.  
S. Taylor, Hebden Bridge, plumber.

## TROUTBECK.

For alterations to the Queen's Hotel, Troutbeck. Mr. ROBERT WALKER, architect, Windermere.

Atkinson, walling.  
Avery & Bertram, joiner.  
E. J. Keighley, plasterer.  
E. D. Bonney, plumber and painter.

## WINDSOR.

For making-up a portion of the Bolton Road, from Osborne Road to Lady St. Leonard's residence.

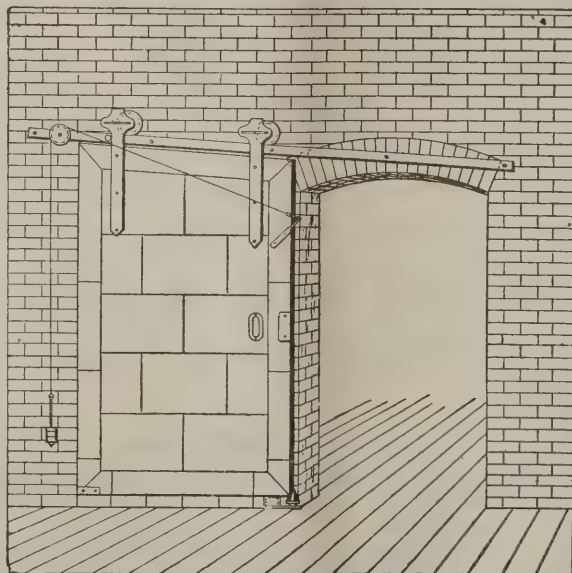
T. KELLY, Windsor (accepted)	£930	0	0
Borough surveyor's estimate	955	0	0

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The door we fitted in these works, although subjected to a heat intense enough to melt brass taps and fittings near it, withstood the heat perfectly, and can now be inspected at our works in Manchester, fit for duty. The metal sheets have expanded without becoming detached, whilst the wood is simply charred to a depth of about ½ of an inch.

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14 VICTORIA STREET LONDON; AND BLACKFRIARS BRIDGE, MANCHESTER.



WALSALL.

For erection of a foreman's house, with workshops and offices, at the Pleck Gasworks.

T. Tildesley, Willenhall (*accepted*) . . . £1,429 0 0  
NOTE.—There were twelve tenders.

For erection of a boundary-wall at the workhouse. Mr. H. E. LAVENDER, architect, Ye Old Queen's Chambers, Walsall.

W. Wistance . . . . . £589 0 0  
R. Harris . . . . . 567 0 0  
W. Kendrick . . . . . 533 0 0  
T. Hughes . . . . . 525 0 0  
J. Wilkes . . . . . 515 13 0  
J. Guest & Sons . . . . . 513 10 0  
G. INSLEY, Walsall (*accepted*) . . . . . 442 0 0

WALES.

For heating the Carmel Congregational Chapel, Fochriw.

H. Williams . . . . . £70 0 0  
J. C. & J. S. Ellis . . . . . 58 10 0  
Woodhead & Co. . . . . 55 10 0  
A. M. Perkins & Son, Limited . . . . . 54 0 0  
W. Truswell & Son . . . . . 37 5 0  
C. Seward & Co. . . . . 37 0 0  
E. HAMPTON, Abergavenny (*accepted*) . . . . . 37 0 0  
Bates & Pearce . . . . . 35 0 0  
R. Alger & Sons . . . . . 32 15 0  
J. Williams & Sons . . . . . 30 18 0  
G. Davies & Co. . . . . 30 0 0  
J. King, Limited . . . . . 28 15 0  
A. J. Kallaway & Co. . . . . 27 0 0

WIMBLEDON.

For erection of billiard-room at Tijuca, The Downs. Mr. ROBERT J. THOMSON, architect, 64 Hill Road, Wimbledon.

Bulled & Co. . . . . £569 0 0  
Whitehead Bros. . . . . 525 0 0  
G. BERRY (*accepted*) . . . . . 448 0 0

WINCHMORE HILL.

For construction of new roads, sewer, surface and manholes on Highfield Estate. Mr. J. H. HIBBARD, surveyor, 17 Union Court, E.C.

Rottenbury . . . . . £4,018 0 0  
Adams . . . . . 3,910 0 0  
E. WILSON (*accepted*) . . . . . 3,759 0 0

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THE WEIDEMANN MEMORIAL, BROMPTON CEMETERY.

STREATHAM CEMETERY.—THE CHAPEL.

WOLVERHAMPTON.

For erection of premises, Lichfield Street. Mr. T. A. LOWRY, architect. Quantities by the architect.

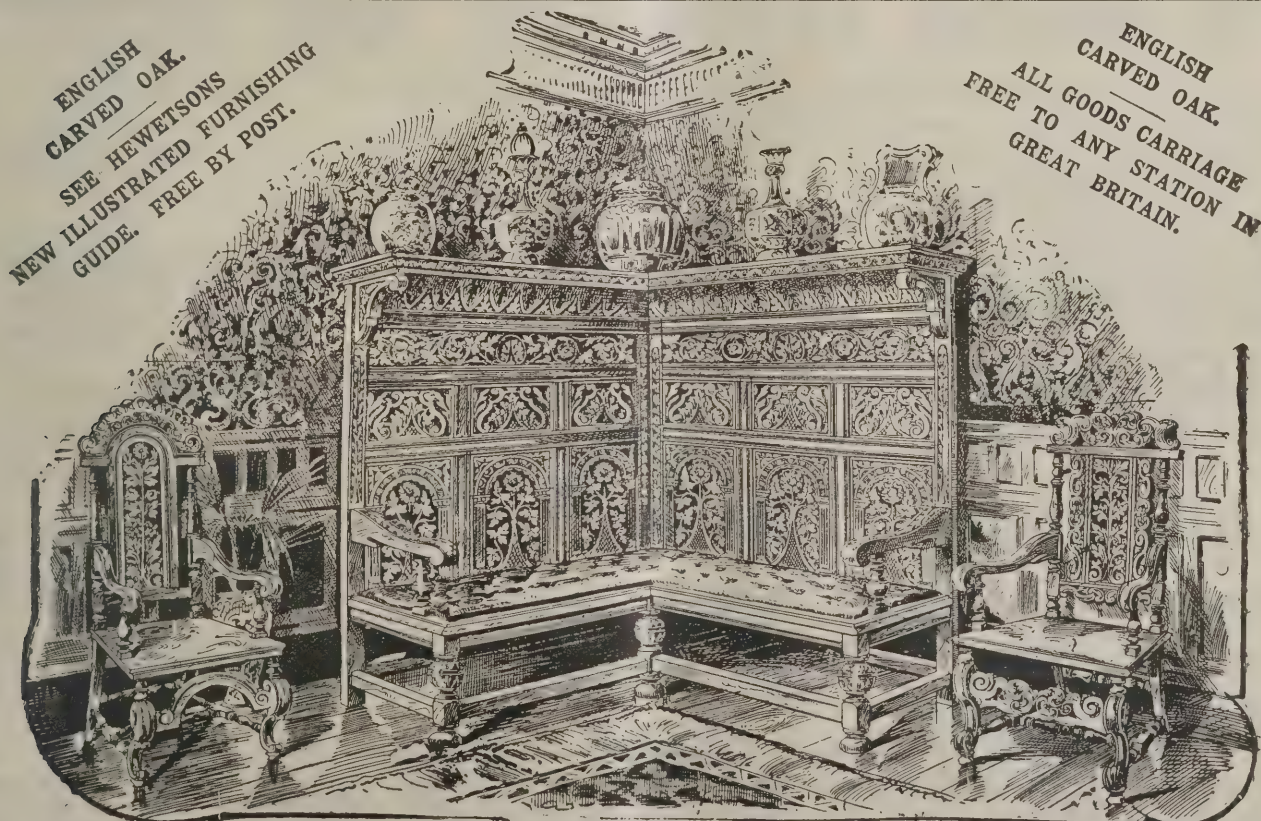
G. Cave . . . . . £3,140 0 0  
Willcock & Co. . . . . 3,080 0 0  
H. Gough . . . . . 3,075 0 0  
Bradney & Lloyd . . . . . 3,018 0 0  
F. L. JONES, Wolverhampton (*accepted*) . . . . . 2,746 0 0  
P. Bowater . . . . . 2,668 0 0

WOOLWICH.

For Science school at the Woolwich Polytechnic. Mr. HENRY H. CHURCH, architect, Woolwich. Quantities by Mr. WALTER WHINCOP, Stoke Newington and Woolwich.

Holliday & Greenwood . . . . . £5,995 0 0  
E. Proctor . . . . . 5,630 0 0  
H. L. Holloway . . . . . 5,572 0 0  
Thomas & Edge . . . . . 5,483 0 0  
Lorden & Son . . . . . 5,300 0 0  
Chessum & Sons . . . . . 5,300 0 0  
Battley, Sons & Holness . . . . . 5,192 0 0  
J. Chapman . . . . . 4,975 0 0  
J. B. Sandford . . . . . 4,875 0 0  
MUNDAY & SONS (*accepted*) . . . . . 4,521 0 0

AN interesting discovery has just been made at Pope's Villa, Twickenham. The house, it is known, stands on or near the site of the house where lived Alexander Pope, but the exact location has not been known until the discovery by some workmen of an old stone, hidden by some masonry. This stone bears the inscription, "On this spot stood until 1809 the house of Alexander Pope. The grotto that formed its basement still remains."



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**TRADE NOTES.**

THE new Cottage Hospital, Newton Abbot, is being warmed and ventilated by means of Shorland's patent Manchester stoves with descending smoke flues, by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. B. FINCH & CO. are issuing their supplement to "Finch's Diary for Architects and Surveyors for 1897," which supplement contains notes, &c., on Plumbing, Evils of Bad Plumbing, Hospital Fittings, Tables for Guidance of Plumbers, Regulations of the Metropolitan and Local Water Companies, Regulations for Registration of Plumbers, &c.

**ELECTRIC NOTES.**

THE electric-light works erected by the Harrogate Corporation about a mile outside the town were opened on the 14th inst. by Colonel Thwaites, chairman of the electric-lighting committee. The Corporation start operations with ninety customers, and in the course of the opening proceedings a confident belief was expressed that the undertaking would ere long be a financial success. The works and installation have cost 25,000*l*.

THE Board of Trade have decided to grant provisional orders to the Reigate Corporation and the Urban District Council of Dorking empowering them to supply electricity within the area of their respective jurisdictions. For this purpose the Reigate Corporation are empowered to spend 15,000*l*., and the District Council of Dorking 10,000*l*. The Board have also granted an electric-lighting order to the Barking Town Urban District Council, who are authorised to expend 15,000*l*. The provisional orders will require confirmation by Parliament before they become operative.

**BUILDING AND BUILDERS.**

A NEW town hall is to be erected for the borough of Conway.

A CHURCH is shortly to be erected at Handforth, near Wilmslow.

IT has been decided to erect a granite obelisk on the Cliffe Hill to the memory of the Lewes martyrs. The memorial will be about 40 feet high, and will entail an expense of about 400*l*.

THE foundation-stones of a new Wesleyan chapel at Ham Green were laid on Tuesday last. The cost of the building will only be 226*l*.

THE 400th anniversary of Cabot's discovery of the North American mainland is to be commemorated in Bristol by the erection of an observatory tower on Brandon Hill, at a cost of 3,000*l*.

THE Rugby Urban District Council have just completed the purchase from Mr. B. H. C. Fox, for 8,000*l*., of eighty acres of land on the north side of the town, chiefly for sewage disposal purposes.

THE Carlisle Town Council have decided to erect a number of workmen's dwellings, at a cost of 2,250*l*., and to have plans prepared for a scheme for lighting the town with electricity, the cost being estimated at 25,000*l*.

THE present vestry hall at Paddington has long been inadequate to public requirements, and it is now proposed to build a handsome and spacious town hall, which will meet the necessities of the growth and be worthy of the importance of the parish.

A NEW extension of the abbey at Crowland is to be carried out, and the foundation-stone has just been laid for the new work. The rector, the Rev. T. H. Le Boeuf, is prominently interesting himself in the undertaking, as he has done in the previous restoration work at Crowland Abbey.

MR. WILLIAM BYRNE, who has been selected as architect for the proposed new church of Teremore, co. Dublin, has submitted plans which have been approved by his Grace the Archbishop. The church will be of the Romanesque style, with nave, side aisles and transepts, and Mr. Byrne calculates that the expense of the church without the spire will be about 12,000*l*.

THE Commissioners of Govan have again considered the competitive designs of the proposed municipal buildings for the burgh. The reports of the experts were adopted unanimously, and the premiums—100*l*., 50*l*. and 25*l*.—were awarded as follows:—First, Messrs. Thomson & Sandilands, 241 West George Street; second, Messrs. Dykes & Robertson, 65 West Regent Street; third, Mr. W. H. Howie, 131 West Regent Street. On Thursday, the 15th inst., the plans were on exhibition in the Robert Street Hall, and from the 20th until the 24th inst. the successful design will be on view in the Burgh Chambers, Albert Street.

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House Cistern fitted with a Cistern Filter.



**PATENT CISTERN FILTERS,** Charged Solely with Animal Charcoal. Requiring, when once fixed, NO attention whatever, and superior to any others. Vide Professor Frankland's Reports to the Registrar-General, July 1866, November 1867, and May 1870.

Also, Testimonials from Dr. Hassall, September 23, 1863; the late Dr. Letheby, February 15, 1865, and December 1873.

Price, £1 10s. and upwards.

Portable Filters on this System, £1 5s. to £3.

Patronised and used by Her Majesty the Queen at Osborne, by H.R.H. the Prince of Wales at Sandringham, by H.R.H. the Duke of Edinburgh at Eastwell, by H.R.H. the Duke of Connaught at Bagshot Park, by H.R.H. the Duke of Cambridge, the *élite* of the Medical Profession, and at the London, Middlesex, St. George's, St. Mary's, Consumption, Fever, and German Hospitals, and various Lunatic Asylums, Institutions, Breweries, &c., and at all the Schools established by the School Board for London. Pocket Filters, 4s. 6d. and 6s. each. Household and Fancy Filters, from 10s. Water-testing Apparatus for detecting impurities in Water 10s. 6d. and 12s. each.

**157 STRAND, W.C. (Four Doors from Somerset House), LONDON.**

Portable Cistern Filters.





IN Boston (U. S.) it has been decided to lay a 12-inch salt-water pipe-line, for fire protection only, in a portion of the city containing many warehouses and office buildings, and regarded by fire-engineers as presenting special hazards. In case of fire in the district near the line of pipes, the city fire-boat is, to be utilised to force water into the pipe, and special hydrants will render the new supply available for the fire-engines.

## VARIETIES.

A NEW temporary iron church dedicated to St. Andrew, which has been erected as a mission in connection with St. John's

THE engine-house and machinery shed at the brickworks of the Scottish Terra-Cotta and Metallic Brick Company, Limited, situated at Braidwood, near Carlisle, were on the 15th inst. discovered to be on fire. Efforts were at once made by the workmen to extinguish the fire, but all the measures taken to extinguish the conflagration were unavailing. The damage is estimated at 3,000*l*.

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for Banks, Warehouse and Newspaper Offices. It is used at the London and County Bank, the Eastern Office and at the Alliance Bank, London and Lancashire Office, and at Messrs. George Newnes & Co.'s Newspaper Offices. These Trolleys are supplied with Rubber Corners to avoid collision with doors, fittings, &c., and can be placed in lift with handles and wheels. It is also used for the application of Sole Manufacturers, J. REAP & Co. Engineers, Confounders, and Pattern Makers, 16 Colindale Street, Southwark, S.E.



THE Archbishop of Canterbury, on the 13th inst., unveiled two stained-glass windows in the triforium in the north transept of Canterbury Cathedral. One is the gift of Mrs. Robertson in memory of her late husband, Canon Robertson, the distinguished Church historian; and the other was given by an anonymous donor. As in the case of the remaining windows on this side of the choir, the subjects of the new windows are taken from the Old Testament. Dean Farrar said that the windows were the first decorative work carried out in connection with the thirteenth-centenary commemoration.

A BEAUTIFUL old Jacobean pulpit of carved oak, which formed part of the appointments in the Archbishop's Chapel at Bishopthorpe, has been presented by the Primate (the most Rev. Dr. Maclagan) to Mrs. Goodwyn, by whom it has been set up in the parish church of Rotherfield, Sussex, "in loving memory of the most Rev. William Thomson. D.D., Archbishop of York from 1863 to 1890." Mrs. Goodwyn is the eldest daughter of the late Archbishop Thomson, and her husband, the Rev. Frederick Wildman Goodwyn, M.A., of Brasenose College, Oxford, Canon and Prebendary of York, is rector of Rotherfield.

A SERIOUS accident occurred at the Phoenix Bessemer Steel Works, owned by Messrs. Steel, Peech & Tozer, Limited, on Tuesday morning. Work had been suspended during the Easter holidays, but had been resumed that morning at six o'clock. Three blows had proceeded all right, and the fourth was just beginning when the explosion occurred. The pipe, which is necessarily of large dimensions, gave way at a point near the blowing engines in the engine-house, and so loud was the report caused by the fracture that it was heard at least a mile distant. A good deal of damage was done to the engine-house, and unfortunately several of the workmen were seriously injured.

THE Glasgow Institute of Architects have now on exhibition at their rooms a selection of drawings submitted for the various prizes and studentships offered by the Royal Institute of British Architects that annually are sent on tour among the affiliated societies. There are architectural designs, measured drawings of old work, pencil sketches and colour studies. For the first the chief prize of the British student is offered—the Soane Gold Medallion, and 100*l.* to be spent on travel for the study of past work—and this is the condition attached to nearly all the other and lesser money prizes. The score or so of drawings are but a sixth of the number submitted, and, selected as the best of their various kinds, are worth study.

THE tenders for the great extension of Ostend harbour and docks, which was provisionally estimated to cost nine millions of francs (360,000*l.*), were opened on the 20th inst. at the offices of the Provincial Government at Bruges, before Baron Ruzette, Governor of the Province. One-half of the cost is to be paid by the town of Ostend and the remainder by the Belgian Government. There were three tenders only—that of a firm at Roulers, West Flanders, 9,435,800 francs; a Bruges firm 9,470,000 francs, and a Paris firm 12,340,030 francs. The tenders will be submitted to the Government at Brussels for final decision. The works include the extension of the outer harbour, the building of a sea wall 850 yards in length, a new dock with 3,000 yards of quay space, bridges, alteration to roads, &c.

### NEW CATALOGUES.

MESSRS. BENNETT'S Ironfoundry Company, of Hyde Road, Manchester, are sending out a strongly bound and well-printed and illustrated catalogue of registered designs of the "Biclam" cast-iron sanitary lavatory stands and ranges, with earthenware basins, suitable for dwelling-houses of all classes, clubs, schools, &c. These designs offer immense variety with a corresponding diversity of price. The "Biclam" cast-iron stands offer the following advantages over wood casings. They do not harbour dirt to the same extent, they are more easily got at, so that any leakage can be readily detected, while there is also greater freedom for cleaning, executing repairs, &c. They are much cheaper and quite as serviceable. They can be easily decorated to harmonise with the surroundings. They are made for every style and every size of earthenware lavatory basin that is in the market, and are very easily fixed.

### RECORD REIGN INVENTIONS COMPETITION.

MESSRS. RAYNER & Co., of 37 Chancery Lane, are conducting for the *Western Mail*, of Plymouth, the Record Reign Inventions Competition. The first subject is "A New Window Fastener." The first prize will be in cash for the sum of 15 guineas; the second prize is a complete patent, value 12 guineas; the third prize is a provisional protection, value 4 guineas. (a) All inventions must be original and practical in their working, and although models are not essential, the particulars forwarded should in all cases be so clear that there can be no possible

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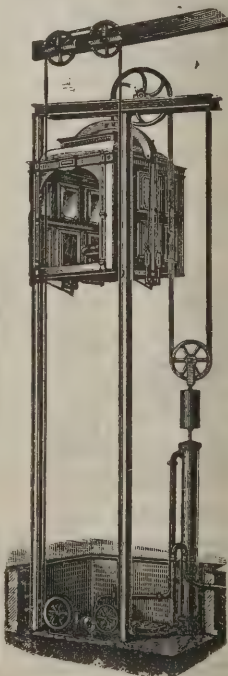
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misconception of the ideas, and competitors are strongly advised to direct their attention to the simplicity and cheapness of the fastener. The judges will take mostly into account the simplicity and usefulness of the article, coupled with the cheapness of manufacture, and their awards will be absolutely final. (b) All inventions must bear the date of provisional protection or patent application after April 8, 1897. Old patents will not be eligible. The executive of the *Western Mail* have decided upon condition (b) entirely in the interests of the competitors. The reason for this decision is twofold. It safeguards the inventor's interests, reserving to him the exclusive control of his invention, and it relieves the executive of the *Western Mail* from a most serious responsibility. Every effort will, of course, be taken to conduct this competition in the most private manner, but the securing of the provisional protection or patent from the Patent Office will safeguard inventors in every respect. The competition will close about the middle of June. All models, explanations and drawings must be sent, carriage paid, to Messrs. Rayner & Co., Patent Editors to the *Western Mail*, 37 Chancery Lane, London, and must be marked boldly in the left-hand corner "Record Reign Invention Competition." Any further particulars that may be required will be forwarded by Messrs. Rayner & Co., to whom all inquiries should be addressed.

### AN ELECTRIC METER PATENT.

JUDGMENT was given by Mr. Justice Wills, on the 10th inst., in an action of considerable interest, whereby Messrs. Chamberlain & Hookham, of Birmingham (makers of the "Hookham" meter), sought to restrain Messrs. Johnson & Phillips, of Charlton, from manufacturing and selling the "Perry" meter, which was alleged to infringe the patent granted to Mr. George Hookham in 1887.

It was urged for the defence that any parts of the "Perry" meter which might be considered an infringement of Mr. Hookham's patent were of general knowledge before 1887, the date of that patent; and further, that a patent granted to Professors Ayrton and Perry in 1882 anticipated it.

It may be mentioned that both these meters are of the motor type, in which type the speed of the motor is proportionate to the amount of energy passing through the meter, and to ensure that the motor will run at a speed proportionate to the current the braking effect must be proportionate to the speed.

Mr. Justice Wills, in delivering judgment for the plaintiffs, stated:—It has been urged upon me that the decision I have arrived at will involve upon Professor Perry, one of the patentees of 1882, great hardship, inasmuch as the defendants are his licensees, working under a patent of 1890, and that it is a strange thing that one of the two men who laid down the correct theory and indicated the lines upon which to work should be thus "hoist with his own petard." I am very truly sorry if my decision does involve hardship, but I cannot help the conclusions I have arrived at. They seem to me, after the most serious consideration, to be the right ones, after which there is no more to be said. But it is well-known law—no intelligent patentee can be ignorant of it—that in order to give right to a monopoly the patentee must not merely set a problem and even render it not very difficult to solve, but must descend to practical details, so that at the expiration of the patent the rest of the world may be able without further experiment to make the patented article. This condition, I think, Messrs. Ayrton and Perry did not fulfil, and, if so, they cannot complain that another should travel by the road they have discovered up to the door which they did not unlock, and, having found the key himself, should unlock the door, go in, and shut them out.

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WE learn that an important section, both at the Crystal Palace and the Victorian Era Exhibition, Earl's Court, is to be set aside for the benefit of those who make a point of having their homes furnished as comfortably, artistically and inexpensively as possible. One of the principal exponents in this class will be the well-known firm of Wm. Wallace & Co., of 151 to 155 Curtain Road, E.C., who have for several years past made a specialty of this class of furniture. Some of these rooms will be arranged by one or other of the lady writers in the Society papers who make a careful study of decorative effect.

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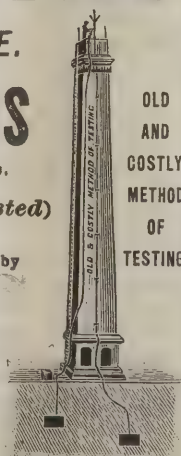
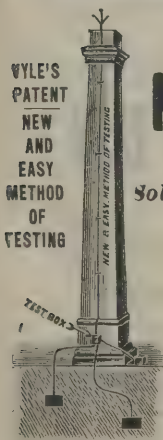
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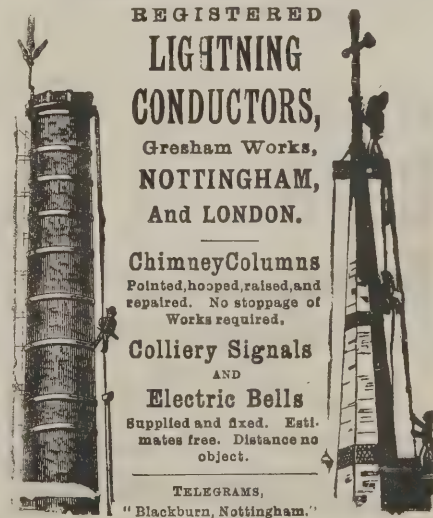
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rooms, we understand, will be arranged by Mr. George Lock, late of Messrs. Collinson & Lock, of Oxford Street, and now established at 38 Conduit Street, Regent Street, where he is doing an extensive business.

With a view to further increasing the business, which is capable of considerable development, both with regard to furnishing and high-class decorations, a company has been registered under the style of G. Lock & Co., Limited, of which Mr. William Wallace, of the firm of William Wallace & Co., will be managing director.

### THE PATENT OFFICE.

THE fourteenth report of the Comptroller-General of Patents, Designs and Trade Marks for the year 1896 has been issued as a Parliamentary paper. It shows that the number of applications for patents, which in 1895 showed a decrease of 324 upon that of the previous year, increased in 1896 by 5,132, an increment four times as large as the average yearly increment. During the last two months of 1896 the applications came in at the unprecedented rate of 700 per week, the total for the year being 30,194. The increase of 1896, like the decrease of 1895, was mainly in provisional specifications, which showed an increase of 4,677, or 22·6 per cent., while the complete specifications accompanying applications showed an increase of only 452, or 10·4 per cent. The principal cause of the rise in patent applications is attributed to the development of the cycle industry, to which more than 5,000 of the inventions had reference. As regards the countries from which the applications were derived, there was a considerable increase in the number from Ireland, from all the Australian colonies except Queensland, from Canada, Natal and New Zealand, and also a certain increase in those coming from the principal foreign States. Of the total number of applications 691, or 2·3 per cent., were made by women, about 153 being for inventions connected with articles of dress. The number of applications for patents in this country received from inventors residing in other States of the Union, under the provisions of the International Convention of 1883, amounted to 247. The number of readers frequenting the Patent Office Library during the year was 113,397, or an increase of 5,112 as compared with the previous year. The new block of buildings facing Staple Inn was occupied by the staff in the early spring of 1896, and

the adjoining block is now in process of reconstruction. During the year 106 volumes of classified abridgments of patent specifications for the period 1884-88 were issued. Some 180,000 letters and forms and about 80,000 parcels of publications were despatched from the office during 1896. The copying of letters and other documents by type-writing machines amounted to about 7,000,000 words.

The number of designs applied for during the year amounted to 21,738, exclusive of 1,111 "sets" of designs, as against 20,507 single designs and 910 "sets" in the previous year. The term "set" includes any number of articles ordinarily on sale together, irrespective of the varieties of the size or arrangement in which the particular design may be shown on each separate article. During the year 1,269 applications for registration of designs were objected to by the Comptroller, and of these 524 were refused on account of their similarity to designs already registered, while the remainder were objected to chiefly on account of want of subject matter or of substantial novelty.

With regard to trade marks, the total number of applications for registration (including 133 applications to the Cutlers' Company of Sheffield) was 9,466, as compared with 8,272 in the previous year, while 3,243 trade marks were advertised and 2,917 were registered.

The total gross receipts from all sources in 1896 were 206,862*l.*, and the total gross expenditure was 96,354*l.*, showing a balance in favour of the Treasury of 110,508*l.* In 1895 the balance was 86,341*l.*, and in 1894, 85,763*l.* The amount of the gross expenditure in each of these years included expenditure on account of new offices and buildings.

### NEW IDEAS IN CERAMICS.

FEW things have been more interesting in recent years than the extended use of ceramic materials for architectural decoration and construction. The opportunities of introducing effects of colour in permanent pottery materials have been largely welcomed by architects, and yet not so much so as might have been expected or desired. Perhaps this may be due to the fact that it is not always easy to bring new ideas to the notice of those most likely to appreciate them. It is certainly difficult for anyone to realise the effect of a decorative scheme from the casual inspection of an isolated fragment of it.

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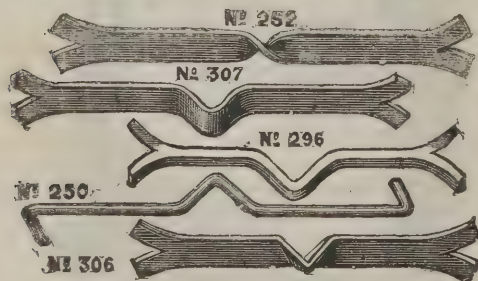
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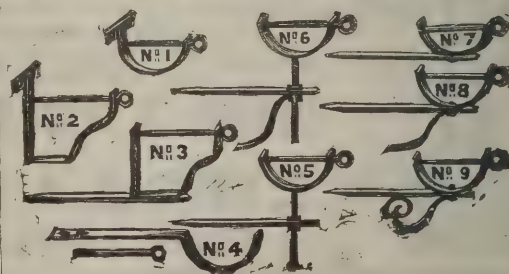
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It is with this thought in mind that Messrs. Doulton & Co. are now arranging in their showrooms at Lambeth a fairly complete display of what they have been producing recently in architectural materials and sanitary construction, and they hope to induce all those interested in the matter to make the journey to Lambeth—not a formidable affair, the showrooms being within two minutes' walk of Lambeth Palace. The works on view will make it evident that in decorative materials Messrs. Doulton & Co. are endeavouring to provide the widest possible range of colour and texture.

The coloured salt-glazed ware (in its earliest form as applied to pottery bearing the distinctive name of "Doulton ware"), with its strong colourings and indestructible glaze, has been used very successfully for tile-facings as well as for constructional block work. Several colours new to salt-glazed stoneware are now available as well as new methods of decoration.

A stoneware with semi-glazed (or eggshell) surface presents many valuable recommendations. It bears, so far, the name of "Carrara" enamelled stoneware, from the similarity of its texture to that of marble. The exterior of the new Birkbeck Bank now being erected in Southampton Buildings, Chancery Lane, from the designs of Mr. T. E. Knightley, is in this material. The absence of a high gloss and the quiet harmony of colour combine to render the effect very striking and suggestive to those who are in search of new materials.

A third class of material for exterior work is found in stoneware with a vitreous-enamelled surface. This ware has a more glossy surface than the "Carrara" stoneware, but is not so glossy as the salt-glazed Doulton ware. The colours applied are more or less opaque, different in this respect from the colours glazed by salt, which always present a somewhat varied transparent appearance brought about by the conditions of the firing. At the high temperature to which all stonewares are exposed in the kilns it is not possible to expect a very extensive palette of colours, but Messrs. Doulton & Co. have successfully enlarged this palette, and show some interesting suggestions in colour effects suitable for all kinds of exterior and interior decoration.

With the rather more extensive colour resources of faience glazes and enamels, Messrs. Doulton & Co. are able to gather together some effective specimens of what they have already supplied for various buildings, and of further new arrangements in colour and design. The body used for the glazed terra-cotta is very hard and is not open to the objections hitherto urged against a soft ware. All kinds of effects are

available in faience modelling in high or low relief, ornament in raised outlines, "underglaze" hand-painted designs of figures, flowers, landscapes, &c., painting in "impasto," painting in glazes or in dull-surfaced enamels, or in Indian and Persian styles. One of the most recent decorative works executed is in ivory-enamelled faience enriched with gold.

It is hardly necessary to do more than mention that in terra-cotta Messrs. Doulton & Co. have recently been entrusted with some large works in which their brown-buff terra-cotta has been successfully introduced.

The showroom for glazed ware mantelpieces and fireplaces has been rearranged, and now contains several new patterns worthy of attention. It is almost too late in the day now to point out the advantages and attractiveness of a glazed ware of good colour for use in what is generally the most conspicuous feature of a room. With these fireplaces is shown one of the open stoves with back and front fires and air-flues which are now being used for hospitals and asylums, the whole construction being in glazed ware.

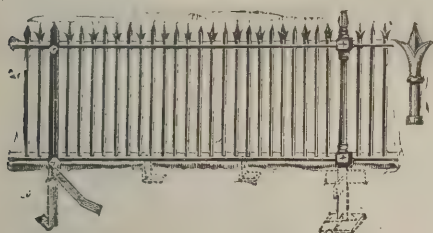
An altogether new showroom has been added to enable the firm to exhibit some of their more recent introductions in sanitary wares and fittings. Among these may be mentioned:—

*The Silent Arrangement for Cisterns.*—All syphons have hitherto made more or less noise in action at the end of the flush; in private houses especially this has been considered a drawback, but by the arrangement of Messrs. Doulton & Co.'s present tank, silent action has been obtained without the power of the flush being in any way weakened.

*Simplificatus Valve Closet.*—This is a new form of closet, being a combination of the pedestal and valve principle, and combines all the advantages of both closets. The basin and trap being entirely of ware, a large body of water is retained in the basin, and owing to the depth of water in the trap, even should the valve be left open, the pan itself can never be dry, the flushing being done by a simple waste preventer.

*1896 Patent Bath.*—This is an arrangement for quick waste to bath, and instead of the old-fashioned standing waste being encased and almost impossible to get at for cleansing, it is in this case exposed, being fitted in a recess at the end of bath. It is glass enamelled inside in order to, as far as possible, prevent fouling, and can be easily removed and cleansed.

*Vitreous and White Porcelain Enamels as Applied to Iron Baths.*—By means of these all the advantages of an earthenware bath may be obtained at a considerably lower cost. The vitreous enamel can be supplied at the same price as the

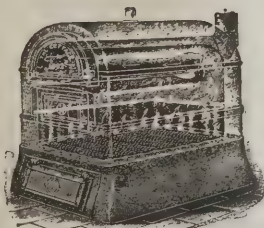


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Architects would find it well worth while to pay a visit of inspection to these interesting showrooms.

### THE BRUSSELS EXHIBITION.

NOTWITHSTANDING the oft-repeated assertion that World's Fairs are "played out," the exhibition about to open at Brussels bids fair to prove, says the Brussels correspondent of the *Times*, a draw in the most comprehensive sense of the word. Nothing could have been better conceived as a device for attracting all sorts and conditions of men than this latest expression of the industrial, artistic, scientific and land-appropriating energies of the human race towards the close of the nineteenth century, planned and put into shape by so art-loving a people as the Belgians. The natural conditions attending the enterprise are also peculiarly favourable. The granite of the country is admirably adapted to the construction of the monumental portico which ushers the visitor into the vast hall, 1,200 feet in length, constituting the main building, and crowned by a dome of majestic proportions.

From this central edifice accessory halls stretch away to the right and left to a distance of 220 metres. The whole block embraces an area of a million superficial feet, and is framed by a landscape which nature and art have alike contributed to beautify.

In conjunction with the erection of the exhibition buildings a nobly devised avenue is in course of construction, which serves as a setting for the whole, and further connects the Parc du Cinquantenaire, or site of the main building standing in Brussels, with the historic park of Terveuren, a village five miles away, whose origin tradition relegates to the days of

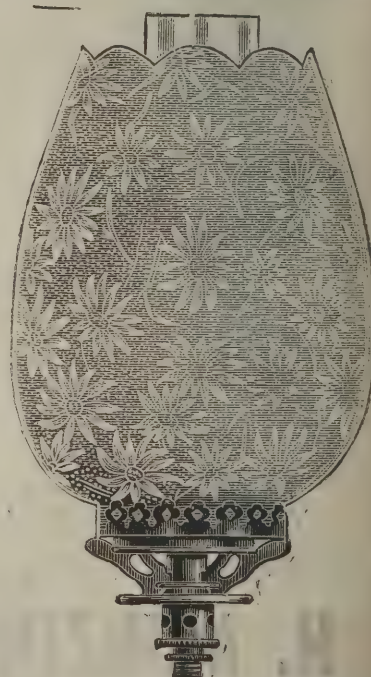
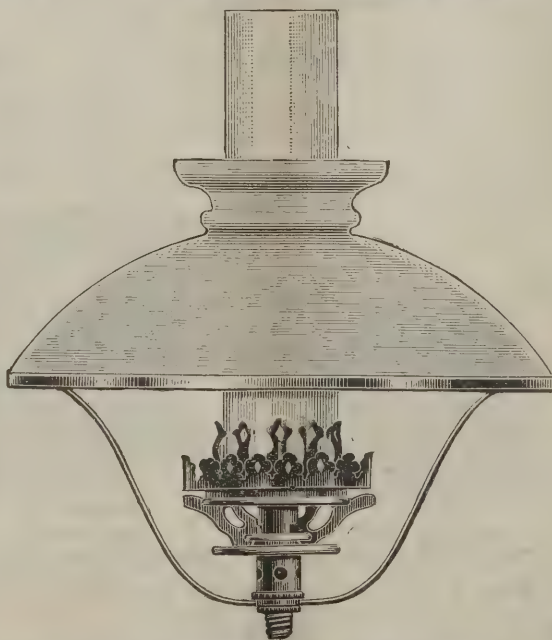
St. Hubert, that mighty hunter before the Lord, who, according to the old chroniclers, "prenait tout son plaisir en chasseries," and who early in the eighth century was converted to Christianity while out hunting by a white stag, which appeared before him carrying "la très sainte croix" between its horns. Under the Dutch Government Terveuren became a royal residence of the Prince of Orange. In later years it was the retreat of the widowed and reason-bereft Empress Charlotte of Mexico, sister of King Leopold of Belgium. For exhibition purposes it has finally blossomed into a Congolese village, if the term may be allowed in connection with the inroad of some 250 unsavoury specimens of the inhabitants of Darkest Africa. There is, however, a certain artistic compensation in noting the uses to which certain products of the Congo State have been turned in Belgium, as an example of which the beautiful ivory Christ hanging upon a cross of native wood, executed by the sculptor Meunier, deserves special mention.

The Avenue de Terveuren has been designed with a lavish regard to the various means of locomotion to which two-legged beings may have recourse. Trees are planted on either side, and the avenue itself is divided longitudinally into five sections, along which one may respectively walk, ride, drive, cycle, or fly through space in an electric tramcar, as the spirit moves one. But each section is sacred to its own particular style of locomotion, and heavy penalties would attach to the error of employing the "voie carrossable" as a "voie cyclable," or *vice versa*. As regards the metaphor of flying through space, there is an exhibit of Baron de Beeckman's which promises to justify it by conveying the traveller for a certain distance at a rate corresponding to the thrilling speed of 130 miles an hour. A peculiarly attractive feature of the exhibition is the reproduction, under the name of Bruxelles-Kermesse, of a conglomeration of quaint old-fashioned shops and dwellings modelled upon the buildings which still existed in the first half of the century, when picturesque façades, small green window-panes, low doorways, and casual angles and corners gave the charm of unexpectedness to the architecture of the day.

Here we see again the fantastic badges with the still more fantastic Flemish legends environing them, that gave such individuality to each separate shop and drinking booth, while to render the illusion still more complete the residents and promenaders are attired in the costumes of 1830.

There is a certain piquancy in the proximity to Old Brussels of the great green lawn where the old-world jousts and sports which justify the name of Bruxelles-Kermesse will be carried on,

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As regards this revival of an ancient part of the town, it must not be forgotten that in the real every-day Brussels, in the lower part of the city, the visitor may see a living and lasting presentment of the architecture of the fifteenth and sixteenth centuries that nothing can surpass, in the beautiful Grande Place, with its world-renowned Gothic Hôtel de Ville and Maison de Roi, hovering between the Gothic and the Renaissance, and its ornate houses of the guilds, with their symbolical and decorative façades.

The entrance to Bruxelles-Kermesse takes the form of a faithful reconstitution of the celebrated triumphal arch, designed by Rubens in honour of the arrival of the Archduke Albert and his wife Isabelle, while the houses follow the lines of those which composed the old quarter of the town known as the Marché au Beurre. Some sixty or seventy of these are utilised as cafés, restaurants, brasseries and establishments for the sale of what the Germans call "Galanterie Waren." Others are reserved for the exercise of industries and crafts peculiar to Brussels, such as lace making, carpet weaving, &c.

A word in conclusion about the organisation of the Brussels Exhibition, which poses as a worthy precursor of the mighty Paris show that is to inaugurate the next century. Its direct patrons are the King and the royal family, and it has the financial aid of the Government, the city of Brussels, and the province of Brabant. The affair, in American parlance, is really run, however, by a great financial society, to whom the profits, if any, will accrue. These are said to be pledged in advance to a national or philanthropic undertaking.

Great satisfaction has been expressed at the number of adhesions notified from other countries. France was first in the field, closely followed by Germany and Great Britain. It is known that Sir Albert Rollit is president of the English Commission. The organisation and executive committees emanate from the administrative commission of the aforementioned financial society, but high influences quite independent of the latter have also been enlisted. For instance, the General Commissioner for the Government is the Comte d'Oultremont, who has represented Belgium at the exhibitions of Philadelphia, Paris, Antwerp, and others. For the foreign section M. Pecher, honorary Consul-general of Belgium, has been appointed president, while the commissary for the jury and the recompense to be awarded is M. Gody, who is also

director of the Société Anonyme, Bruxelles-Exposition. Among Eastern countries, Russia, Persia and China will be well represented. A considerable influx of visitors, among whom the French predominate largely, is already announced.

### THAMES CONSERVANCY.

THE report of the Thames Conservators for the year 1896 has appeared. The Commissioners refer to the completion of the inquiry instituted by Commissioners appointed under the Thames Conservancy Act, 1894, and express concurrence in the opinion of the Commissioners as to the desirability of deepening the river both above and below Gravesend. The Conservators have decided that this work shall be carried out and have entered into a contract for dredging from the Nore to Gravesend a channel 1,000 feet wide and 26 feet deep at low water of spring tides. They have further resolved to dredge channels of the following dimensions above Gravesend:—From Gravesend to Crayford Ness, 1,000 feet wide and 24 feet deep; from Crayford Ness to the Albert Docks, 500 feet wide and 22 feet deep; and from the Albert Docks to the Millwall Docks, 300 feet wide and 18 feet deep. The Conservators have also adopted the recommendation of the Commissioners to discontinue the deposit of dredged material in the river at Deadman's Hole, and have obtained the sanction of the Board of Trade to the discharge of the material at sea in the Barrow Deep. In order that the survey recently completed may be kept up to date, the Conservators intend to appoint two surveyors to sound and chart the river from the Nore upwards, and to establish a self-registering tide gauge at Southend. Thus in future an official record of the condition of the navigable channels of the Thames will always be available, and the information will be of great value to the shipping interests of the port. During the past year 45 sunken vessels were raised by the Conservators' plant—six being steam vessels, measuring 11,327 tons, and 39 sailing vessels and barges, measuring 1,608 tons. The dredging plant was employed in the further improvement of the navigable channel.

The report next describes the various works in progress in the Upper River, and states that the estimates of the Conservators' receipts and expenditure for the river above Staines for 1897 show that, for the first time for many years, there is likely to be a substantial balance of receipts over ordinary expenditure. This balance the Conservators propose to expend

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in additional dredging in parts of the river which are so shallow as to prejudice navigation, and at the same time to prevent the free escape of flood water.

The Conservators have continued to carry into effect the powers conferred upon them by their Act of 1894 to prevent the pollution of the Thames and its tributaries in the largely extended area within which those powers are exercisable—an area covering more than 3,800 square miles—and in doing so have endeavoured to secure the important public object of the purification of the waters of the Thames without putting too great a pressure upon the authorities concerned. Special attention has been given to the more serious cases of pollution from towns and other populous places in the Thames watershed. These places are under close supervision, and samples of the drainage are regularly examined by the analyst to the Conservators. The authorities of several important towns in the watershed, including Newbury, Guildford, Godalming, Caversham and Staines, have completed and brought into operation new sewerage systems by which the pollution of the river and its tributaries from those places should be prevented. Among other places where the requirements of the Conservators are being complied with, mention is made of Sunbury, Swindon, Maidenhead, Uxbridge, St. Albans, Berkhamsted and Willesden, where the local authorities are effecting extensive improvements in the existing drainage arrangements; while at Faringdon, Wantage, Hungerford, Witney, Thame, Aylesbury, Amersham, Marlborough, Aldershot (town and camps) and Woking the authorities have similar schemes before them, some being under the consideration of the Local Government Board. The Conservators have in some instances encountered difficulties in enforcing the provisions of the Act, and have instituted legal proceedings against the responsible parties. In three cases convictions have ensued, and in several other cases the Conservators have consented to an adjournment on receiving from the bodies or persons summoned an undertaking to prevent the continuance of pollution. As the result of protracted action by the Conservators, they have succeeded in securing the adoption by the Corporation of Wokingham of measures by which it is hoped the pollution of the Loddon from that town will be arrested. The villages and other small places in the Thames basin have been inspected, and in many instances pollution has been diverted, while the subject of drainage at many places is receiving the consideration of the rural councils. The inspection of farms, manufactories, private

residences and other scattered premises has been continued, and in 446 cases pollution has been diverted. The houseboats and launches on the river have been watched by the inspectors, and no case of pollution from such vessels has been detected. The Conservators have maintained the flow of the river, and offensive matters have, in compliance with the Act, been removed from the river and its tributaries.

## PATENTS.

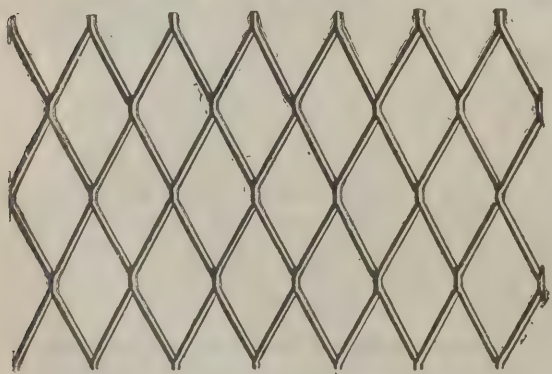
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

- 6060. Archibald Griffin Rider and Edwin Russel, for "Improvements in, and relating to, sliding sash windows."
- 6066. The Wilkinson Sword Company, Limited, for "An improvement in door locks."
- 6113. Frederick Charles Lynde, for "Improvements in flushing cisterns and the like."
- 6129. Thomas Bainbridge, for "Ladder grip and scaffold rest."
- 6138. James Hart Skinner, for "Improvements in, or relating to, chimney ventilating and like cowls."
- 6143. John Arthur Smith, for "Self-locking window sash fastener."
- 6191. John Abraham Noel, for "Improvements connected with chimney or ventilator tops."
- 6224. Edward Taylor, for "Improvements in sash fasteners."
- 6242. John Henry Vidal, for "Improvements in the flushing of water-closets."
- 6310. William Gardiner, for "An improved window fastener."

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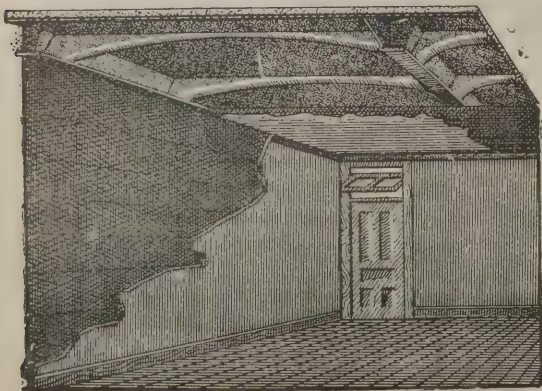
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## COMPETITION OPEN.

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## CONTRACTS OPEN.

ANTRIM.—May 8.—For erection of manse, Templepatrick. Mr. Samuel P. Close, architect, 53 Waring Street, Belfast.

ASHFORD.—May 7.—For new administrative block, addition to infirmary, new chapel and alterations to existing buildings, &c. Mr. Horace Hamilton, clerk, 11 Bank Street, Ashford.

BILDON.—May 11.—For erection of residence, stabling, &c., in Langley Lane. Messrs. Fairbank & Wall, architects, Craven Bank Chambers, Bradford.

BANGOR.—May 1.—For completion of the tower of St. Comgall's parish church. Mr. Stephens, building surveyor, Donegall Square Buildings.

BANSTEAD.—May 7.—For enlargement of the schoolrooms. Mr. Cecil Sharp, architect, 59 Fenchurch Street.

BARRY DOCK.—May 10.—For erection of a chapel and schoolroom at Holton Road, Barry Dock. Rev. T. Pandey John, 25 Regent Street, Barry Dock.

BARWICK-IN-ELMET.—For pulling-down three houses and other buildings near Barwick Church, building boundary wall, and other work for addition to churchyard. Rev. Canon Hope, Barwick-in-Elmet.

BEESTON.—For erection of a pair of villas. Mr. J. Huckerby, surveyor, 8 The City, Beeston, Notts.

BEESTON.—April 30.—For erection of Council offices. Mr. Hedley J. Price, architect and surveyor, 24 Low Pavement, Nottingham.

BILLERICAY.—May 11.—For supplying and laying wood-block flooring to two dayrooms at the Union House. The Master.

BLACKBURN.—May 8.—For erection of a laundry at the Workhouse. Mr. James Aspinall, architect, Victoria Street, Blackburn.

BRADFORD.—For erection of conveniences, &c., to property in St. Jude's Street, Manningham. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

BRADFORD.—May 1.—For erection of two villas near Manningham Park. Mr. T. C. Hope, architect, Old Bank Chambers, Bradford.

BRISTOL.—May 10.—For enlargement of the premises of Herbert Ashman & Co., Broadmead and Silver Street. Mr. James Hart, architect, Liverpool Chambers, Corn Street, Bristol.

BROCKLEY.—May 11.—For erection of public conveniences at Hilly Fields. Architect's Department, County Hall, Spring Gardens, S.W.

BURNLEY.—For erection of three lock-up shops at the junction of Yorkshire Street and Plumbe Street. Mr. Charles Parsons, architect, 9 Grimshaw Street.

BUCHAREST.—May 18.—For construction of an industrial school at Jassy. Application to the Roumanian Ministry of Agriculture at Bucharest.

CARDIFF.—May 3.—For the extension of Albany Road Board School. Mr. S. Rooney, architect, Cefn Mably Chambers, Quay Street, Cardiff.

CARDIFF.—May 17.—For erection of a branch free library at the docks. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CHARLTON.—May 4.—For erecting a shelter in gymnasium at Maryon Park, for the London County Council. Architect's Department, County Hall, Spring Gardens, S.W.

CLAYTON-LE-MOORS.—May 15.—For erection of thirteen houses in one lot. Directors, Co-operative Society, Clayton-le-Moors.

DARLINGTON.—May 3.—For science and art fittings for the technical college now in course of erection. Mr. F. T. Steavenson, town clerk, Houndgate, Darlington.

DURHAM.—For erection of one house and shop at Hobson. Mr. T. H. Stafford, South Garesfield, Lintz Green.

DURHAM.—May 6.—For erection of two blocks of houses at Kettledrum and Manx Rows, Stanley, R.S.O. Mr. T. E. Crossling, architect, Stanley.

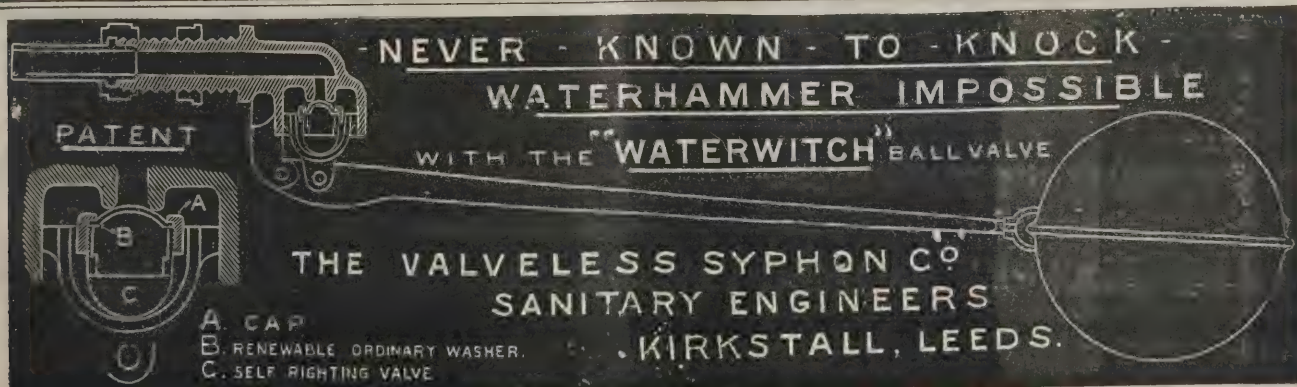
EDINBURGH.—May 8.—For additions to South Morningside Public School. Mr. Wilson, 3 Queen Street, Edinburgh.

ELGIN.—May 8.—For erection of shops and dwelling-houses at 32 High Street. Mr. James Jamieson, 2 Commerce Street, Elgin.

ESSEX.—For erecting a pair of semi-detached villas in the Drive, Buckhurst Hill. Mr. Edmond Egan, architect, Loughton.

FEATHERSTONE.—May 6.—For erection of business premises and manager's house. Mr. William Hurst, architect, Pontefract.

FELIXSTOWE.—May 4.—For erection of four houses. Messrs. William Eade & E. Thos. Johns, architects, Ipswich.



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**GLAMORGAN.**—May 15.—For certain work required in erecting a new stage, staircases, lavatories, supper-room, ventilation, &c., for the Town Hall Trust, Bridgend. Messrs. Lambert & Rees, architects, Bridgend.

**GLOUCESTER.**—May 4.—For erection of a cottage at Barber's Bridge Station. Mr. G. K. Mills, secretary, G.W.R., Paddington Station, London.

**GOSPORT.**—May 12.—For erection of boundary wall and entrance gates at dépôt, South Street, for the Gosport and Alverstock Urban District Council. The Surveyor, High Street, Gosport.

**GREAT YARMOUTH.**—May 4.—For alterations at the Free Library, for the Free Library committee. Mr. J. Wm. Cockrill, borough surveyor, Town Hall, Great Yarmouth.

**HALIFAX.**—May 12.—For erection of stables, cart-sheds, &c., at Washer Lane Dyeworks. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

**HALIFAX.**—May 3.—For taking-down the Barrack Tavern and other buildings, &c., in Charles Street and Causeway, in the borough of Halifax, and erecting upon the site additions to the premises of the Automatic Standard Screw Company. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

**HALIFAX.**—May 6.—For erection of a brick chimney, about 55 yards high, at Washer Lane Dye Works. Messrs. Richard & R. E. Horsfall, architects, 15 George Street, Halifax.

**HANWELL.**—May 10.—For erection of temporary iron structures at the Asylum. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

**HARTING.**—May 15.—For enlargement of schools. Mr. C. Taylor, South Harting.

**HARTLEPOOL.**—May 11.—For conversion into coastguard dwellings, battery, &c., of buildings formerly used as militia barracks. R.N.R. Battery, West Hartlepool.

**HENDON, N.W.**—May 10.—For erection of an asylum. Messrs. Giles, Gough & Trollope, architects, 28 Craven Street, Strand, W.C.

**HORSELYDOWN.**—May 30.—For erection of a laundry at Workhouse, Parish Street, Rotherhithe, and for repairing, painting, distempering, whitewashing, &c., the interior of the Infirmary, Lower Road, Rotherhithe. Messrs. Newman & Newman, architects, 31 Tooley Street, S.E.

**HUDDERSFIELD.**—May 6.—For erection of a villa residence, with surgery attached, near Riding Wood, Clayton West. Messrs. John Kirk & Sons, architects, Huddersfield.

**ILLINGWORTH.**—May 4.—For erection of a detached house in Raw Lane. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

**IRELAND.**—May 8.—For erecting new platform pulpit, for the committee of Drumquin Presbyterian church. Rev. D. Marshall, Drumquin.

**KELD.**—May 8.—For extension of the schoolroom. Mr. Thos. Wilson, Keld.

**KENDAL.**—May 1.—For erection of Victoria mills and offices in Sandes Avenue. Mr. Robert Walker, architect, Windermere.

**LANCASTER.**—May 5.—For alterations at the slaughter-houses and cattle auction mart. Mr. T. Cann Hughes, town clerk, Town Hall, Lancaster.

**LANCASTER.**—May 8.—For erection of a mixed school, with offices, &c., in Bowerham Lane. Mr. Herbert D. Wilson, clerk, 85 Church Street, Lancaster.

**LANCASTER.**—May 8.—For rebuilding St. Mark's Church, Dolphinholme. Messrs. Wright & Son, surveyors, Lancaster.

**LEEDS.**—May 4.—For erection of nine houses to be built in Stanningley Road, Stanningley. Mr. C. Fredk. Wilkinson, architect, 35 Park Square, Leeds.

**LONDONDERRY.**—May 5.—For erection of boundary walls. Mr. Joseph McArthur, Burt.

**LONDON.**—May 10.—For erection of temporary iron structures at Hanwell Asylum, W. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

**MALLOW.**—May 7.—For erection of piers and gates to cottages in electoral division of Buttevant. Mr. Maurice Regan, clerk, Workhouse.

**MANCHESTER.**—For boundary walling, wrought-iron fencing and cast-iron posts, &c., at the Bellott Street Recreation Grounds, Cheetham. City Surveyor, Town Hall, Manchester.

**MARKET WEIGHTON.**—May 4.—For erection of a public hall, overseers' office and caretaker's house in Northgate. Messrs. Jelder & Kitchen, architects, 76 Lowgate, Hull.

**MORLEY.**—May 7.—For erection of a house. Mr. George B. Clegg, architect, 2 Peel Street, Morley.

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**NEWQUAY.**—April 30.—For erection of the Headland Hotel. Mr. Silvanus Trevail, Truro.

**NEW SWINDON.**—May 4.—For additions to house and shop, 14 Fleet Street. Messrs. William Drew & Sons, architects and surveyors, 22 Victoria Street, Swindon.

**NEW TREDEGAR.**—May 7.—For alterations to 105 and 106 Commercial Street. Mr. H. Sketch, architect, New Tredegar.

**NOTTINGHAM.**—For erection of a technical centre in the Leen Side School yard. Mr. A. H. Goodall, architect, Market Street, Nottingham.

**OBAN.**—For erection of a manse in the parish of Acharacle. Mr. William Mackenzie, architect, 42 Stevenson Street, Oban.

**PLYMOUTH.**—May 10.—For erection of new brewery, for Messrs. Polkinghorne & Co., Plymouth. Messrs. Geo. Adams & Sons, engineers, Bristol.

**PLYMOUTH.**—May 10.—For erection of covered market and new offices for Weights and Measures Department. Mr. J. H. Ellis, town clerk, Plymouth.

**PONTYPOOL.**—May 1.—For erection of new infants' school and other alterations at Park Terrace Road Schools. Messrs. Lansdowne & Griggs, architects, Newport, Mon.

**PORTSMOUTH.**—April 30.—For erection of drill hall, for the 2nd Hants V. A. Messrs. Rake & Cogswell, architects, Prudential Buildings, Portsmouth.

**PRESTON.**—April 30.—For erection of stabling for 140 horses, shedding and adjunct works. Messrs. Garlick & Sykes, architects, 33 Winckley Square, Preston.

**ROTHERHAM.**—May 14.—For erection of a swimming-bath in Market Street. Mr. H. H. Hickmott, town clerk, Council Hall, Rotherham.

**RUNCORN.**—May 3.—For erection of a new block of buildings in extension of the Victoria Road schools, 170 boys and 170 girls. Messrs. F. & G. Holme, architects, Westminster Chambers, Crosshall Street, Liverpool.

**SALOP.**—For additions to the National School, Smethcote, near Lebotwood. Messrs. A. B. & W. Scott Deakin, architects, Pride Hill, Shrewsbury.

**SCARBOROUGH.**—May 5.—For enlargement of post office. Mr. J. Flew, 11 Popplewell Chambers, Bradford.

**SCOTLAND.**—May 1.—For erection of a block of dwelling-houses in New Street, Dalgrain, Grangemouth. Mr. G. Deas Page, architect, Old Glebe Chambers, Falkirk.

**SCOTLAND.**—May 3.—For erection of a tenement of dwelling-houses at Sunnyside, Alloa. Mr. George Alexander Kerr, architect, 37 Mill Street, Alloa.

**SCOTLAND.**—May 5.—For additions and renovations of Free Church, Lochmaben. Mr. T. Elton Watson, National Bank House, Lochmaben.

**SHEFFIELD.**—May 3.—For erection of St. Peter's new church and schools at Heeley. Mr. E. Fitt, 138 Alexandra Road, Heeley.

**SLEAFORD.**—May 3.—For erection of a minister's house on the site of No. 22 North Gate. Mr. W. H. Mumby, Market Place, Sleaford.

**STACKSTEADS.**—May 5.—For alterations at Rookhill, Tunstead, near Stacksteads. Mr. S. T. Williams, architect, Waterfoot.

**ST. PANCRAS.**—May 5.—For the cleansing and redecoration of the vestry hall and offices, and for the panelling of the ceiling of the large hall. Mr. C. H. F. Barrett, vestry clerk.

**SUSSEX.**—April 30.—For reshingling and repairing church spire, Bury. Mr. Lacy Ridge, architect, 11 Verulam Buildings, Gray's Inn, W.C.

**SUTTON ST. EDMUNDS.**—May 5.—For erection of school and teacher's residence at South Eau Bank. Mr. R. H. H. Hand, architect, Spalding.

**TILEHURST.**—May 4.—For erection of a cottage at Tilehurst Station. Mr. G. K. Mills, secretary, Paddington Station.

**WALES.**—May 4.—For erection of a chapel at Skewen, Mr. Rees Llewelyn, architect, Birch Grove, Llansamlet Higher.

**WALES.**—May 5.—For erection of a Wesleyan chapel at Abercynon. Mr. Lewis Davies, Margaret Street, Abercynon.

**WALES.**—May 11.—For building thirty-five cottages at Penwynn, Dowlais. Messrs. John Vaughan & Sons, solicitors, Old Post Office Chambers, Merthyr Tydfil, and 8 High Street, Cardiff.

**WALKLEY.**—For erection of new Primitive Methodist Sunday-school, Greenhow Street. Mr. William J. Taylor, architect, 38 Bank Street, Sheffield.

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WALSALL.—May 5.—For re-erection of boundary wall in Vicarage Place. Messrs. Bailey & McConnal, architects, Bridge Street, Walsall.

WESTCLIFF-ON-SEA.—May 10.—For erecting the superstructure of the Queen's Hotel. Messrs. James Thompson & Greenhalgh, architects, Bank Chambers, Southend.

WYLVE.—May 4.—For erection of five cottages at Wylve Station, Wiltshire, for the Great Western Railway Company. Mr. G. K. Mills, Secretary, Paddington Station.

## TENDERS.

### ACCRINGTON.

For construction and furnishing of cases for the museum at Oak Hill Park, also for the alteration to the floor and ceiling of the museum. Mr. W. J. NEWTON, borough engineer.

ACCRINGTON AND CHURCH CO-OPERATIVE SOCIETY (accepted) . . . . . £165 0 0

### ADDLESTONE.

For alterations and additions to Mountain Ash and 1 Richmond Villas, Station Road. Mr. ALBERT VENESS, architect, Brighton Road, Addlestone.

#### Mountain Ash.

Rayner & Winkworth, Kingston . . . . . £225 0 0  
W. Greenfield, Weybridge . . . . . 218 0 0

#### Richmond Villa.

Rayner & Winkworth . . . . . 399 0 0  
W. Greenfield . . . . . 298 0 0

#### Garden Wall.

W. Greenfield . . . . . 10 0 0  
Rayner & Winkworth . . . . . 7 0 0

### ALVERSTOKE.

For alterations and additions to the Workhouse. Mr. HARRY A. F. SMITH, M.S.A., architect, Star Chambers, Gosport.

Clarke & Sons, Portsmouth . . . . . £4,238 0 0  
T. P. Hall, Portsmouth . . . . . 4,197 0 0  
T. W. Quick, Portsmouth . . . . . 4,126 0 0  
J. Crockerell, Portsmouth . . . . . 4,052 0 0  
C. M. Dash, Gosport . . . . . 4,032 0 0  
C. J. Lear & Son, Gosport . . . . . 3,970 0 0  
W. T. DUGAN, Portsmouth (accepted) . . . . . 3,758 0 0

### ATHERTON.

For erection of new cotton spinning mill and appurtenances. Messrs. BRADSHAW & GASS, architects, 19 Silverwell Street, Bolton.

J. PARTINGTON & SON, Oldham (accepted).

### BATH.

For extension of buildings of the Bath Corporation electric light works at Dorchester Street.

Hughes & Weeks . . . . . £2,730 0 0  
S. Ambrose . . . . . 2,684 0 0  
W. Webb . . . . . 2,659 0 0  
J. Tong & Son . . . . . 2,387 0 0  
HAYWARD & WOOSTER, Bath (accepted) . . . . . 3,327 0 0

### BEDFORD.

For erection of new sawmill for Smith's Timber Company, Limited. Mr. WALTER SHAW, architect, 17 The Drapery, Northampton.

T. H. COLEMAN, 84 Foster Hill Road (accepted) . . . . . £1,098 15 0

### BODMIN.

For erection of a residence near Great Western Railway Station. Mr. WILLIAM J. JENKINS, architect, Bodmin.

J. Marshall . . . . . £1,089 0 0  
S. Trehan . . . . . 780 0 0  
HAM, GROSE & GARLAND, Bodmin (accepted) . . . . . 760 0 0  
J. H. Mitchell . . . . . 716 0 0

### BRADFORD.

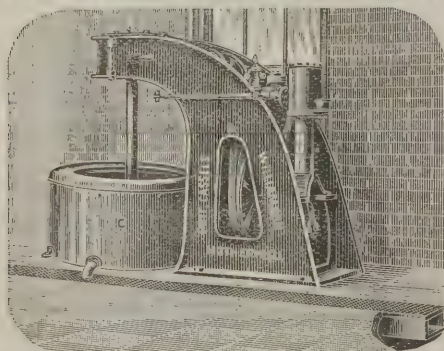
For erection of house, stable and coach-house in Barkerend Road. Mr. G. C. GAMBLE, architect, Parkinson's Chambers, Market Street, Bradford.

W. TOTTY & SONS, Bradford (accepted).

### BURNLEY.

For erection of a memorial in Scott Park. SMITH BROS., Stone Sawmills, Eastham Place, Burnley (accepted).

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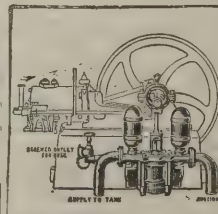
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## CARDIFF.

For supply and erection of about 500 yards of strong unclimbable iron fencing, 6 feet 6 inches high, around the site of the proposed high-level service reservoirs on Penylan Hill. Mr. C. H. PRIESTLEY, waterworks engineer, Town Hall, Cardiff.

Perkins Bros.	£499	4	6
G. Kyte & Co.	383	10	0
C. J. Raybould	380	0	0
A. & J. Main & Co., Limited	366	12	0
J. Williams & Sons	324	4	3
Priest & Son	318	17	0
Fletcher & Co.	295	14	3
D. Rowell & Co.	294	12	0
Rowland Bros.	287	19	0
Walker Bros.	287	15	0
Cross Bros.	285	18	10
Expanded Metal Co.	275	12	0
HILL & SMITH, Dudley (accepted)	271	8	0
G. B. Smith & Co.	270	3	6

For erection of bottling stores, &c., at the Eagle Brewery. Messrs. VEALL & SANT, architects, 5 and 6 Arcade Chambers, High Street, Cardiff.

W. Thomas & Co.	£2,475	0	0
Williams & Thomas	2,098	0	0
J. Blight	2,089	0	0
H. Gibbon	2,050	0	0
J. Shepton & Son	2,035	0	0
J. Gibson	2,023	0	0
Melhuish Bros.	1,998	0	0
Johns & Maddren	1,996	0	0
Turner & Son	1,939	0	0
Knox & Wells	1,900	0	0
Cadwallader & Hockridge	1,900	0	0
J. Thomas	1,890	0	0
J. H. Venning	1,885	0	0
W. Symonds & Co.	1,820	0	0
J. ALLAN (accepted)	1,798	0	0

## COCKERMOUTH.

For painting and decorating the Congregational Sunday School.

D. Pearson	£24	3	6
P. ROBINSON & Co., Main Street (accepted)	18	2	6

## DORCHESTER.

For additions and repairs at the Junction Hotel. Mr. A. L. T. TILLEY, architect, Dorchester.

P. BARRETT & SON, East Parade (accepted) .£1,134 0 0

For painting and decorating municipal buildings, including the Town Hall and Corn Exchange.

BARRETT & SON, Bridport (accepted) .£165 0 0

## EDINBURGH.

For construction of reservoir at Talla, with house and buildings.

John Best—reservoir 164,675<sup>l</sup>., house and buildings 3,789<sup>l</sup>., total 168,464<sup>l</sup>.

JAMES YOUNG & SONS (accepted)—reservoir 159,898<sup>l</sup>., house and buildings 3,235<sup>l</sup>., total 163,133<sup>l</sup>.

Thomas Peattie—reservoir 143,969<sup>l</sup>., house and buildings, 4,070<sup>l</sup>., total 148,039<sup>l</sup>.

## FULHAM.

For paving and kerbing two roadways at the Western Fever Hospital, Seagrave Road.

G. Wimpey & Co. .£437 0 0

B. Nowell & Co. .430 0 0

W. GRIFFITHS, Kingsland Road (accepted) .396 0 0

For redraining eight houses. Mr. J. RANDALL VINING, surveyor, 89 Chancery Lane, W.C.

R. A. Jordan .£198 10 0

J. DORKING & SONS (accepted) .175 0 0

## GLAMORGAN.

For erection of classrooms, &c., at Cowbridge Grammar School. Mr. E. J. WILLIAMS, architect, Cardiff.

W. A. James .£1,370 17 0

A. J. Howell & Co. .1,369 0 0

C. H. Cooksley .1,332 10 0

J. MORGAN, Pontyclun (accepted) .1,275 10 0

Evans & Owens .1,200 11 5

C. K. Parsons .1,150 0 0

## HASTINGS.

For putting up concrete bank wall to the High Bank, Ore.

Vorley .£1,130 0 0

Cornford & Smale .517 10 6

Gutsell .456 0 0

Smith .419 0 0

Piper, sen. .395 0 0

PIPER, jun., Hastings (accepted) .389 0 0

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**HASTINGS—continued.**

For providing and laying in about 86 yards of 9-inch pipe sewer in Old Hollington Lane.

Chapman & Cuff . . . . .	£54	9	0
Cornford & Smale . . . . .	45	17	4
Smith . . . . .	42	10	0
Poole . . . . .	42	3	0
Piper, jun. . . . .	41	10	0
Gutsell . . . . .	39	0	0
PIPER, sen., Hastings (accepted) . . . . .	35	10	0

For providing and fixing a wrought-iron fence to the High Bank, Ore.

Willett . . . . .	£187	17	6
Piper, jun. . . . .	160	0	0
Gutsell . . . . .	146	0	0
Smith . . . . .	130	0	0
Vinall . . . . .	122	10	0
Cornford & Smale . . . . .	120	0	0
Trinder . . . . .	118	0	0
Oakley . . . . .	116	3	4
Raybould & Co. . . . .	112	10	0
MALLETT & CO., London (accepted) . . . . .	109	6	6

**IPSWICH.**

For alterations and additions to Tower House, Tower Street, Ipswich, for the adaptation of the premises for the purposes of offices and cookery and pupil teachers' centres. Mr. J. S. CORDER, architect, Tower Street, Ipswich. Quantities by Mr. J. S. PARMENTER, Ipswich.

Parkington & Son . . . . .	£2,599	0	0
Grimwood & Sons, Ipswich . . . . .	2,569	0	0
S. Hipwell, Wisbech . . . . .	2,527	0	0
E. West, Chelmsford . . . . .	2,460	0	0
G. Kenney . . . . .	2,295	0	0
S. Kenney . . . . .	2,293	0	0
F. Bennett, Ipswich . . . . .	2,185	0	0

**LEDGBURY.**

For erection of villa residence and outbuild'gs. Mr. G. H. GODSELL, architect, Hereford.

R. Taylor . . . . .	£133	0	0
J. Davies . . . . .	85	0	0
G. Hill . . . . .	83	19	2
E. W. WILKS, Hereford (accepted) . . . . .	81	0	0

**KEIGHLEY.**

For erection of additions to warehouse, &c., New Road Side. Mr. JOHN HAGGAS, architect, North Street, Keighley.

*Accepted tenders.*

J. Hird, Ingrow, near Keighley, mason.  
J. Hartley, Harwood Hill, Oakworth, near Keighley, joiner.  
W. Thornton, Bromley Road, Bingley, slater.  
Wilson Bros., Oakworth Road, Keighley, plasterer.  
A. Smith, Domems Road, Ingrow, near Keighley, plumber.  
Total, 500l.

**LEAMINGTON.**

For erection of a steel suspension footbridge, carried on timber piers—span 100 feet, width 8 feet—for the Corporation. Mr. W. DE NORMANVILLE, borough engineer, Town Hall, Leamington.

A. Thorne . . . . .	£983	0	0
Phoenix Foundry Co. . . . .	825	0	0
W. Glover & Sons . . . . .	671	16	11
J. O. BRETTELL, Worcester (accepted) . . . . .	635	11	10

**LEEDS.**

For setting back boundary-wall of Board-school playground.

J. SPEIGHT, Chapeltown Road (accepted) . . . . .	£149	10	0
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For erection of stone abutments and wing walls for steel bridge over the river near Rodley.

A. BRAITHWAITE & CO., Park Square (accepted subject to approval of Council) . . . . .	£1,456	0	0
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For erection of a steel girder bridge over the river near Rodley, including two lines of cast-iron pipes.

J. BUTTER & SONS' TRUSTEES, Stanningley (accepted subject to approval of Council) . . . . .	£3,789	0	0
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**LINCOLNSHIRE.**

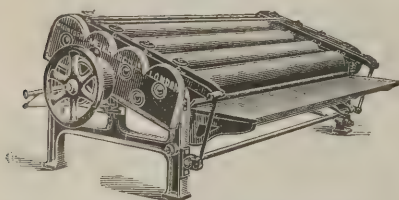
For alterations to the police station at Spittlegate.

RUDD & SON, Grantham (accepted) . . . . .	£203	3	2
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**LONDONDERRY.**

For erection of a gate-lodge at Dullerton. Mr. W. E. PINKERTON, architect, 8 Diamond, Derry.

J. Goligher & Co. . . . .	£745	0	0
R. Colhoun . . . . .	656	0	0
J. COLHOUN, Strand Road, Londonderry (accepted) . . . . .	615	0	0

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## LONDON.

For the erection of a warehouse in Ironmonger Lane, E.C., for Mr. L. Salomons. Mr. GEO. WAYMOUTH, architect, 23 Moorgate Street, E.C. Quantities by Mr. A. PAULL, 6 Quality Court, W.C.

Colls & Sons	£2,985	0	0
Grover & Sons	2,848	0	0
Richardson Bros.	2,744	0	0
Lown & Sons	2,735	0	0
Dove Bros.	2,685	0	0
J. H. Johnson	2,345	0	0

For additions, to joinery mills, Drummond Road. Mr. H. PHELPS DREW, architect, 33 King Street, Covent Garden, W.C.

COLLINS & Co. (accepted)	£400	0	0
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## MITCHAM.

For erection of laundry, laundrymaid's house, baths for boys and infants' lavatories, at schools, Mitcham. Mr. C. E. VAUGHAN, architect, 25 Lowther Arcade, Strand, London.

W. Reason	£6,137	0	0
H. WALL & Co., Carlton Road, N.W. (accepted)	6,087	0	0

## MORTLAKE.

For erection of stables, steam-roller house, cart-sheds, &c. at the Mortlake Dépôt, for the Barnes Urban District Council. Mr. G. BRUCE TOMES, engineer and surveyor, Mortlake. Quantities by Mr. J. T. CARLESS, 39 Old Queen Street, Westminster.

J. R. Broderick	£2,996	0	0
W. H. Lorden & Son	2,687	0	0
J. N. Brooking	2,527	0	0
H. Brown	2,485	0	0
A. HUNT, Archway Street, Barnes (accepted)	2,390	0	0

## OBAN.

For new municipal buildings, Oban. Cost about 6,000l. Mr. A. SHARP, architect, Oban.

## Accepted tenders.

D. & J. McDougall, Crescent Road, mason and joiner.
A. MacArthur, Oban, plumber.
Ross & Peat, Oban, plasterer.
A. Calderwood, Oban, bellhanger and gasfitter.
W. Proctor, Oban, slater.

## OAKWOOD.

For construction of a service reservoir at East Oakwood and small collecting reservoir at Carr Hill, and the laying of about 1,830 yards of 3-inch and 2-inch cast-iron pipes and connections. Mr. EDWARD BROWN, engineer, 85 Clayton Street, Newcastle-on-Tyne.

W. Cumming	£579	19	9
J. Carrick	523	3	0
Kirk & Brown	521	16	9
F. G. Kirtley	498	11	0

G. BAILEY, 9 Eldon Place, Newcastle-on-Tyne

(accepted)	496	13	0
Engineer's estimate	508	16	9

NOTE.—Private tenders were taken for the pipes and valves, &c. In addition the tender of Abbot & Co., Gateshead-on-Tyne, which was the lowest, has been accepted.

## ROTHES (ELGIN).

For supplying and laying about 2,570 lineal yards of glazed fireclay pipes from town to disposal works, for the Police Commissioners. Mr. LOUIS HARPER, engineer, 115 Union Street, Aberdeen.

Milne & Duncan	£1,263	0	9
G. Innes	1,047	17	0
R. Anderson	893	10	0
J. Bain	868	3	0
R. Marshall	835	8	0
C. Stuart	787	15	4
G. Shanks	783	12	0
J. WARRACK, Aberdeen (accepted)	753	10	11

## SANDY.

For erection of a dwelling-house. Mr. E. TWELVETREES, architect.

J. P. White, Bedford	£493	0	0
Woodman, Potton	489	0	0
Rainsford Bros., Potton	464	0	0
French & Co., Sandy	460	0	0

## SCOTLAND.

For building an ironstone kiln at Loanhead.

J. MCLEOD & SONS, Dalkeith (accepted).

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**SOMERSET.**

For erection of a new gasometer.

*Accepted tenders.*Cockey & Son, Frome, ironwork.  
H. W. Pollard, Bridgwater, brickwork.**SOUTH SHIELDS.**

For extension to boundary walls, Harton Cemetery, for the South Shields Burial Board. Mr. HENRY GRIEVES, architect, South Shields.

G. T. Manners, Durham	£1,498	0	0
Robert Brown, South Shields	1,318	19	6
G. Thornton & Co., South Shields	1,290	8	0
ROBERT ALLISON, Whitburn ( <i>accepted</i> )	1,199	8	0
Robert Hudson, Sunderland ( <i>withdrawn</i> )	1,119	0	0

**STOWMARKET.**

For construction of sewers, manholes and other appurtenances, and of two pumping stations, cast-iron rising mains, sewage tanks and other works, for the East Stow Rural District Council. Messrs. JOHN TAYLOR, SONS &amp; SANTO CRIMP, engineers, 27 Great George Street, Westminster.

S. Hipwell	£4,457	0	0
E. Iles	4,229	0	0
A. Coe	4,000	0	0
G. Double	3,736	18	0
H. Weldon	3,626	0	0
J. Jackson	2,954	15	6
H. PLUMMER, Rattlesden ( <i>accepted</i> )	2,905	0	0

**SUFFOLK.**

For alteration of and addition to High Street Board Schools, for the Brandon School Board. Messrs. EDW. BOARDMAN &amp; SON, architects, Queen Street, Norwich.

Parsons & Sons	£1,995	12	0
R. Mayes	1,739	0	0
T. H. Yelf	1,624	0	0
W. T. Newson & Sons	1,588	14	0
C. Fryer	1,560	0	0
Collins & Barber	1,550	0	0
J. G. COWELL, Soham, Cambs. ( <i>accepted</i> )	1,483	0	0

**TAUNTON.**

For erection of public closets and urinals in Castle Green. Mr. JAMES H. SMITH, borough surveyor. Quantities supplied by the borough surveyor.

Stansell & Son	£313	15	0
Morse	302	13	0
H. Jones	290	0	0
Rowsell	290	0	0
Handford	281	12	0
H. T. Cook	280	0	0
Moggridge	275	10	0
T. MANNING ( <i>accepted as amended</i> )	273	0	0
Surveyor's estimate	275	0	0

**WAKEFIELD.**

For erection of a dwelling-house in Stanley Road. Mr. WILLIE WRIGLEY, architect, 10 Wood Street, Wakefield.

*Accepted tenders.*

B. Lockwood, builder	£176	0	0
J. Lazenby, joiner	72	17	0
F. Mosley, plumber	47	0	0
F. C. Tattersall, plasterer	23	14	8
J. Illingworth, slater	17	17	6
S. Rayner & Sons, painter	5	0	0

**WALES.**

For erection of the Colonel North Memorial Hall, including reading-room, library and billiard-room, &amp;c., Maesteg. Mr. E. W. BURNETT, architect, Tondy, near Bridgend.

*Amended tenders.*

E. Evans	£1,740	0	0
S. Lewis	1,730	0	0
RATTRAY & JENKINS, Bridgend, Glam. ( <i>accepted</i> )	1,187	0	0

**WATFORD.**

For making-up the Leathersellers' Arms.

Nowell & Co.	£85	0	0
Dupont	82	10	0
G. R. Mann	80	0	0

**WESTON-SUPER-MARE.**

For erection of a shelter in Grove Park. Mr. HUGH NETTLETON, surveyor.

F. T. READ, Weston-super-Mare ( <i>accepted</i> )	£102	5	0
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## Portland Stone.

J. Jackson	£50,097	0	0
Shillitoe & Son	45,530	0	0
Munday & Sons	44,939	0	0
B. Cooke & Co.	42,240	0	0
Chessum & Sons	40,981	0	0
G. Sharpe	39,945	0	0
C. H. Hill	38,600	0	0
Gregar & Son	35,747	0	0

## Artificial stone.

J. Jackson	47,157	0	0
Shillitoe & Son	44,530	0	0
Munday & Sons	43,561	0	0
B. Cooke & Co.	41,116	0	0
Chessum & Sons	39,208	0	0
G. Sharpe	38,260	0	0
C. G. Hill	36,300	0	0
Gregar & Son	33,747	0	0

## WESTMINSTER.

For construction of new doctor's room, and for the asphalt paving, &c., of the men's workshop. Messrs. JOHN WALDRAM & SON, surveyors, 17 Buckingham Street, Charing Cross, W.C.

## Accepted tenders.

Johnson & Manners, Great Pulteney Street, new doctor's room	£62	10	0
Hobman & Co., South Bermondsey, asphaltting	40	15	4

A DESTRUCTIVE fire occurred in the timber works of Messrs. Anderson & Henderson, Kinning Park, Glasgow, on the 26th inst. The works cover an area of over three acres, including sawmill, joinery and timber stores, and the whole place was swept by the flames, only the office being saved from destruction. The damage is roughly estimated at from 40,000*l.* to 50,000*l.*

## TRADE NOTES.

THE new dormitories, Rainhill Asylum, near Liverpool, are being warmed and ventilated by means of Shorland's patent Manchester stoves, with descending smoke flues, by Messrs. E. H. Shorland & Brother, of Manchester.

THE east end of Penybont Church, Radnorshire, has been enriched with a stained-glass window, in the centre light of which is depicted "The Crucifixion," and in the two sides "The Light of the World" and "The Good Shepherd" respectively, with corresponding emblems in the tracery. The work is from the studio of Messrs. Jones & Willis, of Birmingham and London.

MR. EDWARD STANFORD, of Charing Cross, is issuing a new and very useful pocket-map of London. Its scale is 4 inches to a mile, and it extends from Kentish Town on the north to Clapham Common on the south, and Bethnal Green on the east to Kensal Green on the west. It shows main roads, omnibus and tramway routes, parks, open spaces, public buildings, hospitals, hotels and theatres with the greatest accuracy and detail.

## NEW CATALOGUES.

MESSRS. HAYWARD-TYLER & Co., of 90 and 92 Whitecross Street, E.C., are issuing their new list (B) of asbestos-packed and other steam fittings and engineers' sundries. The book consists of nearly 150 pages of well-printed descriptive matter relating to wheel valves for all purposes, steam cocks, blow-off valves and cocks, fusible plugs for boilers, expansion joints, lubricators, injectors, steam pumps, lifting jacks, &c., &c., all of which are illustrated by carefully executed drawings. Prices are also given and the book will be found very handy for the purpose of reference.

MESSRS. STRODE & Co. have sent us a large book of designs for electrical illuminations for the Diamond Jubilee. These designs, which are in white on a blue ground, offer a wide field for choice, ranging from a scheme for the effective illumination of the entire façade of a house down to the more or less elaborate arrangement of the royal initials.

ALDERMAN ROBERT SWAN, J.P., the well-known builder and contractor of Sunderland, died suddenly on the 22nd inst. at his residence in Roker Avenue, Monkwearmouth.

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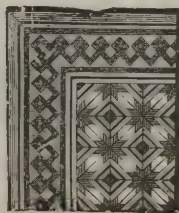


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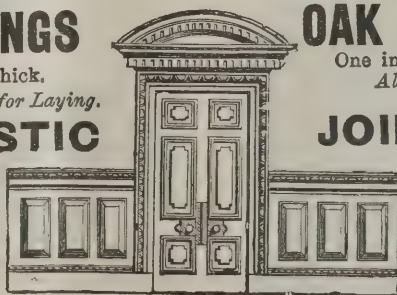
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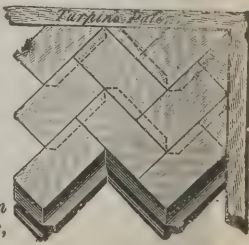
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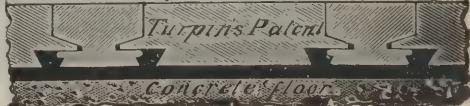
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## ILLUSTRATIONS.

CAIN AND HIS FAMILY.

CATHEDRAL SERIES.—SALISBURY: NORTH CORNER OF WEST FRONT.

THE CHURCH PORCH, CLEY-NEXT-THE-SEA.

ENTRANCE HALL, FOR MESSRS. FOSTER &amp; COOPER.

## VARIETIES.

A LARGE piece of stonework, weighing nearly a ton, fell from the top of the Leicestershire Bank, Kettering, on to the footpath. Two pedestrians had most miraculous escapes.

WITH a view to meeting the increasing demands on the capacity of the Dundee Royal Lunatic Asylum, an extension of the buildings in the way of providing two new dormitories is just now being completed.

NEW Sunday-schools at the rear of Queen's Road Wesleyan chapel, Beverley Road, Hull, have just been opened. The schools have been erected at a cost of 3,500*l.*, and will accommodate about 700 scholars.

A NEW drill hall for the K Company of the 2nd V.B. Lancashire Fusiliers has just been opened at Ramsbottom. The hall, which is of capacious dimensions, has been erected at a cost of over 2,000*l.*

THE watching, lighting and fires committee of Aberdeen Town Council have adopted the plans of Mr. Mackinnon, architect, for the new fire brigade station in King Street. The building is estimated to cost 10,400*l.*

THE Duke of Cambridge, accompanied by General Bateson, visited Worthing on Monday for the purpose of inaugurating the new waterworks, which, together with other local improvements, have been constructed by the Corporation at a total cost of over 100,000*l.*

WHILE helping to fix a heavy Portland stone cornice on the top of the new buildings known as Albert Hall Court, W., a builder's labourer, named John Alexander, fell to the ground, a distance of 80 feet, through the stonework on which he was standing giving way. Death was instantaneous.

THE name of "Ceramic Stone" has been given by M. Garchey, a French inventor, to a new building stone obtained by him from broken glass. The glass—broken bottles, window-panes, &c.—is reduced to powder, different kinds are mixed if a variegated colour is desired, and the pulverised material is devitrified by passing successively through two furnaces, the second one being of high temperature. The pasty mass is then passed under a press, which gives it shape and consistence.

A SHOCKING accident happened at Burnley on Tuesday afternoon to a Carlisle steeplejack named Greenville, who was repairing the chimney at Mr. Robert Brown's joinery works, Talbot Street. About five o'clock he was fastening his appliances and trapèze on to the chimney about 10 yards from the top when one of the staples gave way, and he fell a distance of 35 yards. He alighted on his feet on some solid brick, and the concussion crushed them to a pulp. The man succumbed to his injuries.

A HOSPITAL for the treatment of infectious diseases has been erected at Millerton Hill, near Ayton, by the East District committee of Berwickshire County Council, and was publicly opened on the 21st inst. The hospital, which is of iron and wood, was erected by Messrs. Spiers & Co., engineers, &c., Glasgow. The main block consists of two wards to accommodate twelve patients in all, but only ten beds are provided meantime. The buildings are situated in a dry, open and airy position, and are fully equipped with the latest sanitary and other hospital appliances, and an abundant supply of excellent spring water. The total cost of the hospital and its outfit has been about 1,000*l.*

THE British South Africa Company's new hospital at Gwelo will be opened early in June. The building is nearly finished and will be in habitable condition by the time the three Nursing Sisters, who leave England on May 1, arrive at Gwelo to take up their hospital duties among the Europeans and native miners in the district. The Buluwayo Hospital, built in memory of the victims of the Matabele campaign, has raised the standard of hospital construction in Mashonaland, for it is an extremely comfortable and handsome building. Until this hospital was put up the sick of Buluwayo were treated in thatched, unburnt-brick huts, while Kaffir patients were nursed and Sisters accommodated in native huts.

A HANDSOME triptych has been erected over the altar of St. Alban's Church, Holborn. Its central portion, which, in



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carved alabaster gorgeously coloured and gilded, represents in a series of five panels the martyrdom of St. Alban and attendant circumstances as well as the translation of his relics to the great Abbey, is a huge rectangle, whose chief feature is a resplendent image of the protomartyr of England. The panels aforesaid are set in a massive frame of oak, crowned by a laudatory inscription in honour of St. Alban and a cresting of exceedingly elegant pierced flower-work. A majestic figure of the Saviour, flanked by others representing SS. Mary and Gabriel, crowns the work, which has been designed by Messrs. Bodley & Garner, to whom St. Paul's Cathedral owes its fine reredos.

THE new school erected by the Glasgow School Board for the benefit of Garngad Hill district was formally opened on the 23rd inst. The school, which is named Rosemount Public School, is erected on a site facing Millburn Street, at the highest point of Garngad Hill. The main feature of the interior is the central hall, 70 feet by 26 feet, which is carried up the full height of the building. The staircase, cloakrooms and lavatories are placed on either side of the eastern end of the hall, from which they are separated by glazed screens. An additional drill-hall, 68 by 26 feet, is also provided on the lower floor. Both halls are laid with wood-block flooring. The school and classrooms—sixteen in number—are grouped round the central hall on two floors, and are fully equipped. The number of scholars provided for is 1,203. The total cost is expected to be within 13,000*l.*, exclusive of cost of site. The architect of the school was Mr. John B. Wilson, and Mr. D. Johnstone acted as clerk of works.

### BUILDING AND BUILDERS.

MR. CHARLES WYNDHAM has requisitioned the services of Mr. Sprague for the new theatre which he proposes to build in St. Martin's Court, Charing Cross Road, and the plans have been approved by the London County Council and the local vestry.

THE corner-stones were laid on the 24th inst. of new premises which are in course of erection for the North Ward Liberal Club, Ossett.

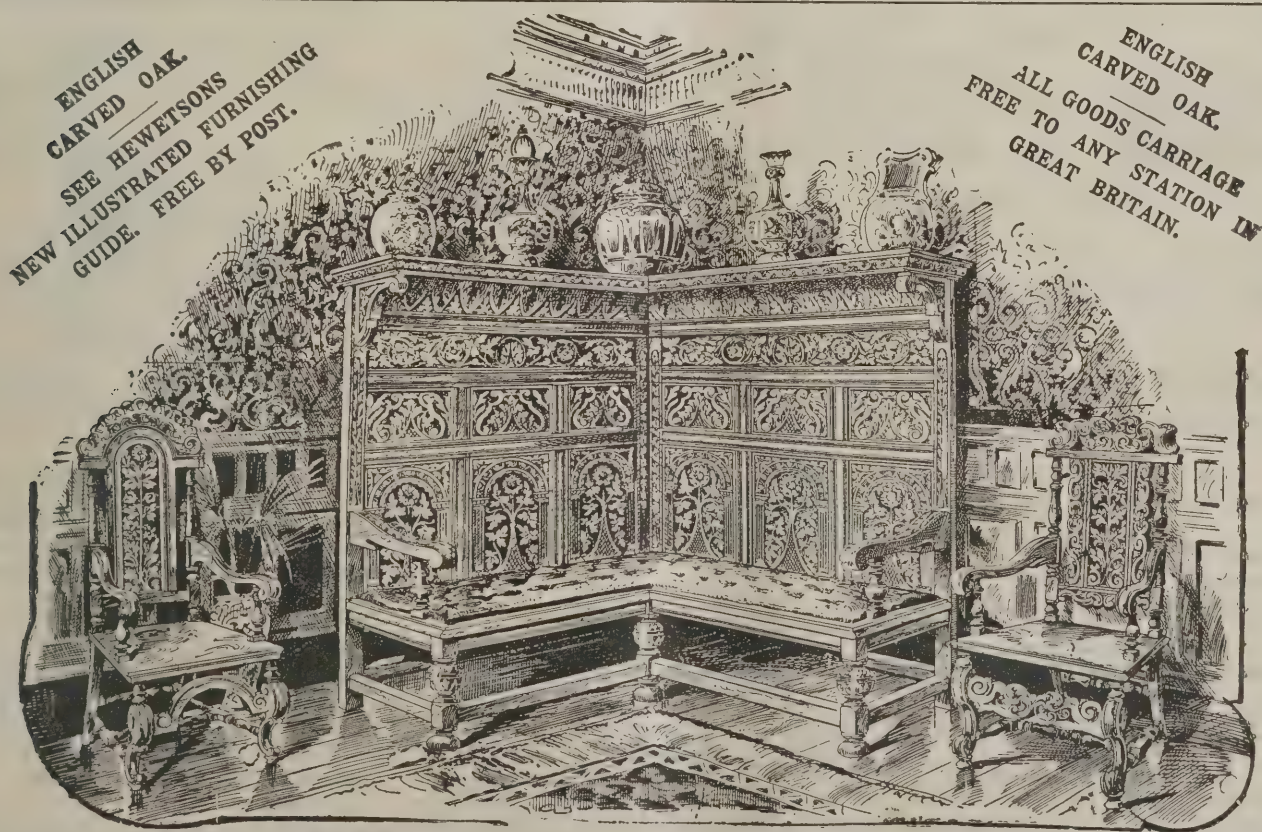
THE foundation-stone of a House of Mercy for the training of young women and girls in domestic service was laid in the convent grounds at Lawside, Dundee, on the 21st inst. The building will be a large one, two storeys in height, and in it the latest laundry and washing apparatus will be introduced.

### HORNIMAN'S FREE MUSEUM.

THE Horniman Free Museum, which was dedicated to the free use of the public in 1890, occupies a commanding position in London Road, Forest Hill, and contains curiosities collected by Mr. Frederick John Horniman, M.P., during the past forty years from all parts of the world. The exhibits include Cyprian and other pottery, treasures from the Holy Land, mummies from the tombs of Egypt, Oriental manufactures and artistic productions, and natural history and zoological curiosities. Two years ago a park and a recreation ground at the rear of the museum were thrown open to the public, and Mr. Horniman has presented an additional eight acres to the neighbourhood. The opening ceremony took place on the upper lawn, known as Surrey Mount, from which an extensive view of the surrounding country can be obtained. In the course of his address to a large crowd of visitors, Mr. Horniman emphasised the advantages of open spaces to the public, and expressed the pleasure it gave him to know that the inhabitants of that neighbourhood had derived much benefit from the free use of the museum and grounds. The exhibits, he added, were contained in premises once used as a dwelling-house, but in celebration of the sixtieth year of Her Majesty's reign he proposed to erect a new museum which would be of lasting benefit to the inhabitants of South London. Mrs. Horniman then declared the grounds and pleasure gardens open. The present museum contains twenty-four saloons of exhibits. The proposed new building is to be much more commodious.

### THE ROYAL CALEDONIAN ASYLUM.

A SPECIAL court of the guardians of the Royal Caledonian Asylum was held in the board-room of the Royal Scottish Corporation, Crane Court, Fleet Street, on Monday. General Moncrieff presided. It was unanimously resolved, on the motion of Mr. John Scott-Balfour, seconded by Mr. Donald Swanson, that authority be given to the managing directors to take such proceedings as they might think necessary for disposing of the present site and building in the Caledonian Road, Holloway, and for erecting a new and more commodious building in a northern suburb of the Metropolis. Towards this object it was announced the treasurer, Sir John R. Heron-Maxwell, had received the sum of 12,000*l.* from an anonymous



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donor as a gift in commemoration of the Queen's jubilee and in memoriam of the late Duke of Albany, who took a very great interest in the prosperity of the institution and presided at one of its anniversary festival dinners, with gratifying results to the funds. It was considered that the situation of the present building, which was erected in 1828, is, from its proximity to Pentonville Prison and from other causes no longer suitable or desirable.

### PROPOSED WESTMINSTER IMPROVEMENT.

A PETITION has been deposited at the House of Commons for leave to bring in a Bill during the present session authorising the extension of the Victoria Embankment as far as Lambeth Bridge, and various extensive improvements in the parishes of St. Margaret and St. John, Westminster. The proposed improvements will involve the clearance of an area 27 acres in extent, and the cost of the acquisition and clearance of the site is estimated at upwards of 1,000,000/ sterling. The proposals include the formation of a wide approach or avenue from Horseferry Road to the Victoria Tower, forming a connection with the approaches to the new Lambeth Bridge; the widening of a street so as to make a connection between Great Smith Street and Horseferry Road, and a street opening out the church of St. John, Westminster; the formation of a square of the size of Hanover Square in front of the Church House buildings, Great Smith Street; and the removal of the whole of the insanitary area and slums of Westminster, and the construction upon the site of large buildings more or less of a public character.

### MODEL VILLAGE OF BOURNVILLE.

A LITTLE beyond the great cocoa manufactory of Messrs. Cadbury Brothers, and on the opposite side of the thoroughfare, says the *Birmingham Post*, stands Bournville Hall, with its velvety lawn sloping to the road, and commanding from its windows a stretch of undulating country which is terminated by the high ridge of Selly Oak. A lovely outlook it must have been when the mansion was erected and when nothing save grassy slopes and clusters of noble trees met the eyes, turn which way they would; but at present all is changed, and idyllic quietude has given way to ceaseless activity. In the im-

mediate foreground men are busily engaged in constructing a large recreation ground for the use and pleasure of the male employés of the great factory which stands hard by, whilst beyond the work of cutting streets is busily in progress. The uninformed pedestrian, were he a lover of nature, would sigh and picture to himself rows upon rows of houses, erected with the sole idea of packing as many as possible on the smallest space of ground, without thought or care for the comfort and health of the occupants—in fact, an outlook of bare walls, roofs and chimney-pots. The picture thus conjured up would, however, be erroneous, for it is upon this estate that Mr. George Cadbury's model village of Bournville is springing up—a village which has no exact prototype in the United Kingdom, or indeed elsewhere; but which, it is hoped by the founder, may not long stand solitary. Mr. George Cadbury has cherished the scheme from boyhood, and it is to be hoped that he will not only see it completed, but imitated in many parts of the country.

In the limits of our space it is impossible to do more than briefly indicate the chief features of the scheme. The land acquired for the purpose of the village consists of about 140 acres, and is situated at the rear and also to the left-hand side of the works. It is bounded on the right by the Midland Railway, on the left by the Row Heath Road and Oak Tree Lane, and extends from the Mary Vale Road, which is situated behind Bournbrook Hall, to Selly Oak, where it adjoins the property of the King's Norton Guardians. The hall and its surrounding grounds are not part and parcel of the estate, however, but belong to the firm of Cadbury Brothers, who have retained them—the hall as a home for their female employés, and the grounds for the purpose of recreation. It is proposed to erect six houses to the acre on the building estate, or about 700 in all, for certain plots of land have been set apart for general recreation grounds for the tenants. Thus the richly-wooded dell known in the neighbourhood as Stock's Wood will remain untouched by the hands of the builder, and a rectangular piece of land, seven acres in extent, which faces the road to Northfield, and is situate opposite the junction of the Row Heath Road and Oak Tree Lane, has also been appropriated as a park for the tenants of the estate. It should form an ideal recreation ground, for it is well wooded and the rich turf slopes down on either side to the banks of a stream. Then, in addition, there will be a number of playing-grounds set apart for the children, which will prevent them getting into mischief in the gardens or meeting with injury in the streets. At every turn, in fact, one meets with something that has been done to



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insure the comfort, health and happiness of this fortunate community. Houses may come and go, but for 999 years their number on the estate must remain the same, for that is the term of the lease granted to each tenant, who is bound by his agreement to observe the conditions of the scheme. It was impossible, of course, to make the estate freehold, inasmuch as tenants would have then possessed the power of using their ground as they liked, and could have defeated Mr. Cadbury's prime object, which, as set forth in the prospectus, is "to make it easy for working men to own houses with large gardens, secure from the danger of being spoiled either by the building of factories or by interference with the enjoyment of sun, light and air." The ground rent varies, according to the situation of the plot, between  $\frac{1}{2}d.$  and  $1d.$  per yard. No houses below a certain standard are allowed to be erected, and only a certain amount of building is permitted on each plot of ground, so that there is no danger of the gardens being overshadowed and spoiled, or the neighbourhood losing its pleasant rural aspect. Thus the fullest encouragement is held out to the thrifty and industrious artisan—the scheme is not limited, as many thought, to the employés of the firm, but, of course, they have the preference, other things being equal—to become a member of this novel village. Should a tenant not be able to pay outright for the building of his residence Mr. Cadbury's solicitors will advance the money at the rate of  $2\frac{1}{2}$  per cent. to 3 per cent. interest—at  $2\frac{1}{2}$  per cent. if the tenant can find half the requisite sum or 3 per cent. if he can only pay down a smaller proportion of the money. In the latter case Mr. Cadbury will erect the house and take a preparatory agreement for lease and mortgage. The money lent will be repaid yearly, together with the interest, and in twelve years the house becomes the property of the tenant, who is not so much money out of pocket as if he had occupied an equally good house and paid a weekly rent to a landlord. It is estimated that the produce of the garden will more than cover the small ground-rent, and certainly there is no reason why it should not if well looked after by the tenant, for many of the gardens are 40 yards or more in length, as the building plots vary from 60 to 85 yards long, in addition to being about 10 yards in width. On a portion of the estate which lies between the Bournville Lane and Mary Vale Road, to the left of Bournville Hall, about seventy of the houses have already been erected, and a glimpse at them gives proof of the excellence of the scheme. They are well built, and are for the most part semi-detached, although

they can be erected in fours, which is the greatest number that can be possessed by the same owner. The gardens insure a fine open space between the backs of the buildings, and in time almost perfect privacy will be established, for Mr. Cadbury has caused to be planted on either side of the dividing hedges three rows of fruit trees—a happy and economic idea. The trees will provide fruit for the tenants, will be agreeable to look at, and will prevent the backs of the houses being overlooked. This idea will be carried out all over the estate, and when it is considered that trees have also been planted in every convenient place it is easy to see that the suburban character of Bournville will be maintained. It will be interesting to read the report of the medical officer of health for the village fifty years hence. It should boast a phenomenally low death-rate. For the houses already built a playground for the children, half an acre in extent, has been set apart. A large wooden shed, ornamental in design, has been set up, so that in case of a shower the children can still enjoy the fresh air without getting wet. Adjoining the playground is a lodge containing baths for the use of those tenants whose houses are not furnished with a bath-room. Bournville will be able to rival Edgbaston in everything excepting the size of its houses, and its tenants will possess the additional advantage of having a park of seven acres and a beautiful wood of between three and four acres devoted to their own use.

Though not forming part of the building scheme, the recreation grounds, which have been provided by Messrs. Cadbury Brothers, deserve a few words of description. They have been acquired solely for the use of the employés of the firm, but, inasmuch as many of the latter will doubtless be tenants on the estate, the two things are to some extent associated. The grounds in the immediate vicinity of the hall, now used as a home for sixty of the girls employed in the works, have been set apart for the benefit of the female employés. They cover about 12 acres, and half will be used as a playground, whilst the other half will be reserved for those who prefer to take a book and spend a quiet hour. It is an ideal spot for rest, the silence being unbroken save for the cawing of the rooks nesting overhead in the elms. A large wooden structure has been erected in the recreation ground, and here in wet weather the girls can indulge in health-giving exercises and at the same time enjoy the freshness of the breezes that blow from the Lickey Hills and the surrounding country. The men's recreation-ground is on the opposite side of the road, and is, almost immediately in front of the windows of the hall.

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Ten acres have been given by Messrs. Cadbury for the construction of a cricket ground and cycling and running track. There was a slope of about 30 feet between the road and the brook at the bottom of the valley, and consequently a great deal of labour has been required in levelling the ground, but the work is rapidly progressing, and it is hoped that it will be completed at an early date. The cricket ground has been constructed under the supervision of G. G. Hearne, the Kent cricketer, and an excellent playing pitch should be secured. It is not improbable that a county match will be played there during the ensuing season. The cricket ground will be surrounded by a cycle track of three laps to the mile, and there will be ample accommodation for the spectators on the tiers of seats that will be erected on the bank which has been formed by the cutting away of half the slope in order to secure a dead level. The cost of construction will be about 2,500*l*. At the bottom of the recreation ground the firm have constructed a handsome open-air bath for the use of their workmen. It is intended by Messrs. Cadbury that the recreation grounds shall be preserved as open spaces for ever, and there is a clause in the deed of gift to the effect that they are handed over to the firm, whose property they will be so long as they are used for the specified purpose. Should they be used at any time, however, for any other purpose they at once become the property of the city or the county authorities, whichever body may then have charge of the district of Bournville. Copies of the deed will be duly forwarded to the clerks of those bodies. Thus, whatever may happen in surrounding districts, there will be at least one suburb of Birmingham which will preserve its character for many generations. It may be mentioned that Mr. A. P. Walker, of Bournville, acts as estate agent and surveyor in the carrying out of the scheme.

#### THE ROYAL INFIRMARY, GLASGOW.

THE proposal to rebuild Glasgow Infirmary has not obtained general approbation. A meeting of the medical profession of Glasgow and the West of Scotland has been held for the purpose of considering the subject, when difference of opinion was apparent. Professor W. T. Gairdner presided.

Dr. Macgregor Robertson intimated that he had received seventy-five letters of apology for absence. Professor Dunlop, in his letter said:—"I hold very strongly the opinion that if anything of a really valuable and permanent kind is to be done

to the Royal Infirmary a new and healthier site should be obtained on which to erect a modern hospital, converting the site of the existing medical and surgical wards into an open public space, thus increasing the size and enhancing the beauty of the Infirmary Square. I do not sympathise with the views which have been expressed as to the healthiness of the site or the general salubrity of the wards; very long experience and observation have led me to an entirely opposite conclusion. As a student, a resident house surgeon, a dispensary surgeon, and ultimately as a full surgeon, I have had an experience of the Royal Infirmary extending over a period of thirty-four years, beginning with the year 1858. I saw the removal of the old wooden sheds in which the cholera patients were treated, and the foundation prepared for the surgical house, the site being on the edge of a huge cholera pit. The whole ground behind the hospital up to near the buildings of St. Mungo's College was used as a grave for cholera patients during the epidemic of 1849. In the early days of Mr. Lister these wards were very unhealthy, and although their condition was greatly improved by the rigid adoption of cleanliness and the new practice invented by him, aided not a little by an attempt which was made by the directors to destroy by quicklime the putrefying remains of the cholera dead, yet when wet and fogs prevailed hospital gangrene, pyemia, erysipelas and other forms of blood poisoning frequently attacked the patients, and rapidly proved fatal. In one week of close, muggy wet weather I have seen five patients in these wards dying from pyemia, due to emanations from the cholera pits. A muggy day was always a source of concern and anxiety to me in these years, and muggy days were painfully common. . . . With an earnest yearning for the continued prosperity of the Royal Infirmary, wherein I had worked so many years of my life, I have longed for the time when I might witness it rebuilt on a healthy site, and its wards and equipment brought up to the level of modern requirements in medical science. To help in bringing about this happy result I shall gladly contribute."

The Chairman said that personally he should have had great difficulty in taking the chair at the meeting had it been supposed for a single moment that it could be construed as a movement in hostility to the Royal Infirmary. They were not opposed to the Royal Infirmary or Lord Provost Richmond's scheme for drawing out public liberality towards a great public object. They did not want to intercept it; they only wished that proper consideration should be given to its application.

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Only the previous day he had the pleasure of meeting Lord Provost Richmond. They talked over the subject, and his lordship told him that he did not consider that the resolutions that were to be submitted to the members were at all strong or offensive. He said he could almost accept them; at all events that his mind was perfectly open, and that he was desirous of having the best possible advice of every kind or any communication that could tend to the thing being done in the best way.

Dr. Henry E. Clark moved:—"That this meeting of the medical profession of Glasgow and the West of Scotland is in full sympathy with the desire to associate the commemoration of the sixty years' reign of Her Majesty with a scheme for the benefit of the sick and injured poor of Glasgow and neighbourhood, which has led to the proposal for the reconstruction of the Royal Infirmary." As the senior member of the staff of the Royal Infirmary, he said that not only were those present not antagonistic to the Royal Infirmary, but they had the strongest possible sympathy with the desire that everything should be done to make it more effective in the work it was doing.

Dr. Perry seconded.

On the proposal of Dr. Lindsay Steven, seconded by Dr. Barlow, it was agreed to add to the resolution the words, "and cordially recommends the proposal to the benevolence of the citizens of Glasgow."

The resolution was then carried unanimously.

Dr. Ebenezer Duncan moved:—"That this meeting of the medical profession of Glasgow and the West of Scotland is of opinion that the reconstruction of the Royal Infirmary is necessary, but that an hospital reconstructed in accordance with either of the schemes suggested in the published appeal for subscriptions would be seriously defective, inasmuch as the site available for building is already overcrowded according to modern ideas, while it is proposed in both schemes to increase the accommodation." The statement published by the Lord Provost and his committee showed that they had not the necessary knowledge to guide them in determining what kind of an infirmary should be placed upon that site. That the reconstruction of the Royal Infirmary was necessary was clearly brought out by a plan he exhibited. Light and air were cut off from one of the pavilions. The front building, five storeys in height, faced the south, and as the prevailing winds were from the south-west, the buildings to the east and west were, to a large extent, cut off from the action of these winds and from sunlight. The wards had not only about double the number of patients that they ought to have, but they had not

the sanitary appliances in connection with them that modern hospitals had. The ventilation was still exceedingly defective. The old fever-house was also very defective, the arrangements not being up to modern standards. The surgical house, however, was pretty much the same as in a great many modern hospitals. The only objection to the site was that the surroundings were not by any means ideal. In the immediate vicinity were two large graveyards. The present accommodation for officials was insufficient. There were 100 servants, mostly scrubbers, lodging outside coming into the wards from the crowded districts round about. That was very objectionable. By one of the schemes it was proposed to add 90 beds and by the other 150 beds on the already overcrowded site on which there were at present 600 beds. He maintained that there ought not to be more than 400 beds in an hospital on the present site. The proposed buildings would perpetuate many of the very objectionable features of the existing buildings. There would not be sufficient air space between the pavilions. According to modern ideas there should be 60 to 100 square yards for each bed, but in the proposed buildings they would not have half that. In a matter like this it was the duty of the medical profession to make its voice heard. It was not only a question of money, but of saddling the profession for 50 or 100 years with a building unsuitable for the treatment of the sick poor.

Dr. Johnston Macfie seconded the resolution.

Dr. Robert Bell claimed to be heard as the only man who had had anything to do with hospital construction during the last few years. He had been consulted by the Assistance de Publique of Paris as to the ventilation of the hospital of St. Antoine, which was being rebuilt on the old ground, and he had visited Paris twenty times during the past two years in connection with his system of ventilation. That system, he held, would obviate the objections which had been raised to this proposal. In the pavilions of that hospital there was a maximum of 17,000 cubic metres and a minimum of 10,000 cubic metres of air passing through every hour. It could be heated or cooled as the case required. In one ward they could have the climate of India, in the next that of the Davos Platz in winter.

Dr. Perry said he had been connected with the Royal Infirmary for forty years and had had a good opportunity of judging of its condition in the past and the present. He had no hesitation in adopting the first part of the resolution that the reconstruction of the Royal Infirmary was necessary, but as

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to the second part he could not agree to it. The present site of the hospital, notwithstanding all the objections that had been raised by Dr. Duncan, was under the circumstances the best that could be got. The ground space was sufficient for the construction of a first-class hospital, but no scheme which was confined to the rebuilding of the front of the house alone was worthy of consideration or of the money that would be spent upon it. Nothing but taking down the east surgical building and the Castle Street as well as other houses, and reconstructing on the whole available site would be sufficient or should be entertained. He believed that by doing so they would be able to construct a new surgical hospital equal to modern requirements. He would, however, strongly deprecate the proposal to increase the number of beds. He did not think that the plan Dr. Duncan had described to them would be suitable for the available space. He thought he knew of another which might be adopted, but he was not an architect and he would not bring it forward. A much better plan would be to build a similar hospital, possibly containing about 200 beds, for the treatment of surgical cases in the East-end.

Dr. Glaister said that they had been listening to a dolorous and dismal tale regarding the condition of the Royal Infirmary twenty-nine or thirty years ago, but it had got no relation whatever to the proposal put before them in 1897. He did not think anybody would object to the major portion of the resolution with regard to reconstruction of the new hospital, and as to the inadequacy of the space at the disposal of the managers of the Royal Infirmary for the building of a new hospital—that might be taken for granted. But the proposal, as he understood it, was to get a certain amount of money for a certain object. It was not anticipated, even according to the most liberal view, that the charity of Glasgow would raise a sufficient sum to rebuild the whole infirmary.

The Chairman said he did not think there was any real difference of opinion in the meeting. The resolution was founded on the statement issued by the Lord Provost. That statement put forward two plans, one of which increased the accommodation to the extent of 90 beds at a cost of 65,000*l.*, and the other increased the accommodation to the extent of 150 beds at a cost of 100,000*l.* The resolution went the length of saying that neither of these plans should be approved. Dr. Perry and Dr. Glaister also said that neither of these plans could be accepted—that no more beds should be put upon the ground.

Dr. Perry said he would propose that the resolution should

read as follows :—"That this meeting of the medical profession of Glasgow and the West of Scotland is of opinion that reconstruction of the Royal Infirmary is necessary, but that the hospital to be constructed on the present site ought not to contain a greater number of beds than is at present in the Royal Infirmary, and that any further accommodation required for accidents and surgical cases should be provided for by the erection of a smaller hospital on a suitable site such as may be determined."

Dr. Glaister seconded the amendment.

Professor Murdoch Cameron supported the amendment. He agreed with those who said that there should be no increase in the number of beds in the new hospital, and that there should be a small hospital in the East-end, so that patients coming from Hamilton and Bothwell would not require to be taken another couple of miles through the city.

Dr. Adams said he did not believe that any man present honestly believed that the bodies in the Necropolis or in the graveyard near the Royal Infirmary had the slightest effect upon the patients in the Royal Infirmary. He thought it was a great pity that such an idea should be mooted and should go forth stamped with their authority.

Dr. Macgregor Robertson held that it was desirable that it should go forth that the hospital should be built in accordance with modern ideas. If Dr. Perry's proposal was to go to the meeting it should be put as a separate motion. The executive committee would never think of building two hospitals, and the object the promoters of the meeting had in view was that the hospital, so far as it was reconstructed, should be reconstructed from top to bottom in accordance with modern ideas.

Dr. Adams suggested that the latter part of Dr. Perry's amendment should be deleted.

Dr. Perry said he was quite willing to adopt the suggestion, and Dr. Glaister, the seconder, assented. The amendment was accordingly put in the following terms :—"That this meeting of the medical profession of Glasgow and the West of Scotland is of opinion that the reconstruction of the Royal Infirmary is necessary, but that an hospital on the present site ought not to contain a greater number of beds than is at present in the Royal Infirmary."

A show of hands was afterwards taken as between the amendment and the original motion, when there voted—For the amendment, 34; for the motion, 21.

The resolution as amended was then put as a substantive motion and was unanimously adopted.

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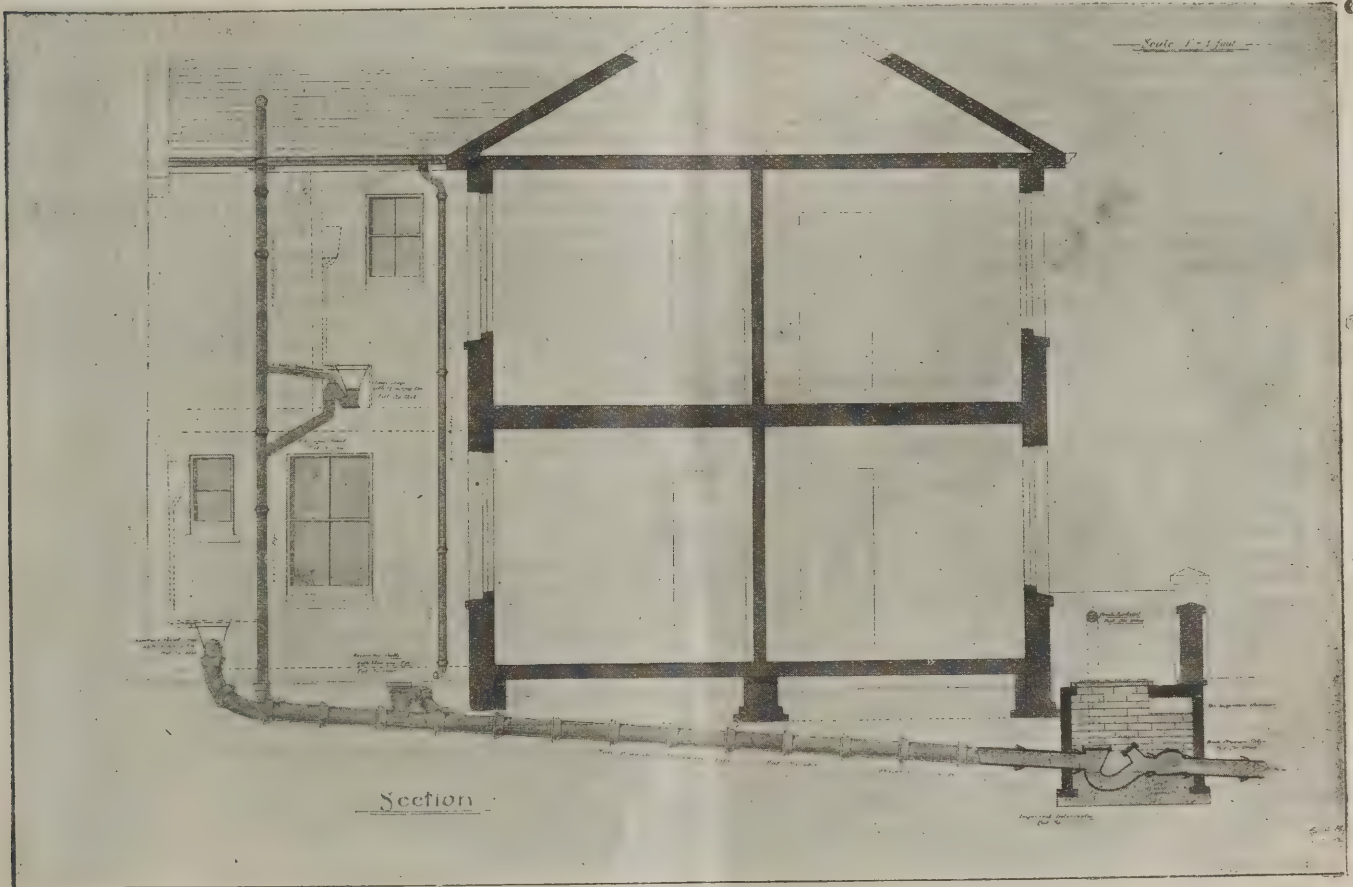


**GEORGE FREEMAN'S CLOSE-SEALED SYSTEM OF HOUSE DRAINAGE.**

IN our issue of March 26 we gave a short account of the exhibit at the Building Trades Exhibition of Mr. George Freeman, Gordon House, Frederick Place, Brighton, which comprised the various patented appliances used in his close-sealed system of house drainage. We now more fully describe them, and print a plan to show their application.

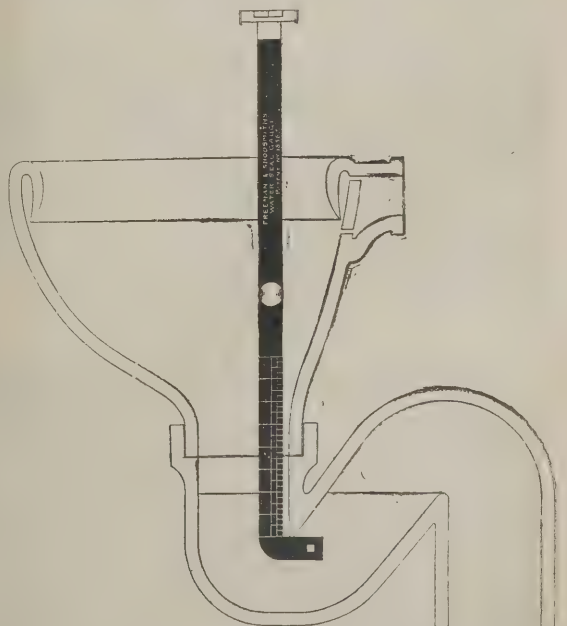
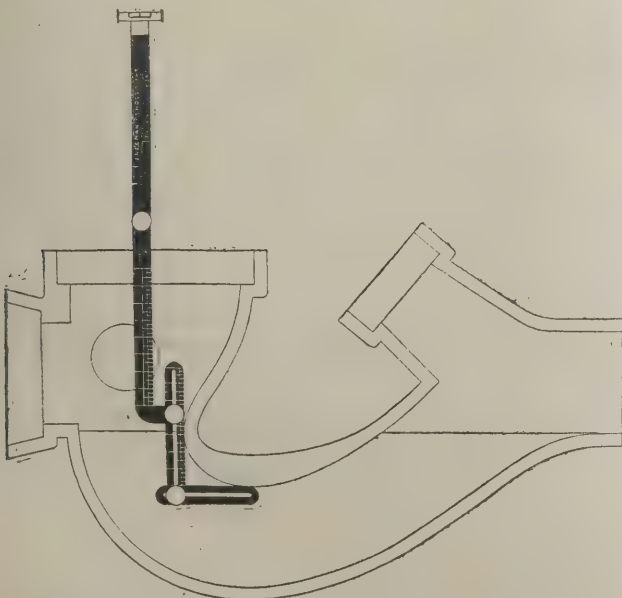
6 inches at the outlet. This enables the 6-inch drain to be brought right up to the outlet, avoiding the necessity of reducing it to 4 inches.

*The Reversible Yard-sink or Gully-trap* has the following advantages. The nose of the gully being longer and further out from the body a better joint can be made and with greater ease than by using the usual pattern. There is an oval opening in the nose (see illustration) closed by a stoneware stopper as in the closet-trap, insuring a clean joint and facilitating the



*The Improved Closet-trap*, made in two designs, No. 1 for use *above* the basement or ground floor, and No. 2 for use *in* the basement or ground floor. In this trap (No. 1), which has a clear 4-inch bore, there is an oval opening in the nose (which is closed by a stoneware stopper), which insures a clean joint

removal of any stoppage from this branch of the drain, which can be done with a rod and the stopper replaced and sealed, thus avoiding breaking open the drain. The gully is made with a reversible top, thus doing away with the use of bends, as it can be set to any angle, insuring a straight line to the



by affording the means of easily removing the burrow of cement which forms in jointing the ordinary closet trap, which often causes a stoppage, and also for clearing away any obstruction, should such occur, without damage to the drain. Through the stopper there is a 2-inch opening, in which is inserted a lead pipe to form the anti-syphonage. No. 2 has the same opening at the nose and is made with a 4-inch bore in the body, widening to

main drain of the building. It is self-cleansing, being made of a round vertical design, and the absence of angles prevents the accumulation of offensive matter, grease, &c.

*The Close-sealed Intercepting-trap* is designed with a very easy sweep, and is the same size bore all through, which prevents it getting choked. It has a tapering clearing-eye enabling the same clean joint to be made at the nose, and an ova

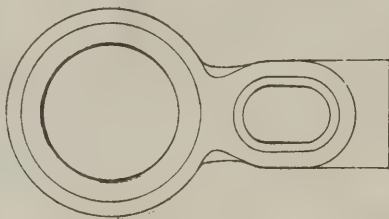


opening on the after part. The stoppers are sealed by a joint of fine mortar being laid on them and a thin layer of gauged cement. This immediately forms the close-sealed arrangement to the interceptor and drain. It is placed within a dry brick-built chamber, and should it become choked at any time the stopper can be taken out of the front clearing-eye, and the stopper of the back oval opening broken, when the soil immediately flows into the sewer. The obstruction being removed, the stoppers can be replaced and sealed down as before without damage being done to the drain or trap. This trap can be set to a fall of from 1 in 60 to 1 in 20 without the danger of lessening the water seal. The following figures give the depth of seal with various falls of drain:—

Fall of Drain.				Depth of Seal.
1 in 30	...	...	...	2½ inch
1 in 40	...	...	...	2¾ "
1 in 50	...	...	...	2¾ "
1 in 60	...	...	...	2¾ "

It has a separate arm on each side, at angles of 35 deg. and 40 deg. respectively, right and left-handed, and it is therefore immaterial on which side of trap the fresh-air inlet or gully for area water is placed.

*Patent Sanitary Pipes and Undrawable Joint.*—This invention provides an improved drain pipe and joint for sanitary purposes, whereby a quicker and easier method is obtained for constructing a drain. These pipes are made at the spigot end on the tapering principle, with a shoulder and deep grooves; the socket is on the bell-mouthed principle with similar deep grooves inside. When jointed together with cement they form a perfect undrawable joint. In constructing a drain with these pipes, the workman must gauge the cement in the ordinary way, then putting a layer or bed of cement in the bottom of the socket, and the same on the top of the spigot end, press the spigot end into the socket and finish the joint with the trowel in the ordinary way. This obviates the necessity of the workman using his fingers in making the joints. These pipes can be



used and jointed by the most inexperienced workman, as they can be laid to a straight line or to an easy curve without splaying the spigot, or any gradient as required, and a smooth regular joint is formed inside of the pipe. They are also better adapted for boggy or new made ground. Should a subsidence occur underneath the drain these pipes will remain as they were laid, the joint being made in such a way that it is practically impossible for the pipes to be drawn apart.

*The Automatic Back-pressure Tidal-valve for Drains* has for its object the prevention of the back flow of sewage and flooding of basements arising from any cause. Should the public sewer become blocked, the valve will immediately shut itself, stopping the water and preventing the basement from becoming flooded, and the rising of foul matter from the drain into the dwelling. As will be seen from the plan, it can be fixed in front of the interceptor.

A most useful invention is the water-seal gauge, by which the water-seal of closet-traps, gullies, or yard sinks and sewer-gas interceptors can be tested without passing the hand into the soiled trap, as has been hitherto necessary. The accompanying illustrations clearly show their use.

### STAFFORDSHIRE GENERAL INFIRMARY.

THE Staffordshire General Infirmary at Stafford, which has undergone complete reconstruction at a cost of about 20,000*l.*, was reopened on the 21st inst. The infirmary itself dates from the year 1766, but the building which has just been practically rebuilt was about seventy years old. Before the alterations it consisted of a single block of buildings, with a central corridor and rooms used as wards opening out of it on both sides—a very usual arrangement fifty to seventy years ago, but making the central corridor dark and preventing any proper cross ventilation to the wards. At the south end of this central block was a wing used for fever patients. The sanitary arrangements throughout and the nurses' accommodation were most defective. After careful consideration, it was decided to pull down all the old buildings with the exception of the central portion, and to devote this to administrative purposes, nurses and servants' accommodation. The provision for patients has therefore been entirely rebuilt, and is disconnected by open corridors from the central or administrative block, and in two pavilions to

the north and south, making an elevation towards the high road of 370 feet in length. The patients are provided for in four large wards, facing east and west, and containing 14 beds each, a children's ward of 12 beds, three isolation wards of two beds each, three isolation wards of one bed, and two day-rooms, making a total of 80 beds. Detached sanitary blocks are provided at the ends of the large wards, and the whole are built on arches, so that there is a complete circulation of air round them. Attached to the north block is a new operating theatre, served with a patients' lift and with a preparation-room adjoining. Each block is reached by a stone staircase, and at the further end is an external escape in case of fire. The out-patients' department, with its dispensary, consultation and examination-rooms, is placed under a portion of the south block, and a mortuary and post-mortem-room have been arranged in the grounds. In the centre block are the kitchens, doctors', nurses' and servants' dining-rooms. On the ground-floor are situate entrance and board-room, receiving-room for patients, doctors' and matron's rooms, while on the first-floor are nurses' cubicles and sisters' and nurses' sitting-rooms, and on the floor over servants' bedrooms. The building is heated throughout with hot-water radiators, the large wards having a combination of an open stove and hot water which answers well, the fresh air supply to these wards being drawn from the outside and warmed before its entry into the wards, by passing through these radiators. The air is extracted by means of flues in the walls collected in flues in the roof, and finished with Kite's extract ventilators. The walls of the wards have all their corners rounded and finished in Keene's cement and painted. The floors are laid in polished oak. Everything has been done to put the patients under the most favourable conditions known to modern sanitary science. Externally the walls generally have been faced with rough-cast, partly for the sake of warmth and partly as an easy means of making the old central block harmonise with the new red brick facings being employed round the window and door openings. A new central porch has also been erected, and the external appearance has been further improved by the erection of a new boundary wall and entrance gates towards the road. The work has been carried out in two contracts, the first being the north wing, which was built by Mr. Espley, of Stafford; the second including the south wing, the isolation and children's wards, and the remodelling of the central block, being carried out by Mr. J. Gething, of Shrewsbury. Mr. Pebworth and Mr. Tanner have acted as clerks of works. Mr. Aston Webb, of Queen Anne's Gate, S.W., is the architect, and the work has been carried out at a cost of 20,000*l.*

### ORMOND QUAY PRESBYTERIAN CHURCH, DUBLIN.

THE Ormond Quay Presbyterian church building has been enlarged by the addition of a hall and Sunday schools. The new building, which has been erected on the site of Nos. 3 and 4 Upper Ormond Quay, is nearly completed. It was considered advisable to adopt a different style from that of the church adjoining, and accordingly a modified Jacobean design was selected as being appropriate, and as allowing of the introduction of an unusually large projecting oriel window towards the street, which forms the main feature of the front elevation, and also adds to the area of the rooms on the two upper storeys. The front is faced with granite and red brick. The former comes from the Glencree quarries, and comprises the whole of the ground floor and quoins, dressing cornice, balustrading, &c., over same. The plain surfaces of wall are filled with red brick from Portmarnock, co. Dublin. The harmony of the quiet deep grey tones of the stone with the rich warm colour of the brick is good. The large oriel is constructed entirely of timber, and sits upon a projecting granite base corbelled out to about 2 feet 6 inches in advance of the face of the wall. There are two entrance doorways from the street, one on each side, with a large shop window occupying the space between, from the cornice of which springs the base of the projecting window. The entrance on the eastern side leads direct to the shop, which occupies the greater portion of the ground floor and which is separated from the rest of the building by solid brick walls and fireproof floors. All the floors are constructed of concrete carried on steel girders, and no timber is used in their construction except the flooring boards themselves. The door on the western side leads to the upper part of the house by a wide hall and stairs. At the foot of the latter are placed a cloak-room, a lavatory for gentlemen and an entrance to the church. The larger meeting hall is a fine apartment, occupying the whole front of the house and 17 feet high from floor to ceiling. The walls are panelled in wainscot for nearly half the height of the room and the ceiling is coved, the upper portion of the walls being divided into compartments by pilasters in plaster. Mantelpieces of polished walnut and marble, specially designed, are provided. The storey over this is divided into two apartments, so arranged as to form one or two rooms as may be needed, and these are also wainscotted.



Off the upper stairs a ladies' lavatory is fitted up. The building has been erected from the designs and under the superintendence of Mr. W. M. Mitchell, R.H.A., architect, the contractor being Mr. John Good, of Great Brunswick Street, who has executed the work in an excellent and substantial manner.

### PORTSEA ISLAND BUILDING SOCIETY.

ON December 14, 1891, the Society, which did a banking business and financed several builders, failed, with liabilities exceeding 800,000/. For some time there was the prospect of protracted litigation, but this was avoided by the passing of a special Act of Parliament, under which Lord Macnaghten became the hon. arbitrator, assisted by a local committee. The Act placed shareholders and depositors on an equal footing so far as dividends were concerned, and this met the greatest difficulty that the liquidators had to encounter. It required 40,000/. to pay 1s. dividend, and in the process of winding up dividends amounting to 9s. in the pound have been paid. Tenders for the purchase of the remaining properties in the hands of this Society have been forwarded to Lord Macnaghten, the hon. arbitrator, and on the realisation of the property the last dividend will be paid and the Society will be closed. At the present moment the cash in the bank amounts to over 20,000/., and this amount is equalled by the tenders for the remaining property, so that as soon as this is sold arrangements will be made for the payment of a final dividend of 1s. in the pound, making a total of 400,000/. that has been recovered from the wreck of the Society. After the payment of the final dividend there will be a balance left to wind up the litigation that is still pending.

### ENLARGEMENT OF THE GUILDHALL SCHOOL OF MUSIC.

THE almost phenomenal success of the Guildhall School of Music has demanded the serious consideration of the music committee appointed by the Corporation of London as to the best means of enlarging the present school premises. It appears that, in 1887, 2,813 students attended the school; this number increased in 1896 to 3,527. Many students are now applying for admission who cannot be accommodated on account of the limited number of classrooms, while some of

the professors are giving lessons in rooms not at all suited to that purpose. A large practice-room is also needed for the use of the choir, orchestra and the operatic and dramatic classes.

The Corporation have wisely decided that the piece of land on the Victoria Embankment adjoining the school (fortunately reserved for possible necessities) shall be utilised for the new wing.

Mr. Andrew Murray, the city surveyor, in his explanation of the proposed plans, describes the new orchestral saloon as a chamber 47 feet wide by 55 feet long; it will have a stage 47 feet by 14 feet by 27 feet high, with suitable dressing-rooms, &c. The chamber is to seat about 600, 410 on the ground floor and the remainder in the gallery. The second, third and fourth floors of the new building will be occupied by classrooms, and the height of the façade will be 66 feet 6 inches from the pavement to the parapet.

To prevent fire there will be no open fireplaces. The heating of the building is to be effected entirely by means of hot air. For the same reason all the floors will be fire-resisting.

The front walls are to be built of Portland stone; those at the rear of white glazed bricks. The style of architecture will be somewhat similar to the present building, but owing to the greater height the details will be bolder and the piers and pilasters in greater relief. The total estimated cost is 20,500/.

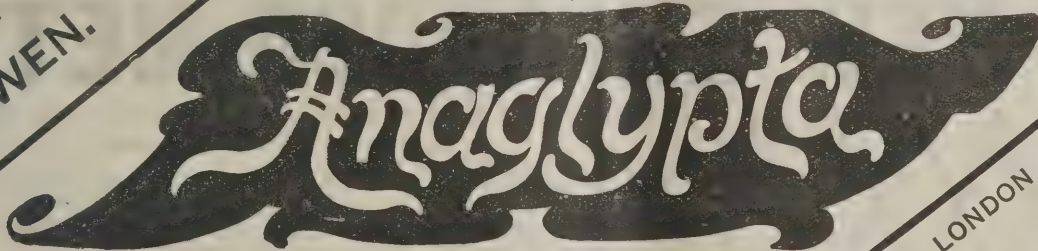
That this undertaking will be a good job for the successful contractor may be judged from the fact that the original building only cost 25,930/.

### PROPOSED REBUILDING OF THE CENTRAL CRIMINAL COURT.

THE finance committee of the Corporation have recently considered the question of finance in connection with the proposed rebuilding of the Sessions House in the Old Bailey. They state in their report that they had obtained from the surveyor an approximate estimate of the probable cost of carrying-out the sketch plans for the new courts, and they had instructed the officers to report as to the several sources from which the requisite funds might be obtained. The cost of the proposed rebuilding and complete equipment of the Sessions House, with its various courts and offices, was estimated at 120,000/. It was also proposed to utilise the female wing at Newgate, the freehold of the Corporation, of an estimated value of 21,750/. The land on which the existing Sessions House and courts stand,

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with the adjacent yard, is estimated to be of the value of about 50,000*l.*, and is also the freehold of the Corporation. The utilisation of the suitors' fund of the City of London Court, now amounting to 70,585*l.*, was a suggestion which received due attention; but although, no doubt, under certain conditions the Corporation, if it were deemed advisable, could thus utilise the fund, the committee did not in all the circumstances advise the adoption of such a course in this instance. In their judgment the present state of its finances would not justify the sinking by the Corporation of such a sum as 70,585*l.*, or anything like that sum, in connection with an undertaking which must necessarily be absolutely unremunerative. Further than that, they did not consider that the present state of its finances would justify the Corporation in parting with the female wing of Newgate for that purpose unless some adequate pecuniary benefit could be made to accrue to the Corporation thereby. It must not be forgotten that in 1902 the grain duty, now producing on an average 18,000*l.* per annum, would come to an end, when the open spaces belonging to the Corporation would have to be wholly maintained out of the City's cash in the absence of Parliamentary assistance, and the Corporation would be left to discharge the outstanding loan raised upon the credit of the grain duty, now amounting to 194,000*l.* The trial of prisoners at the Central Criminal Court was not restricted to persons committed from the City and County of London, but included prisoners from Middlesex, Essex and Surrey, and it might not be unreasonable to approach those various counties and suggest the desirability of a contribution being made by each towards the cost of the proposed rebuilding, such contributions to be based upon the proportions in which the respective counties are liable to contribute towards the salaries of the officers of the court—viz. London (including the City), 35-40ths; Middlesex, 2-40ths; Essex, 2-40ths; and Surrey, 1-40th. It could not be urged against the Corporation that in making such a suggestion it was not acting reasonably in the matter, inasmuch as it must be carefully borne in mind that the whole of the new buildings would stand on freehold property of the Corporation, from which no income would be derived, and that the Corporation, in addition to paying out of the City's cash the salaries of the Recorder and Common Serjeant, would also continue to bear the other expenses in connection with the maintenance of the courts and buildings, including supervision and repair. The Central Criminal Court holds almost continuous sittings far more than any other court of assize, and prisoners are always sent for trial there from the counties

enumerated in far greater proportions than those committed from the City itself. In cases of offences on the high seas and other places within the jurisdiction of the Admiralty of England the prisoners must be tried at the Central Criminal Court. For these reasons the finance committee recommend that the whole cost of the proposed rebuilding of the Sessions House and courts, including the additional land required for the purpose and the premises to be used during rebuilding, be defrayed by means of a county rate restricted to the City area. The report will be considered at a future meeting of the Corporation.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

9223. William Greenwood, for "Improvements in safety-chain fastening for doors."

9226. George Rockliffe, for "Improvements in door-frames for ships and like structures."

9230. Archibald Ansell, for "Improvements in sliding sashes and frames."

9237. John Douglas, for "An improved ventilator."

9270. Sidney Lawrence, for "Improvements in and relating to sash-fasteners."

9271. Sidney Lawrence, for "Improvements in connection with the raising and lowering of window and like sashes."

9272. George Henry Young, for "An improved method of and tool for forming grooves in wood and other materials."

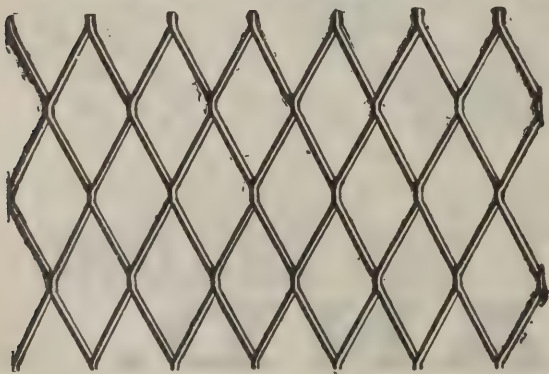
9357. William Jackson, for "Improvements in or relating to window-sashes or frames."

9466. Joseph Kaiser and Joseph Wilbrand, for "Improvements in door-fastenings."

9479. Julius Heinrich Brückner, for "An improved self-closing door-hinge."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & CO., Patent Agents, 37 Chancery Lane, London, W.C.

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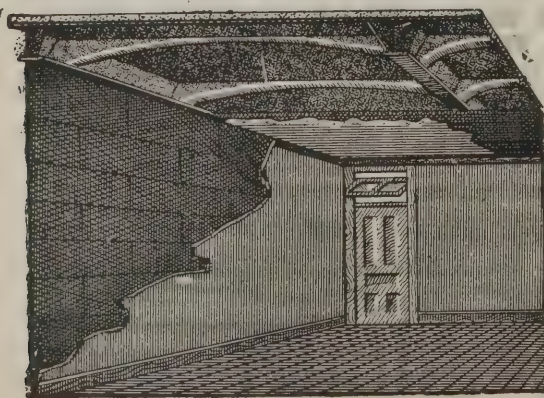
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# THE Architect and Contract Reporter.

## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xiii.*

## COMPETITIONS OPEN.

**BOOTLE.**—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l.* Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

**MORECAMBE.**—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000*l.*, at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

## COMPETITION DECIDED.

**KNARESBOROUGH (YORKSHIRE).**—Mr. W. D. Caröe has placed first the plans submitted by Mr. George H. Barrowcliff, architect, of Loughborough, in public competition for the Knareborough Grammar School, designed to accommodate 100 scholars, thirty boarders, with head-master's house and a complete technical school.

## CONTRACTS OPEN.

**ABERDEEN.**—May 18.—For erection of the Morison Wing, Scott's Hospital, Huntly. Mr. A. Marshall Mackenzie, architect, 1 Bon Accord Street, Aberdeen.

**ABERDEEN.**—May 11.—For erection of dwelling-house at Hilton, Lumphanan; new byres at Wester Kincairgie, Lumphanan; men's sleeping-place at Bogloch, Lumphanan; alteration on dwelling-house at Knappyrround, Lumphanan. Messrs. Cochran & Macpherson, advocates, 152 Union Street, Aberdeen.

**ALVESTON.**—May 15.—For erection of parish hall and commemorative building. Mr. F. Bligh Bond, architect, Alliance Chambers, Corn Street, Bristol.

**BAILDON.**—May 11.—For erection of residence, stabling, &c., in Langley Lane. Messrs. Fairbank & Wall, architects, Craven Bank Chambers, Bradford.

**BARNESLEY.**—May 10.—For pulling-down shop premises, May-Day Green, Barnsley, and erection of new buildings. Mr. Herbert Crawshaw, architect, 13 Regent Street, Barnsley.

**BARRY DOCK.**—May 10.—For erection of a chapel and schoolroom at Holton Road, Barry Dock. Rev. T. Pandey John, 25 Regent Street, Barry Dock.

**BATLEY.**—May 12.—For erection of additions to water-tower at Hick Lane Mills. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

**BATLEY.**—May 14.—For erection of additions and alterations to the National Schools. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

**BEDALE.**—For erection of a classroom for the boys' school and for alterations in the infants' school. Master, Wycar, Bedale.

**BELFAST.**—May 11.—For erecting lavatory and water-closet accommodation at Lock Wards, also providing and laying new sewer from weighbridge to Lisburn Road. Mr. James C. Neeson, clerk, Workhouse.

**BELFAST.**—For erection of business premises, Berry Street. Mr. W. J. Moore, architect, Whitehall Buildings, Ann Street, Belfast.

**BILLERICAY.**—May 11.—For supplying and laying wood-block flooring to two dayrooms at the Union House. The Master.

**BRADFORD.**—May 10.—For erection of a gymnasium at the Nutter Orphanage. Mr. T. C. Hope, architect, Old Bank Chambers, Bradford.

**BRADFORD.**—For erection of two houses and house and shop in Lilycroft and Westfield Roads, Manningham. Messrs. Fairbank & Wall, architects, Craven Bank Chambers, Bradford.

**BRIDGNORTH.**—May 19.—For erection of a new mixed and infant school at Highley, near Bridgnorth. Messrs. R. Scrivener & Sons, Howard Place, Hanley.

**BRIDGWATER.**—May 7.—For alterations and additions to and to the Board schools, Albert Street. Mr. A. Basil Cottam, architect, Eastover, Bridgwater.

**BRIGHOUSE.**—May 25.—For erection of an engine, boiler and press-house, chimney-shaft and other buildings, also for large sewage-tanks, subway and other works. Mr. A. M. Fowler, 1 St. Peter's Square, Manchester.

**BRISTOL.**—May 10.—For enlargement of the premises of Herbert Ashman & Co., Broadmead and Silver Street. Mr. James Hart, architect, Liverpool Chambers, Corn Street, Bristol.

**BROCKLEY.**—May 11.—For erection of public conveniences at Hilly Fields. Architect's Department, County Hall, Spring Gardens, S.W.

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**BUCHAREST.**—May 18.—For construction of an industrial school at Jassy. Application to the Roumanian Ministry of Agriculture at Bucharest.

**BURNLEY.**—For pulling-down, rebuilding and extension of assembly-room, &c. Mr. Thos. Bell, architect, Burnley.

**CANTERBURY.**—May 13.—For demolition of seven cottages in Ruttington Lane, Canterbury, and other works in connection therewith, for the Trustees of St. John's Hospital. Mr. W. J. Jennings, architect, 4 St. Margaret's Street, Canterbury.

**CARDIFF.**—May 10.—For erection of chapel and buildings. Messrs. J. P. Jones, Richards & Bugden, architects, 18 St. Mary Street, Cardiff.

**CARDIFF.**—May 17.—For completion of St. Catherine's parish church. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

**CARDIFF.**—May 17.—For erection of a branch free library at the docks. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

**CASTLEFORD.**—May 10.—For erection of public hall and offices in Jessop Street. Mr. R. M. McDowall, architect, Castleford.

**CLAYTON-LE-MOORS.**—May 15.—For erection of thirteen houses in one lot. The Directors, Co-operative Society, Clayton-le-Moors.

**CLOUGHFOLD.**—May 15.—For the pointing and painting of thirteen cottages. The Weavers' Office, 30 Bacup Road, Cloughfold.

**CORNWALL.**—May 19.—For erection of a range of buildings, consisting of cattle, root, calves and trap-houses, at Little Trewirgie, in the parish of Probus. Mr. George Gow, Tregothnan Office, Truro.

**CROMER.**—May 17.—For erection of a boiler and exhaustor house, sheds over purifiers and oxide floor, and other work. Mr. Percy Griffith, 55 Parliament Street, Westminster, S.W.

**CRONDALL.**—May 17.—For erection of an infirmary on the ground adjoining the school. Mr. A. Ansell, architect, 63 Finsbury Pavement, E.C.

**DENTON.**—May 15.—For construction of a river retention wall, about 120 yards in length, near to the outfall sewage works. Messrs. Lomax & Lomax, civil engineers, Fold Street, Bolton.

**DEVIZES.**—May 18.—For building a recreation-room at the Wilts County Pauper Lunatic Asylum. Mr. Charles S. Artyl, county surveyor, County Offices, Trowbridge.

**DEWSBURY.**—For erection of boundary wall, &c., at West-town. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

**DOWNPATRICK.**—May 13.—For erection of two dwelling-houses on the Circular Road. Mr. Edward Lascelles, Market Street, Downpatrick.

**DUBLIN.**—May 12.—For alterations and additions to the workhouse kitchen and other apartments in the workhouse. Mr. John O'Neill, clerk, North Brunswick Street, Dublin.

**DURHAM.**—For additions to the Primitive Methodist chapel. Messrs. Plummer & Burrell, architects, Market Place, Durham.

**DURHAM.**—For re-covering the roof of Windlestone Hall with lead and slate. Agent, Estate Offices, Windlestone, Ferryhill, co. Durham.

**DURHAM.**—For erection of new premises, Pelton Fell. Mr. Edwin Bowman, architect, County Chambers, 52 Westgate Road, Newcastle.

**DURHAM.**—May 11.—For additions to co-operative store, Springwell. Mr. H. Miller, architect, Felling.

**ESCRICK.**—May 20.—For additions and alterations to the police-station and court-house. Mr. Alfred Beaumont, county surveyor, County Hall, Beverley.

**ESSEX.**—May 12.—For repairs to and alterations of Tolleshunt D'Arcy Church. Rev. R. V. O. Graves, the Vicarage, Tolleshunt D'Arcy.

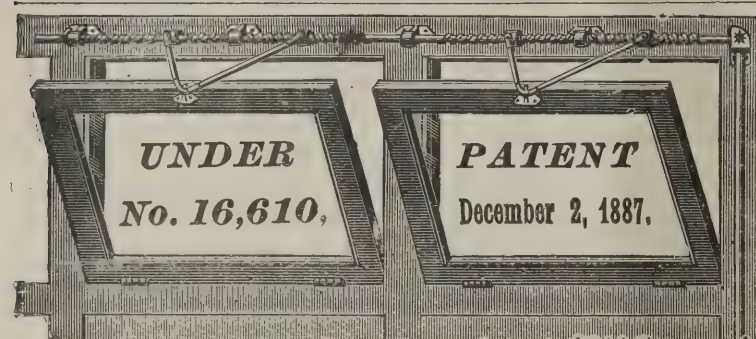
**GLAMORGAN.**—May 15.—For erecting a new stage, staircases, lavatories, supper-room, ventilation, &c., for the Committee of the Town Hall Trust, Bridgend. Messrs. Lambert & Rees, architects, Bridgend.

**GLAMORGAN.**—May 15.—For certain work required in erecting a new stage, staircases, lavatories, supper-room, ventilation, &c., for the Town Hall Trust, Bridgend. Messrs. Lambert & Rees, architects, Bridgend.

**GOSPORT.**—May 12.—For erection of boundary wall and entrance gates at depot, South Street, for the Gosport and Alverstock Urban District Council. The Surveyor, High Street, Gosport.

**GRAYS.**—May 18.—For erection of a portion of a school at Bridge Road. Mr. Christopher M. Shiner, architect, 2 Walbrook, E.C.

**HALIFAX.**—May 18.—For alterations and additions to Shaw Lodge. Mr. W. Clement Williams, architect and surveyor, 29 Southgate, Halifax.



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**HALIFAX.**—May 14.—For erection of tenting and grey-room drying-house and offices at the Washer Lane Dye Works. Messrs. R. & R. E. Horsfall, architects, 15 George Street, Halifax.

**HANWELL.**—May 10.—For erection of temporary iron structures at the Asylum. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

**HANDSWORTH.**—May 10.—For erection of two cottages, weigh-house, offices, boundary walls, &c., at the Sanitary Dépôt, Queen's Head Road. Mr. E. Kenworthy, surveyor, Council House, Handsworth.

**HANWELL.**—May 10.—For erection of temporary iron structures, at asylum. Clerk of the Committee, L.C.C., 21 Whitehall Place, S.W.

**HARTING.**—May 15.—For enlargement of the present schools, for the School Committee. Mr. R. G. Blackwell, hon. secretary, Down Place, South Harting, Petersfield.

**HARTLEPOOL.**—May 11.—For conversion into coastguard dwellings, battery, &c., of buildings formerly used as militia barracks. R.N.R. Battery, West Hartlepool.

**HAVANT.**—May 13.—For erection of vagrant wards at the workhouse. Mr. A. Edwin Stallard, architect, West Street, Havant.

**HENDON, N.W.**—May 10.—For erection of an asylum. Messrs. Giles, Gough & Trollope, architects, 28 Craven Street, Strand, W.C.

**HIGHLEY.**—May 19.—For erection of a new mixed and infant school at Highley, near Bridgnorth, in the county of Salop. Messrs. R. Scrivener & Sons, Howard Place, Hanley.

**HIGH SPEN.**—For erection of thirteen cottages at High Spen, or for institute at Witton Gilbert, co. Durham. Secretary of the Consett Iron Company, Limited, Blackhill, co. Durham.

**HOLDSWORTH.**—May 18.—For erection of barn and mistal, &c., at Holdsworth House Farm. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

**HORNCastle.**—May 17.—For repair of five bridges, viz. three in the parish of Wispington, one in the parish of Thimbleby and one in the parish of Edlington. Mr. J. E. Chatterton, clerk, Horncastle.

**HORSELYDOWN.**—May 30.—For erection of a laundry at Workhouse, Parish Street, Rotherhithe, and for repairing, painting, distemp'ring, whitewashing, &c., the interior of the Infirmary, Lower Road, Rotherhithe. Messrs. Newman & Newman, architects, 31 Tooley Street, S.E.

**HUDDERSFIELD.**—May 10.—For erection of boundary walls (1,150 feet long by 8 feet high) at Crossland Moor. Messrs. John Kirk & Sons, architects, Huddersfield.

**IRELAND.**—May 10.—For making good defective work at Ardglass parish church. Mr. Alan B. Stokes, 16 Chichester Street, Belfast.

**IRELAND.**—May 10.—For erection of a coal store, 61 feet by 35 feet by 10 feet, and boundary wall, 59 feet long by 10 feet high, to be erected at the gasworks, Ballymagee Street, Bangor. Mr. Francis Pollock, town clerk.

**JARROW.**—May 13.—For alterations and additions to the higher-grade school. Mr. George Mason, clerk, Jarrow.

**LARNE.**—May 17.—For building additions, &c., to church, for the committee of Raloo Presbyterian Church. Rev. Ewing Gilfillan, Raloo Manse, Larne.

**LEITH.**—For improvements at St. John's Parish Church, in connection with lighting, ventilation, reseating, painting, &c. Messrs. A. & R. McCulloch, architects, 3 Bernard Street, Leith.

**LANDAFF.**—May 12.—For building a villa residence. Messrs. Morgan & Hodge, architects and surveyors, Prudential Buildings, Newport, Mon.

**LONDON.**—May 19.—For the construction of two underground public conveniences, No. 1 in High Street, opposite Shoreditch Church, and No. 2 at the junction of East Road with New North Road. Mr. J. Rush Dixon, engineer and surveyor, Town Hall, Old Street, E.C.

**LONDON.**—May 10.—For erection of temporary iron structures at Hanwell Asylum, W. Mr. R. W. Partridge, clerk of the Asylums Committee, 21 Whitehall Place, S.W.

**MANCHESTER.**—For erection of premises at Heaton Park, for the Prestwich Conservative Club Building Company, Limited. Mr. Percy D. Lodge, architect, 5 Cross Street, Manchester.

**MANCHESTER.**—May 27.—For erection of vagrant wards at the workhouse, Crumpsall. Messrs. W. Telford, Gunson & Son, architects, 10 Marsden Street, Manchester.

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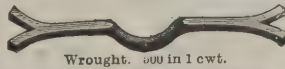
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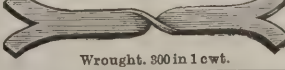
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**MIDDLETON.**—For erection of a branch store in Higher Wood Street. Mr. F. W. Dixon, architect, Trevelyan Buildings, Manchester.

**NEWHAVEN.**—May 13.—For extension of premises in Chapel Street, also for alterations to bakery. Mr. Edward John Hughes, architect and surveyor, Riverside, Newhaven.

**NEW TREDEGAR.**—May 10.—For building four houses, near Cwm Farm. Mr. H. Sketch, architect, New Tredegar.

**PLYMOUTH.**—May 10.—For erection of new brewery, for Messrs. Polkinghorne & Co., Plymouth. Messrs. Geo. Adams & Sons, engineers, Bristol.

**PLYMOUTH.**—May 10.—For erection of covered market and new offices for Weights and Measures Department. Mr. J. H. Ellis, town clerk, Plymouth.

**PURSTON.**—May 10.—For erection of four houses and shop in Streethouse; also two houses in Purston. Mr. W. Hamilton Fearnley, architect, Station Lane, Featherstone.

**QUEENSBOROUGH.**—May 12.—For erection of a Congregational chapel. Mr. W. Cotes, 157 High Street, Queensborough.

**RAWTENSTALL.**—May 12.—For erection of fire station and stables in King Street. Borough Surveyor, Municipal Offices.

**ROCHESTER.**—May 11.—For alterations, painting and other works at Watts's Public Baths, Esplanade. Mr. J. W. Nash, surveyor, Medway Terrace, Rochester.

**ROTHERHAM.**—For erection of 150 cottages (50 small and 100 large), at Denaby Main. Denaby and Cadeby Main Collieries, Limited, Denaby Main, near Rotherham.

**ROTHERHAM.**—May 14.—For erection of a swimming-bath in Market Street. Mr. H. H. Hickmott, town clerk, Council Hall, Rotherham.

**ROWLEY REGIS.**—May 15.—For erection of a school. Mr. J. W. Cornwell, Bullfield Farm, Springfield Lane, Rowley Regis, near Dudley.

**SCAMMONDEN.**—May 11.—For erection of stabling for twenty horses at Brown Cow pleasure resort. Mr. W. H. D. Horsfall, architect, &c., 9 Harrison Road, Halifax.

**SCARBOROUGH.**—May 10.—For erection of warehouses, stables, coachhouses, &c., in Cross Street. Mr. David Petch, architect and surveyor, Victoria Chambers, Huntriss Row, Scarborough.

**SHEFFIELD.**—For erection of a shop in Saville Street. Messrs. Spear & Jackson, Etna Works.

**SHOEBURYNESSE.**—May 11.—For erection of an engineer's house at waterworks. Messrs. Burles & Harris, architects and surveyors, Southend-on-Sea.

**SHREWSBURY.**—May 18.—For painting the inside of the general market. Mr. W. Chapple Eddowes, borough surveyor, The Square.

**SOUTHOWRAM.**—May 13.—For erection of two farmhouses, with barn, stables, mistals, &c. Mr. Raymond Berry, architect, Arcade Chambers, Halifax.

**STEYNTON.**—May 12.—For erection of wells, one at Priory and two at Dreen Hill. Mr. David Davies, chairman of Council, Steynton.

**ST. PANCRAS.**—May 13.—For seatings for Lancashire boilers, main flues, &c., and other works for the vestry. Mr. C. H. F. Barrett, vestry clerk, Vestry Hall, Pancras Road, London, N.W.

**WALES.**—For erecting two semi-detached villas at Pentryrch. Mr. J. Jenkins, Sunny Bank House, Pentryrch.

**WALES.**—May 10.—For erection of a school at Lechryd, near Rhymney Bridge, to accommodate 68 scholars. Messrs. James & Morgan, architects, Charles Street Chambers, Cardiff.

**WALES.**—May 19.—For erection of new Congregational chapel at Brynamman. Mr. John Harris, Penybont House, Brynamman (R.S.O.).

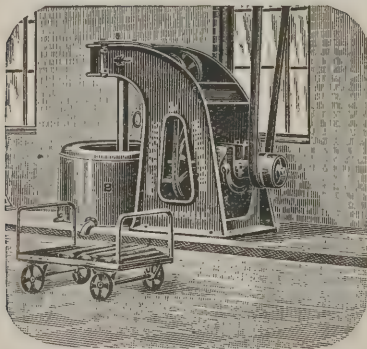
**WALES.**—May 12.—For erection of four shops in Beaufort Street, Brynmawr. Mr. John Watkins, The Emporium, Brynmawr.

**WALES.**—May 13.—For alterations and additions at the Welsh Baptist Chapel, Rhos, Ruabon. Mr. Thomas Thomas, Mountain Street, Rhos.

**WALES.**—May 17.—For erection of a new schoolroom and alteration of Mount Zion Chapel, Troedryhiw. Mr. Arthur Daniel, 67 Cardiff Road, Troedryhiw.

**WALES.**—May 11.—For building thirty-five cottages at Penywern, Dowlais. Messrs. John Vaughan & Sons, solicitors, Old Post Office Chambers, Merthyr Tydfil, and 8 High Street, Cardiff.

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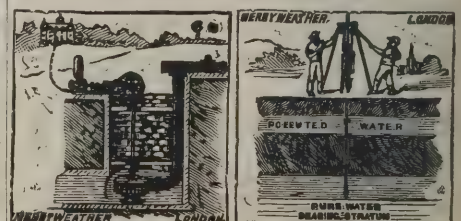
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**WEST HAM.**—May 25.—For erection of sewage pumping engine and boiler-houses and electric-lighting buildings, at the Abbey Wharf, Stratford, E. Mr. Lewis Angell, engineer to the Corporation, Town Hall, Stratford, E.

**WHITBY.**—For erection of a dwelling-house, with stables and coachhouse, at Hawsker. Mr. John J. Milligan, architect and surveyor, 77 Baxtergate, Whitby.

**WIMBLEDON.**—May 17.—For construction of an underground convenience in the Broadway. Clerk to the Council, Broadway, Wimbledon.

**WITHINGTON.**—May 17.—For erection of the following buildings in the town's yard:—(a) Conversion of existing buildings into 10-stalled stable with loft over; (b) erection of work-shops, 10-bay shed and store-rooms. Surveyor to Council, Town Hall, Withington.

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For erection of buildings at the Workhouse. Mr. A. PURKISS, architect, 16 Junction Road, Andover.

Annett & Son	£400 0 0
C. Grace & Sons	370 0 0
S. Bell	335 0 0
H. COOK, Andover (accepted)	305 0 0

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C. WIBLEY, Bath (accepted)	£1,546 10 0
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For erection of the iron roofs, columns, gutters, &c. (about 310 tons), in moulding and fitting shops on Derby Road. Mr. MAURICE HUNTER, engineer. Quantities by engineer.

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Butterley Co.	4,109 0 0
PHENIX FOUNDRY Co., Derby (accepted)	3,938 0 0

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Davey Bros. . . . . 3,747 4 0

## BUXTON.

For erection of a residence, "Maison Rouge," for Mr. Frederick Smallman. Messrs. WM. SUDGEN & SON, architects, Leek and Hanley. Quantities by the architects.

Groome & Co., Limited, Bakewell . . . £3,173 0 0

## CAMBORNE.

For erection of premises at Market Place.

J. COLLIVER, Truro (*accepted*).

Five tenders received.

## CARDIFF.

For erection of attendants' rooms and carrying-out other alterations at Workhouse. Mr. EDWIN SEWARD, architect, Queen's Chambers, Cardiff.

S. Shepton & Sons . . . . . £1,085 0 0

C. C. Dunn . . . . . 1,054 11 10

W. Symonds & Co. . . . . 1,022 15 7

D. Davies . . . . . 995 0 0

J. Allan . . . . . 989 13 1

E. Turner & Sons . . . . . 948 0 0

Latley & Co. . . . . 943 0 0

G. GRIFFITHS, Working Street (*accepted*) . . . 929 3 0

## CARNARVON.

For erection of chapel and schoolroom, Chwilog.

G. JONES, Morfa Nevin, Pwllheli (*accepted*) . £1,140 0 0

## CHATHAM.

For erection of town hall and municipal offices. Mr. G. E. BOND, architect, High Street, Rochester.

R. Avar. . . . . £26,747 0 0

Wallis & Sons . . . . . 26,263 0 0

J. & M. Patrick . . . . . 24,173 0 0

Pryer & Son . . . . . 22,985 0 0

L. Seager . . . . . 21,998 0 0

WEST BROS., Rochester (*accepted conditionally*) 20,598 0 0

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**DENTON.**

For erection of a residence on Manchester Road. Mr. J. H. BURTON, architect, 2 Guide Lane, Hooley Hill.		
Thomas Dean, Ashton-under-Lyne	£937	0 0
E. Kirkley, Ashton-under-Lyne	928	0 0
Fitton & Bowness, Ashton-under-Lyne	920	0 0
Hirst & Kinder, Hooley Hill	838	16 9
Joseph Clayton, Denton	837	10 0
James Ridyard, Ashton-under-Lyne	798	0 0
Zachariah Pike, Hooley Hill	752	0 0
Exors. of Thomas Storer, Denton*	709	10 0

\* Accepted subject to certain alterations.

**FARNHAM.**

For erection of men's casual wards on land adjoining Workhouse. Mr. S. STAPLEY, architect, West Street, Farnham.		
General Builders, Limited	£2,100	0 0
G. Kemp	1,967	0 0
W. Garland	1,910	0 0
Tompsett & Co.	1,868	0 0
GODDARD & SONS, Farnham (accepted)	1,746	0 0

**FLEETWOOD.**

For sewerage, levelling, paving, metalling, &c., in following streets:—Pharos Street, Poulton Street, Upper Dock Street, Back Street and passage near Cross Street. Mr. M. S. GAULTER, surveyor, Town Hall, Fleetwood.		
J. & T. Binns	£3,095	15 3
J. Kirkbride	2,686	2 6
Bentley & Co.	2,590	0 0
P. BOOTH, Bolton (accepted)	2,161	2 9
Surveyor's estimate	2,089	7 6

**GREAT YARMOUTH.**

For laying drains at Caistor-on-Sea. Mr. JAMES E. TEASDEL, surveyor, 3 Queen Street, Great Yarmouth.		
F. Hipperson, Barford	£305	0 0
A. E. Bond, Great Yarmouth	295	0 0
G. Rackham, Norwich	290	0 0
E. Bland, Bradwell	232	15 0
R. F. Chase, Caistor	159	15 0

**HANLEY.**

For erection of shop premises at the corner of Marsh Street and Broad Street. Messrs. R. SCRIVENER & SONS, architects, Hanley.		
Tompkinson & Bettelley	£3,207	0 0
Bagnall	3,095	0 0
Ellis	3,064	0 0
GODWIN, Hanley (accepted)	2,735	10 0
Cornes	2,710	0 0
Bennett	2,656	0 0

**HULL.**

For drainage-works and erection of bath-room, water-closets, &c., at Workhouse, Beverley Road. Mr. T. BEECROFT ATKINSON, architect, 11 Trinity House Lane, Hull.

*Bricklayer.*

B. Harper, Brunswick Street	£4,098	0 0
J. Carr, Constable Street	4,097	0 0
B. Nicholson, Beverley Road	3,982	0 0
G. Houlton, Baker Street*	3,969	0 0

*Joiner.*

B. Drury	233	4 0
Marsden & Son	223	10 0
H. Neale	223	4 0
V. Knowles*	210	11 9

*Stonemason.*

J. Peers	555	0 0
F. Sweeting	529	6 0
T. & W. Wriglesworth*	517	8 0

*Plumber.*

J. W. Newham	225	5 11
E. J. Torr	216	10 6
Atkinson & Son	215	18 0
W. G. Padgett*	206	11 0

*Slater.*

Folkard & Son*	19	8 6
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*Painter.*

Torr & Sons	37	9 1
E. Hollings*	37	6 6

\* Accepted subject to confirmation of Board.

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**JARROW.**

For additions to premises, Bede Burn Road, Jarrow, for Mr. Geo. Charlton. Mr. J. WALTER HANSON, architect, South Shields and Jarrow.

Cowper & Henderson..	£347	3	2
R. Summerbell & Son..	336	0	0
W. B. Ingram ..	331	16	1
J. McHarg ..	299	15	0
W. H. BROWN (accepted) ..	283	19	9

**KILLAMARSH.**

For erection of retort-house, purifier-house, engine-house, meter-house, stores, chimney-stack, tar and liquor wells, &c. Mr. W. H. WAGSTAFF, engineer, 57 Saltergate, Chesterfield.

G. WRIGHT, Worksop (accepted).

**LEYTONSTONE.**

For erection of premises for the London and Provincial Banking Company. Mr. A. R. BARKER, architect.

Roberts ..	£6,394	0	0
Wood ..	6,257	0	0
W. Shurmur ..	6,236	0	0
Chessum & Son ..	5,997	0	0
Mattock ..	5,991	0	0
Patman & Fotheringham ..	5,950	0	0
Gardner ..	5,930	0	0
J. Bentley ..	5,805	0	0
Gough ..	5,654	0	0
Carmichael ..	5,319	0	0

**LONDON.**

For erection of a court-house at the corner of Archway and Bishops Road, for the Middlesex County Council.

S. J. Bird ..	£8,950	0	0
Mowlem & Co. ..	8,793	0	0
Phillips & Son ..	7,675	0	0
Higgs & Hill ..	7,100	0	0
Holloway Bros. ..	7,047	0	0
L. & W. H. Patman ..	6,911	0	0
Kirk & Randall ..	6,870	0	0
Southcott & Co. ..	6,801	0	0
Lawrance & Sons ..	6,637	0	0
J. W. Dixon ..	6,600	0	0
GODDARD & SONS, Farnham (accepted) ..	6,290	0	0

**LONDON—continued.**

For erection of warehouse at Broadwall, S.E. Mr. ED. POWER, architect. Quantities by Mr. W. BARNETT.

Allen & Son ..	£10,072	0	0
Britton ..	9,997	0	0
F. & H. F. Higgs ..	9,778	0	0
Edwards ..	9,736	0	0
Myring & Son ..	9,339	0	0
Ashby & Horner ..	9,327	0	0
W. Downs ..	9,168	0	0
W. Shurmur ..	8,998	0	0

For alterations at "The Earl Russell" public-house, Finsbury Park, London, N. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.

A. Porter ..	£1,183	0	0
G. E. Todd ..	1,169	0	0
J. T. Robey ..	1,017	0	0
P. HART (accepted) ..	956	0	0

For new offices, factory, &c., 89 Worship Street, &c. Mr. GEORGE HORNBLLOWER, 20 Fitzroy Street, W.

Holloway Brothers ..	£11,800	0	0
N. Lidstone ..	10,565	0	0
F. Gough & Co. ..	10,494	0	0
John Marsland ..	9,916	0	0
J. W. Falkner & Sons ..	9,900	0	0
McCormick & Sons ..	9,888	0	0
J. L. Grover & Sons ..	9,870	0	0
Holland & Hannen ..	9,790	0	0
Wm. Shurmur ..	9,669	0	0
KILLBY & GAYFORD (accepted) ..	9,436	0	0

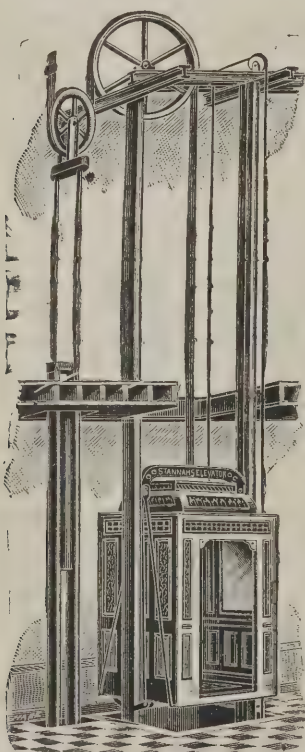
For grand Jubilee pavilion in St. Paul's Churchyard, for Mr. J. N. Maskelyne. Mr. J. G. BUCKLE, architect. Quantities supplied.

William Johnson & Co. ..	£4,023	0	0
F. G. Minter ..	3,281	0	0
JOHN GREENWOOD (accepted) ..	3,274	0	0

**MAIDENHEAD.**

For erecting and furnishing office for the borough surveyor at the Guildhall. Mr. PERCY JOHNS, borough surveyor.

F. W. Edwards ..	£125	0	0
Cox & Son ..	125	0	0
J. K. BOLTON (accepted) ..	110	0	0



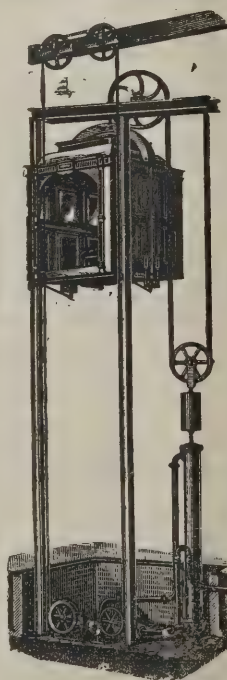
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**MIDDLESBROUGH.**

For alterations, additions and new mahogany shop-fronts to premises in Albert Road. Mr. **WALTER G. ROBERTS**, architect, 61 Albert Road, Middlesbrough.

HUDSON BROS. (accepted)	£196	0	0
Allison Bros.	95	10	0
Perks & Son	87	0	0
Perks & Son	84	0	0
D. Doughty	76	5	0
Baker Bros.	35	0	0
Lambert & Son	34	0	0
Walton & Gaithwaite	26	10	0

For erection of Sunday schools and assembly hall. Mr. **WALTER G. ROBERTS**, architect, 61 Albert Road, Middlesbrough.

Bestiman Bros.	£1,500	0	0
J. Lord	1,367	19	0
J. G. Newby	1,347	0	0
PERKS & SON, Stockton-on-Tees (accepted)	1,300	0	0

**MORLEY.**

For formation of reservoir at the new mill premises, Topcliffe Lane. Mr. **T. A. BUTTERY**, architect, Queen Street, Morley.

**SIMPKIN & ROBINSON**, Morley (accepted).  
All material found by proprietor.

**NEWPORT.**

For pulling-down and rebuilding a portion of the Tredegar Arms Hotel, High Street, Newport, Mon. Messrs. **JOHN J. SWALWELL & H. C. CREIGHTON**, architects, Steam Packet Chambers, Dock Street, Newport.

J. Linton	£2,300	0	0
Lawson & Co.	2,273	0	0
J. Charles	2,199	0	0
D. J. Davies	2,125	0	0
J. Moore	2,110	0	0
T. Westacott	2,079	0	0
W. A. Linton	2,029	0	0
D. Jones	2,000	0	0
E. C. Jordan	1,999	0	0
C. Lock	1,995	0	0
C. H. REED, 1 Malpas Road (accepted)	1,988	0	0

**SOWERBY BRIDGE.**

For erection of West End Congregational Sunday school. Mr. **S. WILKINSON**, architect, Sowerby Bridge.

*Accepted tenders.*

W. Sutcliffe, mason.
L. Whitaker, joiner and carpenter.
G. Whiteley, slater and plasterer.
J. Stafford, plumber, glazier and lighting.
E. Whitehead & Co., painter.
Dorman, Long & Co., Limited, steel girders.
J. Mackrill, iron pillars.
J. Bagshaw & Sons, Limited, iron roof principals.
L. Lamb, heating apparatus.
Total, £2,216.

**STEETON.**

For alterations and additions to the Wesleyan Sunday school, Steeton. Messrs. **JOHN JUDSON & MOORE**, architects, York Chambers, Keighley.

*Accepted tenders.*

T. Atkinson, mason.
W. Steele, joiner.
W. Thornton, slater.
J. Greenwood, plasterer.
Parke & Lodge, plumber.

**STOCKPORT.**

For wrought-iron railings and gate at St. Thomas's Recreation Grounds. Mr. **JOHN ATKINSON**, borough surveyor.

Princess Royal Art Metal Company	£92	0	0
R. & W. Brownwood	73	5	0
H. Hollingdrake & Sons	67	5	0
R. HAMNETT, Stockport (accepted)	55	12	6

**WEST HARTLEPOOL.**

For rebuilding large business premises in Church Street. Mr. **JOHN J. WILSON**, architect, West Hartlepool.

T. Dickinson & Son	£5,900	0	0
J. Proud	5,800	0	0
G. Moody	5,473	10	6
R. J. Marshall	5,384	12	8
Watt Bros.	5,314	0	0
J. HOWE & Co., West Hartlepool (accepted)	5,190	0	0

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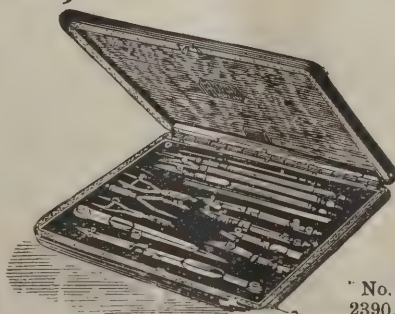
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## WITHAM.

For erection of infirmary on the ground adjoining the school, for the Managers. Mr. F. WHITMORE, architect, Chelmsford.

H. Everett & Son	£3,975	0	0
S. Parmenter	3,957	0	0
R. Girling	3,842	0	0
Smith & Sons	3,789	0	0
Grimwood & Son	3,737	0	0
E. WEST, Chelmsford (accepted)	3,700	0	0

## TRADE NOTES.

IN our notice in the issue of April 23 respecting the firm of G. Lock & Co., Limited, we should have mentioned that Mr George Lock will act in conjunction with Mr. William Wallace as managing director.

THE Verdin Technical Schools, Northwich, are being ventilated by means of Shorland's patent exhaust roof ventilators and special inlet panels, by Messrs. E. H. Shorland & Brother, of Manchester.

THE handsome new theatre which Mr. Beerbohm Tree has just opened on the site of the old Her Majesty's Theatre in the Haymarket, is fitted with all the latest improvements and appliances to meet the London County Council regulations and ensure the safety of the audiences in case of fire. The old theatre was twice saved from destruction by the Merryweather fire apparatus, with which it was fitted, and Mr. Tree's new building has been provided by the same firm with a complete system of fire-mains and hydrants connected to the constant high-pressure water service.

## ELECTRIC NOTES.

THE St. Helen's gas and lighting committee have resolved to duplicate the electric light plant at an estimated cost of 7,500*l*. There will also be 7,500*l*. for mains, and 2,000*l*. for excess of expenditure on present works, making a total of 17,000*l*., which the town clerk has instructions to borrow.

A LOCAL provisional order Bill has been passed providing for an electric light supply to the borough of Dudley.

## ILLUSTRATIONS.

CATHEDRAL SERIES.—NORWICH: VIEW FROM SOUTH-EAST.

THE EMPIRE PALACE OF VARIETIES, MIDDLESBROUGH, YORKS.

5 QUEEN STREET, MAYFAIR. NEW DINING-ROOM FOR MR. CHARLES GRANT DUCROZ.

THE BRITISH EMPIRE MUTUAL LIFE ASSURANCE COMPANY'S NEW BOARD-ROOM.

THE ROYAL MUSIC HALL, HOLBORN.

## BUILDING AND BUILDERS.

RAPID progress is being made by the contractors under the North-Western Railway with the construction of the extensive and commodious station at Llandudno Junction.

PLANS have now been adopted for the restoration of Bradford parish church as a memorial of the late Archdeacon Bardsley. The estimated cost is 4,000*l*.

THE York Master Builders' Association have granted the plasterers an advance from 8*d*. to 9*d*. per hour, and bricklayers and plasterers' labourers an increase from 5½*d*. to 6½*d*. per hour, on condition that they undertake not to make a further application for an advance next year. The bricklayers had also asked for an advance from 8*d*. to 9*d*. per hour, but subsequently withdrew the request.

BATHS and washhouses are to be erected in Pitfield Street, Hoxton, and the foundation-stone was laid on the 1st inst. The first class swimming-bath will be 100 feet by 40, the second class swimming-bath somewhat smaller; there will be many slipper-baths, besides accommodation for fifty washers. The site and building will cost 51,093*l*.

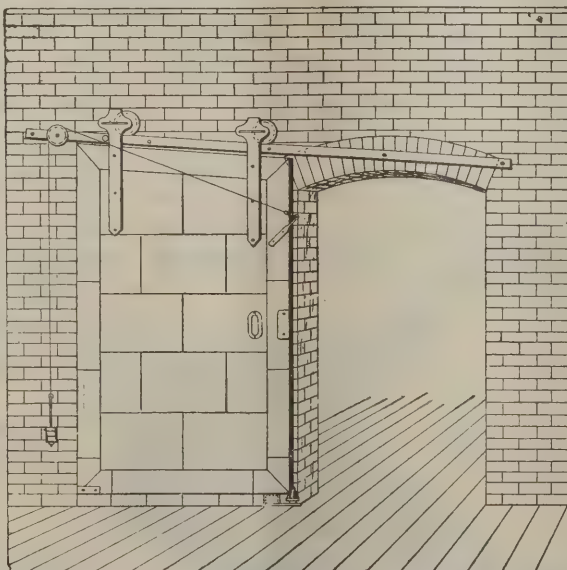
THE foundation-stones of the new Wesleyan day and Sunday schools and lecture-hall at Garston were laid on the 29th ult. The buildings are being erected on land adjacent to Island Road Wesleyan church by Messrs. Turner & Moss, Garston, from plans by Mr. Rhind, architect, Liverpool, and are estimated

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to cost 3,100*l*. The schools will accommodate 339 scholars, and in addition there will be a spacious lecture-hall and ladies' parlour, and a library.

A MISSION church is being erected in connection with St. Peter's Church, Woolton, at Hunts Cross, an outlying portion of the parish.

THE lady chapel of the church of St. Bartholomew-the-Great is to be reopened on Tuesday, May 18, by the Bishop of London. The ceremony is to be followed by a luncheon in the great hall of St. Bartholomew's Hospital, by way of celebrating the completion of the work. The bishop will occupy the chair, and a great effort is being made to enable him to announce that the chapel has been opened free of debt, but 400*l*. is still required.

THE corner-stone of a new Episcopalian church was laid at Stourton on the 1st inst. The building which is to take the place of St. Andrew's mission church, which has become too small, will be of the late fourteenth-century style of architecture. It will be a brick building, with red Dumfries stone dressings on the outside and with a roof of red Staffordshire tiles. The dressings of the interior will be of Harehills stone. The church will consist of a nave and aisle, chancel, organ chamber, vestry and heating chamber. On the north side there will be a small chapel, providing accommodation for about twenty-five people. An octagonal turret will rise from the north-east corner of the nave. The aisles are to be divided from the nave by two arcades of five arches each. Above these there will be a range of three-light traceried clerestory windows. A large five-light east window and clerestory windows on the north and south will light the chancel. The main entrance to the church will be at the north-west corner. There will also be doors at the north and west ends of the building. The chancel ceiling will be arched and panelled, and the roof of the nave will also be subdivided into panels. A floor of wood blocks, deal seats and an oak altar complete the building. The estimated cost, including extras, is a little over 5,000*l*. Mr. Hodgson Fowler, of Durham, is the architect, Mr. T. A. Bolton, of York, clerk of the works, and Mr. Isaac Gould, the contractor.

A NEW Wesleyan church is to be built at Burley, and the foundation-stone, memorial-stones and "commemorative bricks" were laid on Saturday afternoon. The site is in Cardigan Lane. At present this is only a narrow, inconvenient road, but it is said that the Corporation intend to widen it,

so as to provide a satisfactory thoroughfare leading from Burley to Headingley. Then the situation of the chapel will be admirable. The premises have been designed by Mr. G. F. Danby, architect, of Leeds. They comprise a chapel, school-room, infants'-room, church parlour, minister's-room and twelve vestries or classrooms. The style of architecture adopted is the Decorative Gothic. The chapel is being built of stone, lined with brick, while all the internal woodwork will be of pitch-pine. A leading feature of the front elevation will be a double doorway with granite columns, carved capitals and moulded arches, terminating in a gable. Over this there is to be a five-light traceried window. At the south-east corner a handsome tower and spire will rise to a height of 110 feet. Inside the tower there will be a stone staircase leading to the gallery in the chapel, and a similar staircase will be provided at the opposite corner of the building. The chapel is to be 84 feet long, 48 feet across the nave and 57 feet across the transepts. Accommodation will be provided for 480 persons on the ground floor and for 320 in the gallery. The chancel will be separated from the chapel by a moulded arch supported on granite columns, with carved bases and capitals. At this end of the chapel there will be a large traceried circular window filled with stained-glass, while two-light traceried windows terminating in gables will be placed at the side and filled with leaded lights. The open-timbered roof will in the centre rise to a height of 40 feet. In heating the premises the low-pressure hot-water system is to be applied. Fresh air will be admitted to the chapel and various rooms by air inlets and ventilating radiators, the foul air being carried off by roof ventilators and flues. The contracts at present let amount to about 6,000*l*. The contractors are:—Mr. C. Myers, masonry; Messrs. Ledgerd & Son, joinery; Mr. H. Boston, plumbing and glazing; and Messrs. J. Atkinson & Son, slating.

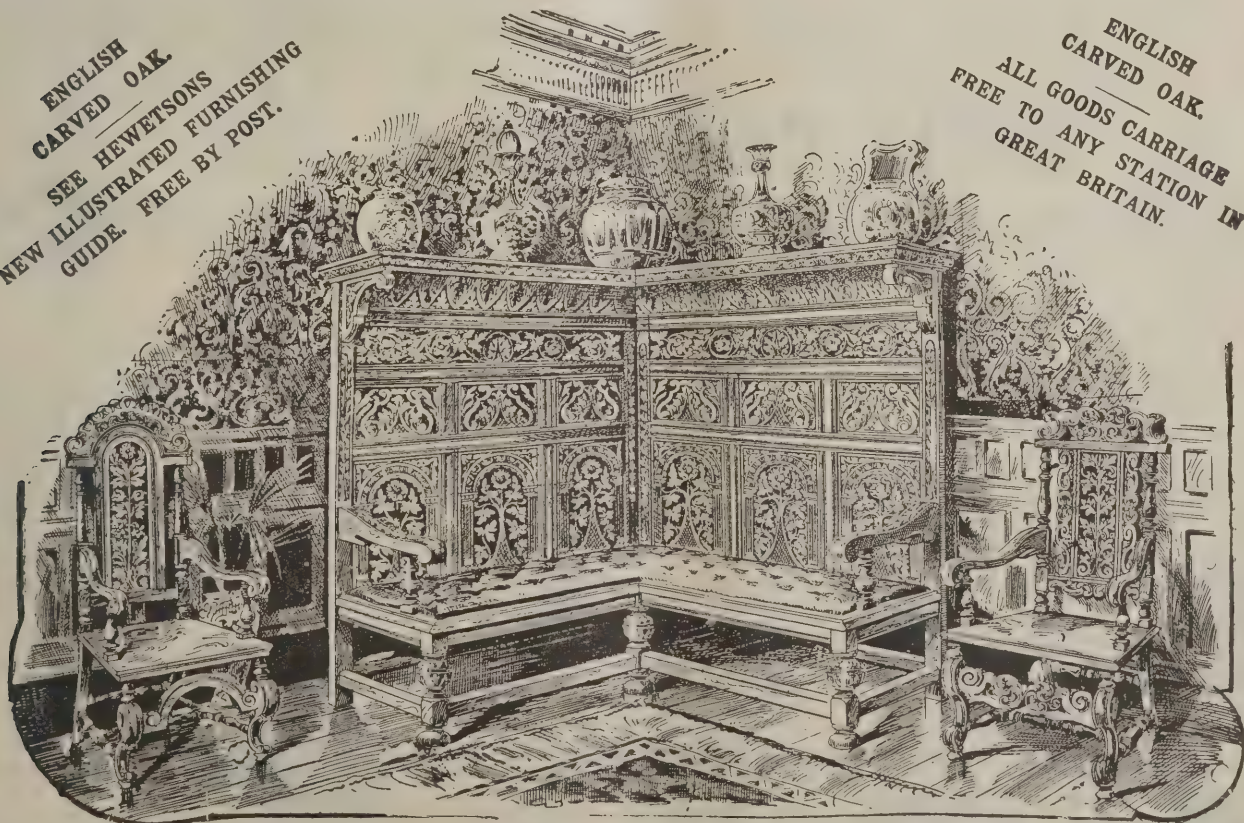
### VARIETIES.

ST. ANNE'S Roman Catholic church, Stretford, having been restored and decorated at the cost of Sir Humphrey de Trafford, was reopened on Tuesday last.

THE Ayr E. U. church was reopened on Sunday, the 2nd inst. The building has been almost entirely renewed, and the electric light has been introduced.

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A NEW English church was opened in Zürich on Sunday last. The building, which holds 300 people, and site have cost about 5,000l.

At the Kibble Reformatory, Paisley, the new south wing which has been added to the institution was opened on the 28th ult. The new wing contains, besides other apartments, a large reading-room and a dormitory with forty-two beds.

The church of St. John the Evangelist, Walton-on-the-Hill, having undergone considerable extension, will be reopened on the afternoon of Monday, May 31. The cost of the extension will be 3,400l.

THE Archbishop of Canterbury opened the new library at Hereford Cathedral on the 30th ult. The building occupies the exact site of the Mediæval library in the Bishop's Cloisters, and has been erected with a legacy of 4,000l. left by Canon Powell. Sir A. Blomfield was the architect.

PORT VICTORIA pier, the terminus of the Hundred of Hoo Railway, was reopened on the 1st inst. by the South-Eastern Railway Company, after being closed for seven months for extensive repairs. Railway traffic to Port Victoria was resumed, and the service of boats between Sheerness and Port Victoria will run as heretofore, thus bringing Woolwich Arsenal and North Kent in direct communication with Sheerness and the entrance to the river Medway.

A NEW Middlesex county upper and technical boys' school at Isleworth, built jointly by the Middlesex County Council, the British and Foreign School Society and the governors of the Isleworth Blue Schools, was opened on Saturday, the 1st inst., by the Earl of Jersey who was accompanied by the Countess.

A FINE pile of buildings, erected by the Corporation in St. Michan's Street, Dublin, directly facing the western side of the new vegetable, fruit and fish market, has now been completed, and will be opened by the Right. Hon. the Lord Mayor on Tuesday, the 11th inst., at eleven o'clock.

The new premises of the Hindley Conservative Club in the Ince Parliamentary Division were opened on the 1st inst. by Lord Balcarras, the member for the Chorley Division. The new club house, which has cost something like 3,000l., has been constructed in the principal street of the town, and is one of the most commodious and best equipped clubs in the county.

The Midland Great West Company's new hotel at Malranny, which has recently been erected, and will shortly be

opened for visitors, is very prettily situated on the shores of Clew Bay, and stands in its own grounds, the extent of which is about fifty acres. It has been fitted with all modern conveniences, electric light, &c., and is altogether very comfortable and spacious. The grounds have been carefully laid and planted by the company, the walks especially being very ornamentally laid out. The scenery around is picturesque, and a fine view can be commanded of it from the hotel. The hotel is also supplied with a first-class billiard-room. It is within easy distance of Achill Island by rail or road.

THE thirty-fifth general meeting of the shareholders of the London and Lancashire Fire Insurance Company was held on the 29th ult., when the annual statement and balance sheet for the year ending December 31, 1896, were submitted. The net premium income amounted to 836,165l., the profit on the working of the business to 84,800l., and the interest on investments to 36,116l. The total surplus on the year's operations was consequently 120,916l. The directors recommend the payment of the usual dividend of 20 per cent. upon the paid-up capital (10s. per share), which was duly confirmed. The reserve funds and paid-up capital of the company now amount to 1,085,944l.

A NATIVE of Kilmarnock proposes to erect and present to the town a building, at a cost of 8,000l., to be used as a public library and museum. It is to be erected on the site of the present library buildings at Elmbank. This generous gift will meet a want that has been felt in the town. Since the adoption of the Public Libraries Act by the community the library and reading-room have been very largely taken advantage of, and the accommodation in Elmbank House has been found to be far too limited. The museum contains the valuable geological collection presented to the town by Mr. James Thomson, F.G.S., and it has for some time back been a matter of regret that that collection, for want of room, has not been properly displayed, but this difficulty will be overcome by the gift in question.

A CENTENARY hall and other new buildings, which have been added to the Jews' Hospital and Orphan Asylum at West Norwood, were opened on Monday, the 3rd inst., by H.R.H. the Duke of Cambridge. The centenary hall is a handsome structure, built in the Domestic Gothic style, and it has three special adornments—an organ, given by Mr. Alexander Joseph; the Faudel memorial window, taken from its former position in the entrance-hall and placed over the gallery, and a large window above the organ, the gift of Messrs. Joseph & Smithem,

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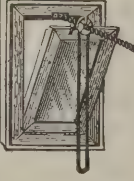
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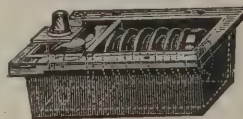


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the architects. By the Faudel window the uncle of the Lord Mayor is commemorated, and the centre panel of the other is filled by a portrait of the chief magistrate, the President of the Institution, in his robes of office, on either side being medallions of the founders of the charity, the brothers Abraham and Benjamin Goldsmid. The side windows contain medallion portraits of deceased presidents, vice-presidents and treasurers. The artistic effect of the Elizabethan front has been enhanced by the addition to the main building of a new storey with dormer windows, and a notable feature is the "Henry Behrend" library, which Mrs. Behrend has presented to the Institution in memory of her late husband, who was for some years President and rendered invaluable services to the asylum. The Duke also unveiled a bust of the Queen which has been placed in the front of the gallery.

THE new schools which have been erected at Penkhill by the Stoke-on-Trent School Board were opened with some ceremony on Monday last. The buildings occupy a position at the junction of Princes Road and Penkhill Street, and adjoining the new Blind and Deaf School at The Mount. They provide accommodation for 470 children, the school being a mixed one on the central hall plan. The schools have been erected by Mr. T. Godwin, of Hanley, from the plans of Messrs. R. Scrivener & Sons. Subsequently a large party assembled at The Mount, Penkhill, for the formal opening of the premises as a school for the blind and deaf children of North Staffordshire, the place having been acquired and adapted to the purpose by the North Staffordshire Joint School Authority, consisting of representatives of the Stoke, Hanley, Longton, Burslem, Wollstanton and Norton School Boards. The Mount is an oblong building with a semicircular entrance of stone on its west front, whilst a lofty dome gives external grandeur to the structure. It has now been converted into the administrative department of the new Blind and Deaf Schools. There is accommodation for 139 children and the necessary staffs. The whole work has been carried out from the plans and under the direction of Messrs. R. Scrivener & Sons, Hanley.

THE Free High Church, Edinburgh, besides having its interior entirely repainted and redecorated, has just had introduced into it a new pipe organ, a new pulpit and communion table, together with an installation of the electric light. The organ, which has been built by Messrs. H. S. Vincent & Co., Sunderland, to a specification drawn up by Mr. T. H. Collinson, of St. Mary's Cathedral, Edinburgh, consists of a great swell and pedal organ, with twenty-one stops, besides couplers and com-

position pedals. The swell and great organs are placed on the left of the communion table, balancing the canopied pulpit on the opposite side; the pedal organ occupies the centre of the elevation, behind the chairs set apart for the session; while the console is placed some little distance in front of the communion table. The instrument has been enclosed in a handsome case designed by Mr. Henry F. Kerr, architect, in a style to harmonise with the interior of the building, and made of oak like the pulpit and communion table. The mechanical power to the organ is supplied by an electro-motor, which is placed in a receptacle to the left of the instrument. The principal feature of the electric-lighting installation, which is regarded as particularly successful, is an 18-light electrolier that depends from the roof. The whole scheme has cost about 1,500*l.* During the progress of the alterations the congregation worshipped in the Free Assembly Hall. The church was reopened on the 25th.

### AMERICAN NOTES.

IN New York and at the Brooklyn Navy Yard tests have recently been made of the application of the sand blast for the purpose of cleaning iron prior to painting. The apparatus used consisted of a Blake blowing engine and receiver for compressed air and a sand mixer with flexible pipes connecting to the receiver and a working nozzle. The engine was operated at 100 lbs. pressure from the boiler of a road rolling machine. The gauge showed a pressure of from 18 to 20 lbs. of air. The air at this pressure was forced through the mixer, and, taking up the fine natural sand therein contained, forced it through a 2½-inch hose 30 feet in length and ¾-inch nozzle upon the surface of the iron at a distance of about 6 inches from the iron. By this method a steel column was cleaned at the rate of nearly 2 square feet per minute, one-tenth of a cubic foot of sand being used per square foot of surface cleaned. By the same method 25 square feet of the bottom of an iron vessel in the Brooklyn Navy Yard was cleaned in about six minutes. The estimated cost in the case of the New York test, on a viaduct, was from ⅓ of a cent to 1 cent per square foot. It is thought that this might be considerably reduced by reducing the amount of scaffolding. The sand blast is said to remove paint, &c., without having any appreciable effect on the solid steel, the surface treated being cleaned of every particle of paint, rust, grease, &c., and the metal being left bright and clear, exposing even the cavities,

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irregularities and pitting, and edges of cracks and joints being penetrated beyond the limit of accessibility by the brush. The method is said, however, to be very destructive to stone, brick, cast-iron or other crystalline substances.

### THE CRUSHING STRENGTH OF CONCRETE.

IN his last report Mr. A. W. Dow, inspector of asphalt and cements in the Engineers Department of the District of Columbia, describes some investigations he is making to compare the relative strengths of concretes composed of various aggregates, made with natural cement and Portland cement mortars. This comparison is being made by determining the crushing strength on foot cubes of the several concretes at the age of ten days, one month, three months, six months and one year. The ingredients used in the concrete were selected as representing the average material then being furnished the district for that purpose. The composition by volume of the concretes is as follows:—No. 1, 1 part natural cement, 2 parts sand, 6 parts crushed bluestone (average concrete size); No. 2, 1 part natural cement, 2 parts sand, 3 parts crushed bluestone (average concrete size), 3 parts small gravel; No. 3, 1 part natural cement, 2 parts sand, 4 parts crushed bluestone (average concrete size), 2 parts small gravel; No. 4, 1 part natural cement, 2 parts sand, 6 parts of a mixture of 3 of concrete stone to 1 of granolithic; No. 5, 1 part natural cement, 2 parts sand, 6 parts average gravel; No. 6, 1 part natural cement, 2 parts sand, 6 parts bluestone (coarse concrete size); No. 7 same as No. 1, except Portland cement used in place of natural; No. 8 same as No. 2, except Portland cement used in place of natural; No. 9 same as No. 3, except Portland cement used in place of natural; No. 10 same as No. 4, except Portland cement used in place of natural; No. 11 same as No. 5, except Portland cement used in place of natural; No. 12 same as No. 6, except Portland cement used in place of natural.

In mixing the concrete all the ingredients were weighed for each batch, sufficient for 2 cubic feet being mixed at a time. The concretes were mixed by a man experienced in this work in the usual way. The damp sand was first thoroughly mixed with the dry cement, after which sufficient water was added to make a plastic mortar. This mortar was mixed with the aggregate (which had been previously sprinkled) by turning over with a shovel until every stone was thoroughly coated with mortar.

The concrete was then shovelled into the moulds, care being taken that the coarse and fine stone should remain evenly distributed. The moulds were filled to the depth of 4 inches and lightly rammed, this operation being continued until the moulds were filled. The ramming was done in moderation, just sufficient to settle the concrete and bring mortar to the surface. The average time taken to mix a batch and fill moulds was 15 minutes. The concrete cubes are kept in a damp condition by being thoroughly wetted twice a day.

The proportions by weight used in mixing these concretes were calculated from the weights per cubic foot of the various ingredients. The weights per cubic foot of the ingredients were determined as follows:—The measure, which was a box with an inside measurement of 1 cubic foot, was filled half full of the material to be weighed and jolted four times; then filling it full, and after four more jolts it was struck off and weighed. In this method of measuring the cubic foot of material was not absolutely loose, nor was it by any means the most compact possible, but it gave me much more concordant results than weighing the material either loose or after shaking until it had reached its minimum volume.

The voids given were calculated from these measurements, the specific gravity of the stone being taken as 2.8, and that of the gravel 2.6.

As far as the tests have gone the concretes showed the following crushing strength in pounds for periods of ten and forty-five days respectively:—No. 1, 32,900 and 77,687; No. 2, 15,550 and 52,362; No. 5, 17,500 and 60,652; No. 7, 130,750 and 257,922; No. 8, 136,750 and 266,962; No. 11, 99,900 and 234,475.

The cubes were crushed parallel to the way they were packed into the moulds.

The ten-day cubes were crushed between sand beds. The crushing faces of the one-month cubes were carefully faced with plaster-of-paris twenty-four hours before testing.

### THE FORTIFICATION OF SCILLY.

VARIOUS rumours have been circulated at Penzance and Scilly since the Government announced their intention to spend a sum of money with a view to make the Isles of Scilly available as a naval coaling station. The position, however, appears to be a very simple one. The islands are now the property of the Duke of Cornwall, although for a great number of years they have not been administered by the Duchy authorities, but by

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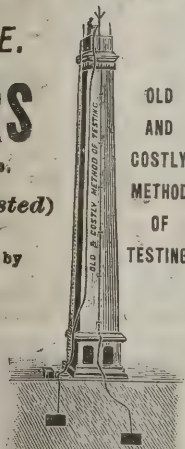
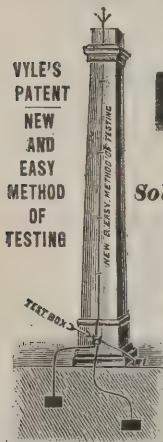
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private leaseholders. A new lease was granted to the present lord proprietor, Mr. T. A. Dorrien-Smith, some three or four years ago. It is believed that the Government propose to purchase the freehold from the Duchy, and then to grant a new lease to Mr. Dorrien-Smith. The Government do not contemplate fortifying all the islands, the main object being to make Scilly a coaling station. For this purpose it is understood that the island of Stampson will be utilised and strongly fortified, and possibly masked batteries may be put on some of the other islands.

### SCOTTISH BUILDING TRADES FEDERATION.

THE half-yearly meeting of this Federation was held in Dundee on the 29th ult., Mr. John Adam, president, in the chair. Representatives were present from all parts of the country. The secretary (Mr. J. L. Selkirk, C.A., Glasgow) submitted the report of the executive on the work of the past six months, which bore that a number of additional local associations had been organised and that others were in progress. The movement had been hailed by employers as an important step in the direction of securing various urgent improvements in matters of vital interest to the building trades, and which could only be satisfactorily accomplished by a thorough combination on the part of those immediately concerned. The meeting had under consideration a draft form of contract, which was fully discussed, and thereafter remitted to the executive. The question of a suitable general mode of measuring, as well as of working by-laws, also engaged attention. Arrangements were made for stated reports on the condition of trade throughout the country being received and tabulated for circulation among all the local associations. Other matters of interest to the building trades falling within the scope of the Federation were afterwards dealt with, and satisfaction was expressed at the prospect of building trade questions being now taken up in a manner fitted to result in practical benefit to all concerned.

### SOCIETY OF ENGINEERS.

At a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, May 3, 1897, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Mr. Henry O'Connor (vice-president), entitled "Automatic Gas Station Governors."

The author first explained the need for the station governor in a gasworks, and pointed out that the pattern now in use and being manufactured by many firms was practically the same as that made fifty years ago. He then described the working and the method of finding the weights necessary for throwing certain pressures, and proceeded to explain the necessity of the parabolic form of cone. He then described the most notable of the suggestions made from time to time to improve the working of the governors, such as the double cone governor, the equilibrium single cone governor, the governor with a separate loading bell worked at a distance from the cone bell, water loaded governors, the double bell and cone equilibrium governor, the throttle valve governor, and governors with parallel side valves. The use of clockwork for the purpose of regulating the time of the loading and unloading of the bell was noticed, and also the loss due to uneven pressures. A new method of automatically loading governors according to the absolute requirements of the district was described, with details of several ways in which that might be carried out. The advantages of this system were pointed out, and a method of approximately registering the output of gas by the variations in pressure was suggested.

Before such an automatic apparatus could be put to work in a satisfactory manner upon any district, it would be necessary to make a series of tests of the pressures in various parts of the district, and also to examine carefully the capacity of the various pipes supplying that district, so that the point of minimum pressure might be previously determined. It would also be necessary to so regulate the pressures that the supply at that point would be at all times sufficient to supply the consumers, despite any calls which the mains between that point and the works might be called upon to supply. The author regretted that, owing to the death of a well-known gas engineer (Mr. Linton), the series of experiments intended to have been carried out during the recent winter have had to be postponed, which would otherwise have conclusively proved the advantages of this system when supplying a large district served by three distinct trunk mains worked by three governors, all fitted with this apparatus at one centre. Sufficient, however, has probably been said upon this subject to enable those interested in this important question to examine into the merits or otherwise of the system, and it is hoped that any of those present who may have any opinions either opposed to or in favour of the arrangement will state their views, so that, if possible, a further improvement may be made, and the general work of the gas

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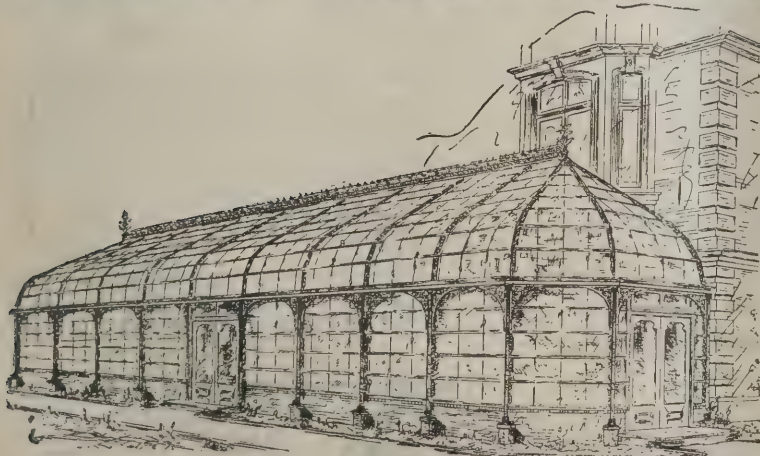
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engineer rendered a little less arduous and worrying than it is at present.

### THE PROPOSED DRAINAGE BY-LAWS.

At a meeting of the Sanitary Inspectors' Association, held on Saturday at Carpenters' Hall, London Wall, a paper was read by Mr. W. H. Grigg (vice-chairman) on "The Proposed Drainage By-laws for the Metropolis." In the course of his paper, which was largely of a technical character, Mr. Grigg said that the necessity for a complete code of drainage by-laws for the Metropolis was obvious to everyone, and it was difficult to understand why it had not long ago forced itself on the authorities as a matter of extreme urgency, particularly when London's central authority had had the power to make by-laws since 1855, and had now prepared them under that Act. In commenting on the by-laws, he pointed out several respects in which he considered they required to be amended. There was no provision made for the submission of plans, sections and elevations of the proposed works to the local authority to be approved before commencing the works; the fall of drains was not specified; drains were not required to be true in invert and clear in bore; construction of piers for iron drains was not specified; inspection chambers were not made compulsory; there was no penalty for covering up work before it was approved by officers of the local authority; the supplying of water and filling of drains by the builder was not provided for, and the construction and maintenance of urinals was left out entirely. When sanitary inspectors served notices requiring certain specified works to be performed, unsympathetic owners frequently retorted, "Well, if I do all this work now, what guarantee have I that in a year's time you will not come again and condemn it all owing to some new fad, and require something else?" And when it was borne in mind that it was only on June 28, 1893, that the by-laws under the Public Health (London) Act, 1891, were issued, which differed materially from those now proposed by the London County Council, it was not surprising that such complaints should be made. Continuity in methods and requirements was a most desirable thing in this matter, and unless there was some absolute proof that the existing requirements were inadequate, it was earnestly to be hoped that the change would not be insisted on. There was nothing to show whether these by-laws were to supersede those under the Public Health (London) Act, 1891, or if they were both to

exist side by side. Many necessary things were provided for in the latter which were omitted from the new ones, and if they were to remain in force, in matters dealt with by both they must be made to agree. That the new by-laws had in them the elements of a great change there could be no doubt, but if they were not made to apply to repairs, &c., in old houses a great work yet remained to be done. A discussion followed.

### ALABASTINE.

"ALABASTINE," which is well known and appreciated throughout the United States as a material for colouring walls and wall decoration generally, has in this country hitherto not met with the recognition it deserves owing to no want of merit, but rather to the circumstances under which it was placed upon the English market. The inventor, Mr. M. B. Church, after protracted but successful litigation with the licensee, has secured fresh patents and established works in London for its manufacture, and is in a position to meet the large demands for it that are sure to be made when the advantages of its use become better known.

Alabastine is supplied in dry form, and is made ready for use by simply adding cold water, either for plain and permanent wall covering and decoration or for relief work, stippling, glazed tilework, &c. This, by doing away with the old laborious method of mixing the various ingredients, marks it as a great improvement; but there are many other advantages gained by its use, before referring to which it will be well to explain as to how it differs from other materials. The following extract from the report describes this:—

"The base of Alabastine is made from solid rock, which is ground and calcined, driving off the water of crystallisation by boiling in large kettles at great heat. This, when mixed with water, sets by taking up its water of crystallisation again, reforming a stone as hard as the original; this setting is retarded by admixtures, used in exact proportions, to hold it from setting long enough for the purpose without changing its texture or strength. This has been accomplished by years of experimenting and testing in actual work; and, more than this, the base in setting absorbs these admixtures, and the coat is porous and is therefore purified by air passing through.

"This base from which Alabastine is made, prepared as above described, is ground and mixed by a special process, polishing and separating the atomic crystals, and these are

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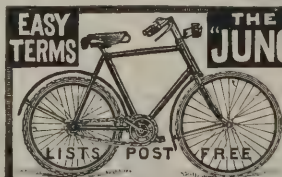
Prize Medal.  
Liverpool Exhibition, 1886; Awards  
Sanitary Exhibition, 1885 and 1886.



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tinted by automatic machinery, making the Alabastine tints as if they were ground from rock of their colour; and pure colours only are used, and not enough colour to hide the lustre of the crystals."

The result is that Alabastine is a cement that forms permanent coats, admitting recoating without removing its old coats, and hardening with age.

From a sanitary point of view Alabastine is deserving of attention. In buildings intended for habitation it can be used in place of paper, which is often the harbourer of disease and vermin, as it can be instantly cleaned and a fresh coat added. We have seen a specimen treated with thirty-five coats. The Michigan State Board of Health has given much attention to the subject of wall coatings and their relation to health. A paper read before them recommended the use of Alabastine, which they afterwards published, and at the World's Columbian Exposition they used it throughout the whole of the Michigan State buildings. In addition, a number of rooms in the fine arts section were decorated by it, as well as all the other walls of the main buildings where the walls had been plastered to receive decorative work, and that the highest diploma and medal were awarded is sufficient proof of its successful application. A most useful table is given by the company showing how forty tints can be made from three colours, setting out the proportions of each, which will prove a great help to the decorator. It is a splendid finish for new walls in place of a white coat of plaster, is done after the other work is finished and when the building is dry, and fills and hides the cracks.

Full particulars are given in the pamphlets issued by the Alabastine Company (British), Limited, from their works, Church Street, South Lambeth, London, S.W., which may be had on application. Amongst other important buildings on which Alabastine has been used are the New General Post Office, Polytechnic Institute of Chelsea, &c.

Jelstone made by this Company is an improved distemper, also ready for use by mixing in cold water, taking the place of whitening and size. It is easily removed when required to be renewed, and the Company guarantee that it gives satisfaction.

#### THE INSTITUTION OF CIVIL ENGINEERS.

It has been arranged to hold a conference of the members of the Institution in London this year under conditions which, it is hoped, will be convenient to many who are precluded from

attending the weekly meetings during the session, and may be serviceable to all by the discussion of a wider range of subjects than can be dealt with on ordinary occasions. It is intended that the business of the conference should differ from the ordinary proceedings of the Institution, papers descriptive of works executed giving place to brief statements concerning important debateable matters in engineering science and practice, introduced with a view to eliciting discussion on the questions raised. The conference is fixed for May 25, 26 and 27, the morning of each day (from 10.30 to 1.30) being devoted to the consideration of the statements referred to, and visits of inspection to engineering works being made in the afternoon. The work of the conference will be carried out under the direction of the council, with the assistance of seven sectional committees, consisting of members of the Institution representative of various localities in the United Kingdom and identified with the several branches of engineering. The sections are:—Railways, with Sir Benjamin Baker as chairman; harbours, docks and canals, Mr. Harrison Hayter, chairman; machinery and transmission of power, Sir Frederick Bramwell, chairman; mining and metallurgy, Mr. T. Forster Brown, chairman; shipbuilding, Sir William H. White, chairman; waterworks, sewerage and gasworks, Mr. Mansergh, chairman; and applications of electricity, Mr. W. H. Preece, C.B., chairman.

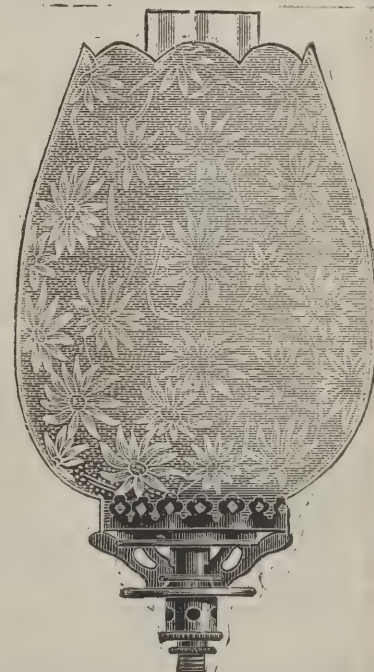
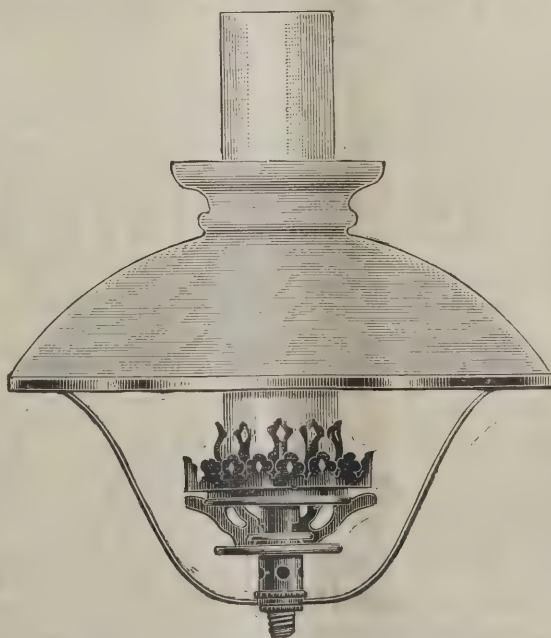
#### PAPYROLITH.

THE United States Consul in Zürich, Mr. E. Germain, has sent to his Government the following report on papyrolith:—A new material suitable for flooring, roofing, lining of water-closets, bath-rooms, walls, &c., was invented by Otto Kraner at Einsiedel, near Chemnitz, Saxony, about two years ago. The article did not, however, prove to possess sufficient resistance and consistency. Subsequently it was taken up and improved by Messrs. Braendli & Co., at Mainaustrasse No. 24, Zürich, Switzerland, who, by the addition of some chemicals have, as they claim, brought it to perfection and made it as durable as stone.

I called on the above firm to obtain what information I could, and from them learned the following:—

Papyrolith is a new kind of material, the principal ingredients of which are waste-paper and sawdust. These two substances are mixed with certain chemicals which, so far, are the exclusive secret of the manufacturers. The material is made into

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three separate bodies, viz. (1) a moist powder; (2) a dry powder, and (3) a liquid. These are then mixed in a proportion of 4 lbs. of moist powder with 6 lbs. of the dry one, and enough of the liquid substance is mixed therewith to bring the mass to the density of ordinary mortar. It is then spread over a foundation of wood or stone, as the case may be, in the same manner as asphaltum or cement, stamped down, levelled, left to dry and then polished. It requires at least two days to dry and harden.

This papyrolith, it is claimed, becomes as hard as stone, but without losing its elasticity, is perfectly water-tight, fireproof, a non-conductor of heat, cold, or sound; being spread into one solid mass it has no joints, is not porous, is non-adherent of dust or microbes, is noiseless and therefore especially recommended for flooring schoolhouses, hospitals, houses and public halls, water-closets and bath-rooms.

For roofing it is spread over a grooved or kind of corrugated roofing pasteboard especially manufactured for that purpose. It is lighter than other roofing material, weighing only 14 kilogrammes per square metre (about 26 lbs. per square yard), and requires therefore but a light wooden construction to support it; it is water-tight, a non-conductor of heat or cold, and what is more important, it is incombustible. It can be made in whatever colour desired.

As to its wear and durability, the article has not been in use long enough for experts to give an opinion; but contracting architects with whom I have talked on the subject believe that it possesses all the qualities the manufacturers claim for it.

The Zürich school authorities have had floors of this material laid in several of the city schoolhouses as a trial. In the Federal Museum an entire hallway is covered with it. Private individuals are contracting for it to line the walls of their bath-rooms, kitchens, &c., in place of tiling, formerly used for the same purpose, it being water-tight and less cold, and not so apt to crack under the changes of temperature.

The prices of papyrolith, laid down and ready for use, are, for the present, quoted at the following figures by the manufacturers (Braendli & Co.):—Floors with a layer of 0.591 inch thickness, about 1 dol. per square yard; floors with a layer of 0.985 inch, about 1 dol. 25 cents per square yard; roofing, 1 dol. per square yard; walls, 1 dol. 25 cents per square yard; special decorative work, as per agreement. Cost of manufacture is not obtainable.

No patent or application therefore has been obtained or applied for. The manufacturers state that none is obtainable

on an article of this kind, but as the chemicals or mixtures used in the preparation of papyrolith are only known to themselves, they feel safe against competitors.

### THE SURREY PAVILION.

THE report of the committee of the Surrey County Club deals at length with the question of the new lease of the Oval, which has been obtained for thirty-one years from Lady Day, 1896, from the Duchy of Cornwall at the increased rental of 750*l.* a year. By the terms of the lease the committee are under obligation to spend a sum of not less than 10,000*l.* in improvements and additions to the club buildings, subject to the approval of the Duchy. As was made known last season, the committee have determined to build a new pavilion on a considerably enlarged scale. The scheme will include the erection of a new tavern with every convenience for catering adequately for the vast numbers of people who attend the principal matches. For this purpose it may be requisite to borrow some money, and the committee propose to take powers to raise debentures to an extent not exceeding 10,000*l.*, and they ask the members of the club for their concurrence in this proposal. They point out that the payment of interest on any money borrowed and the repayment of the principal will undoubtedly increase the annual expenditure of the club, and they therefore propose that the annual subscription of all new members elected after May 1, 1897, shall be two guineas. They also ask for power, if necessary, to raise the subscription of all members to a sum not exceeding two guineas, but they trust it may not be necessary to exercise this power so far as existing members of the club are concerned. They further propose to raise the number of members to 4,000. The balance-sheet for last year shows an invested capital of 10,999*l.* 9*s.*, a sum of 1,000*l.* on deposit, and a sum of 133*l.* 4*s.* 7*d.* in cash in hand and at the bank. The balance of revenue account for the year ending December 31, 1896, was 1,803*l.* 14*s.* 8*d.*

### THE BLACKWALL TUNNEL.

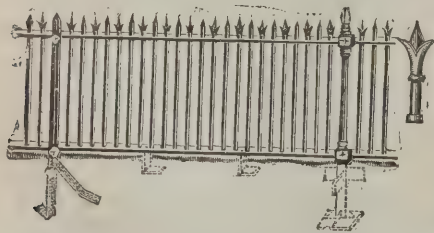
THE formal opening of the Blackwall Tunnel by the Prince of Wales, as our readers are aware, has been fixed for Saturday, May 22. The contract to do this work for 871,000*l.* was signed at the end of 1891, and a practical commencement was made

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in March 1892. It has taken, therefore, just about five years. Few works of equal magnitude have ever been carried out in so short a time, says the *Daily News*, and no more signal success has ever been achieved in the engineering world. There has been nothing quite comparable to it in the way of subaqueous boring. The Severn Tunnel is much longer and looked to be much bolder. It is 4 miles and a half in length and it dips down right under the estuary of the Severn. The actual tunnel at Blackwall is but 4,465 feet, or about five-sixths of a mile. But the Severn Tunnel went down so deep that it left 45 feet of solid rock between its soffit and the estuary water overhead. At Blackwall there was but a space of 5 feet 6 inches between their boring and the 56 feet of water overhead at high tide, and that 5 feet 6 inches consisted of loose shingly gravel. The extreme length of the old Thames Tunnel works was but 1,300 feet, and it went 15 feet below the actual river bed. Yet they were twice drowned out there and several lives were lost; and between the commencement of the Thames Tunnel and its actual opening there was an interval of eighteen years. The total length of the Blackwall Tunnel works is 6,200 feet. The tunnel itself is 4,465 feet long, and of this length 1,220 feet is under the actual river bed and nearly 3,000 has had to be constructed by means of the compressed air system. The whole of it is now so far complete that it will certainly be ready for public opening by the date fixed for the ceremonial, the details of which have been for some time under consideration.

Approached from the south side, the first indications of the new connection between the two river banks are two new roads, broad and well made, and already studded by lamps and young plane trees. They are further embellished by the attractive and comfortable red brick cottages which, as required by Act of Parliament, the London County Council have set up for the accommodation of working people who have been displaced by the progress of the work. It is greatly to be wished that all the occupants of slum property throughout the metropolitan district could be similarly displaced and similarly rehoused. Of the two roads, one runs from East Greenwich and the other curves up from the direction of Woolwich. It branches out from the Woolwich Road, in fact, and the two highways join at a point half a mile or so from the entrance to the tunnel approach. The little colony of houses on the left-hand side of this joint road forms a particularly bright and pleasant feature in this rather prosaic expanse of marsh land and factories. They constitute quite a little model village round a central playground asphalted over and encircled with

a double row of trees, and provided with a "giant stride" for the enjoyment of the children.

The southern approach to the tunnel is through an archway close to the great gasholders of the South Metropolitan Gas Company. The arch forms a gauge for the height of the tunnel itself, so that any load that will pass beneath this entrance will have no difficulty in making the passage. From this point the road sweeps down between walls of white glazed bricks, with an incline rather less than that of the Haymarket, to the mouth of the tunnel. The tunnel face was to have been of white brick, like the walls that lead down to it, with just a rim of red granite round the entrance. This, however, had a somewhat paltry appearance. It is being altered, and the whole of the front at each end will be finished in red granite, which will have a decidedly more solid and imposing appearance. A flight of stone steps runs up from the tunnel mouth to the roadway above, thus giving easy access to foot-passengers.

The subway itself is now complete, the great semicircular arch, rising to a height of 17 feet, being entirely lined with white, and roadway and footpaths being ready for traffic. The arrangements for three rows of electric lamps are now being finished, and the whole length of the tunnel is completely lined with the white bricks or the glazed tiles, the fixing of which until quite recently rendered the whole of the central portion of the tunnel almost as busy a scene as it has been throughout. The tiles are from the works of Messrs. T. & R. Bōote of Burslem, and they have been brought in crates from which they had to be taken and sorted and dipped into water before being handed up to the workmen on the scaffolding. The tubs of water, the barricades of crates and heaps of straw and gleaming white tiles, and the large staff of workmen, all seen under the glare of the electric lights, afforded a very curious scene underneath the bed of the Thames and its 50 or 60 feet of water and all its shipping. All this, however, has been cleared out. The tunnel is practically finished from end to end, and the great shield which, under the gentle persuasion of eight-and-twenty hydraulic jacks, each pushing with a force of 150 tons, ate its way right through the bed of the river from shore to shore has had its centre knocked away. Its outer ring has, however, been embedded in the circumference of the tunnel, and remains a permanent memorial of this mode of tunnel construction, and of the greatest work of the kind ever carried out upon this system up to the present time. The busiest scenes in connection with the work are now to be found within the four great circular shafts, two of which

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will form huge wells for spiral staircases. The tunnel shoots right through all four of these vertical cylinders, and the work going on within them now is that of "junctioning up"—joining the horizontal tunnel with the vertical shaft, that is to say—and they were, long after the rest of the tunnel was complete, bewildering scenes of timber and machinery, bricks and pipes, and wires and steam-engines. There are two of these iron and concrete wells on each side of the river, one of which on the north, and one on the south, will be used for a staircase, giving the public access to the tunnel below from the roadway above. They will be domed over by glass roofs. The other two will not be open to the public, but will be reserved for necessary works or for ventilation.

The approach to the tunnel on the Kent shore, as has been said, commences at a point close to the South Metropolitan gasometers. Thence it plunges under the Ordnance Wharf and the bed of the river, Northumberland Wharf and the Blackwall branch of the Great Eastern Railway close to Poplar Station. From that point the work runs up to near the East India Dock gates, where there is another archway at the head of the slope. Both these archways are to have over them rooms to be occupied by the men employed at the tunnel. The open approach is quite finished, and the outer portion of the tunnel-face is here also being built in polished red granite. The most important work going on on this northern side the river is the erection of buildings for the installation of the electric light, including a chimney 120 feet high and about 12 feet square at the base. This part of the work has been in a somewhat backward state, but is proceeding rapidly, and the engines and dynamos are all ready for getting into position as soon as the building is sufficiently advanced. There is a considerable amount of work still remaining to be done in connection with this stupendous undertaking, but there is nothing that will present any such difficulty as will be likely to occasion delay, and there is no reason to doubt that all will be ready in due time. It has been a wonderfully successful piece of work throughout, and one remarkable fact has been the freedom from accident. Contrary to many forebodings, the loss of life has not been anything like so great as is usual with works of such magnitude. It was feared that many lives would be lost by the necessity for working in condensed air, and Sir John Hutton humanely secured the adoption of a scheme of compensation to wives and families of men so employed. One death has, unhappily, been attributed to this cause, and the widow and children have been duly provided for. Dr. Snell, who was resident on the works,

has left, and one of the County Council resident engineers, Mr. Hay, has also gone, leaving Mr. FitzMaurice to represent Mr. Binnie. Mr. Moir, who was engineer in charge for Messrs. Pearson & Sons, and who has really been the practical genius throughout this very heavy piece of work, has returned from a well-earned holiday abroad, after seeing the tunnel right through. Mr. Ernest Pearson has had charge during his absence.

### PATENTS.

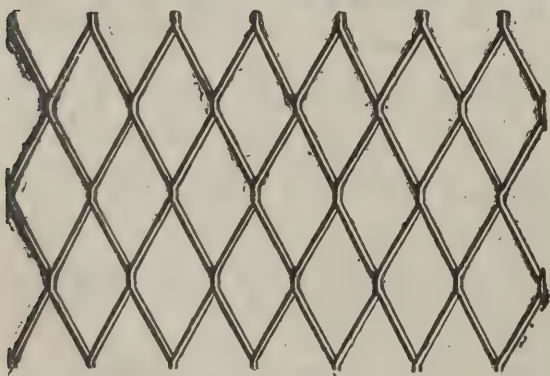
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

- 9843. Nimrod Simmons, for "Improvements in flushing cisterns and water-waste preventers."
- 9844. James Whittaker and C. Whittaker & Co., Limited, for "Improvements in presses for bricks and like articles."
- 9893. William Frederick Wible, for "Improvements in combination locks."
- 9960. Charles Frederic Baker, for "Improvements in window blinds."
- 10021. Joseph Makinson, for "Improvements relating to pivotted window sashes."
- 10071. Oswald Kahnt, for "Improvements in or relating to the construction of plank floors."
- 10091. William Hewett, for "Improvements in apparatus for manufacturing tiles."
- 10099. Carl Fischer, for "Improvements in catches or fastenings for sash and folding windows and the like."
- 10147. Thomas Constantine Holford, for "Improvements in window-sash fasteners."
- 10219. Joseph Morton, for "An improved form of brick-tile or slab to be used in covering steam boilers."

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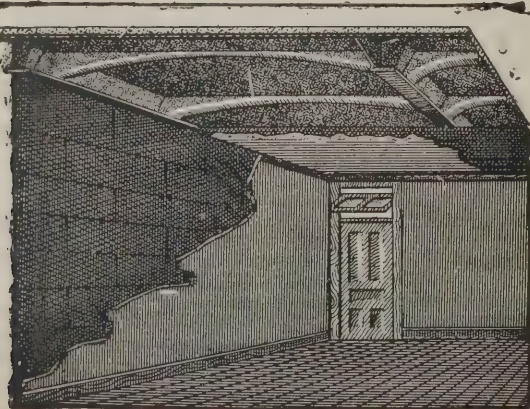
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

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*For Advertisement Scale, see page xiii.*

## COMPETITIONS OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l*. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

MORECAMBE.—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000*l*., at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

## CONTRACTS OPEN.

ABERAMAN.—May 21.—For erection of thirty or more houses on Waun-y-Han-Ddwr, Aberaman. Mr. G. A. Treharne, architect, 27 Canon Street, Aberdare.

ABERDEEN.—May 18.—For erection of the Morison Wing, Scott's Hospital, Huntly. Mr. A. Marshall Mackenzie, architect, 1 Bon Accord Street, Aberdeen.

ALFORD.—May 21.—For erection of a house. Rev. M. Riggall, Malta House, Alford.

ALNWICK.—May 21.—For erection of a house, Swansfield Park Road. Mr. W. Robson Hindmarsh, jun., architect, Alnwick.

BACUP.—For alterations at the Thorn Inn and Butchers' Arms. Mr. Charles Parsons, architect, 9 Grimshaw Street, Burnley.

BATLEY.—May 20.—For erection of branch stores, house, reading and conversation-rooms in Purlwell Lane, Mount Pleasant. Mr. Jno. H. Brearley, architect, Hanover Street, Batley.

BIRKENHEAD.—May 17.—For erection of an additional wing to the Holt School of Science and Art, Leighton Road, Tranmere. Mr. Charles Brownridge, borough engineer and surveyor, Town Hall, Birkenhead.

BRIDGNORTH.—May 19.—For erection of a new mixed and infant school at Highley, near Bridgnorth. Messrs. R. Scrivener & Sons, Howard Place, Hanley.

BRIGHTHOUSE.—May 25.—For erection of an engine, boiler and press-house, chimney-shaft and other buildings, also for large sewage-tanks, subway and other works. Mr. A. M. Fowler, 1 St. Peter's Square, Manchester.

BUCHAREST.—May 18.—For construction of an industrial school at Jassy. Application to the Roumanian Ministry of Agriculture at Bucharest.

CARDIFF.—May 17.—For completion of St. Catherine's parish church. Mr. George E. Halliday, architect, 14 High Street, Cardiff.

CARDIFF.—May 17.—For erection of a branch free library at the docks. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

CHARTHAM DOWNS.—May 21.—For plastering repairs, painting, sanitary improvements and other works in connection therewith to wards C (male and female) of the Kent County Lunatic Asylum. Mr. W. J. Jennings, architect, 4 St. Margaret's Street, Canterbury.

COLCHESTER.—May 24.—For erection of a pavilion, lavatories and custodian's lodge on the Recreation Ground, Old Heath Road. Mr. Herbert Goodyear, borough engineer.

COLTON.—May 19.—For erection of a mission church at Colton, in the parish of Bolton Percy. Mr. Cobb, 19 Blake Street, York.

CORNWALL.—May 19.—For erection of a range of buildings, consisting of cattle, root, calves and trap-houses, at Little Trewirgie, in the parish of Probus. Mr. George Ggw, Tregothnan Office, Truro.

CORNWALL.—May 24.—For erection of a new mixed school at Porthallow, in St. Keverne. Mr. Thomas J. Joyce, clerk, St. Keverne.

CROMER.—May 17.—For erection of a boiler and exhaustor house, sheds over purifiers and oxide floor, and other work. Mr. Percy Griffith, 55 Parliament Street, Westminster, S.W.

CRONDALL.—May 17.—For erection of an infirmary on the ground adjoining the school. Mr. A. Ansell, architect, 63 Finsbury Pavement, E.C.

CUMBERLAND.—May 17.—For building two cottages. Messrs. George Watson & Sons, architects, 3 St. Andrew's Place, Penrith.

DEVIZES.—May 18.—For building a recreation-room at the Wilts County Pauper Lunatic Asylum. Mr. Charles S Artyl, county surveyor, County Offices, Trowbridge.

DEWSBURY.—May 20.—For erection of six terrace houses, outbuildings and boundary walls in Savile Road, Savile Town. Mr. Jno. H. Brearley, architect, Hanover Street, Batley.

DORSET.—May 28.—For erection of a new bridge at Little King's Mill, in the parish of Marnhull. Mr. Walter J. Fletcher, county surveyor, Wimborne.

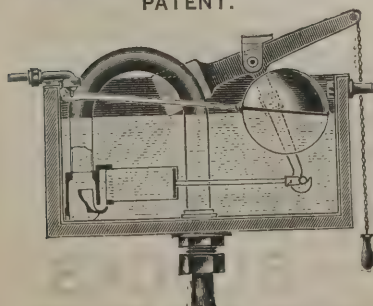
DUBLIN.—May 19.—For alterations and additions to the workhouse kitchen and other apartments in the workhouse. Mr. John O'Neill, clerk, North Brunswick Street, Dublin.

DUBLIN.—May 26.—For erection of eight labourers' cottages. Mr. John O'Neill, clerk, North Brunswick Street, Dublin.

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**ELLAND EDGE.**—May 29.—For erection of stabling, cartshed and alterations to the Royal Oak Inn. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

**ESCRICK.**—May 20.—For additions and alterations to the police-station and court-house. Mr. Alfred Beaumont, county surveyor, County Hall, Beverley.

**EXETER.**—May 22.—For erection of the church of Emmanuel in St. Thomas. Mr. Harold Brakspear, architect, Corsham, Wilts.

**GATESHEAD.**—May 26.—For erection of post office, Messrs. Gardner & Theobalds, 110 Great Russell Street, London, W.C.

**GRAYS.**—May 18.—For erection of a portion of a school at Bridge Road. Mr. Christopher M. Shiner, architect, 2 Walbrook, E.C.

**GREAT YARMOUTH.**—May 22.—For alterations and additions to the Stradbroke Road, Girls' School, Gorleston. Messrs. Bottle & Olley, architects, Queen Street, Great Yarmouth.

**GREAT YOULDON.**—May 19.—For erection of new farm buildings at Great Youldon, near Southtawton. Mr. Thos. Jones, architect, 6 Western Villas, Crediton.

**GUILDFORD.**—May 19.—For erection of buildings to contain the carburetter water-gas apparatus, the sulphate of ammonia plant, at their works, for the Guildford Gaslight and Coke Company. Mr. William Titley, secretary, Gas Offices, Guildford.

**GUISELEY.**—May 17.—For erection of stabling for twelve horses, with outbuildings, &c. Mr. Harold Chippendale, architect, Guiseley, near Leeds.

**HALIFAX.**—May 18.—For alterations and additions to Shaw Lodge. Mr. W. Clement Williams, architect and surveyor, 29 Southgate, Halifax.

**HASTINGS.**—May 31.—For erection of girls and infants' departments, Priory Road School, West Hill. Mr. Frank H. Humphreys, architect, 6 Trinity Street, Hastings.

**HENWICK.**—May 25.—For erection of station buildings and other works at Henwick, Worcestershire. Mr. G. K. Mills, Secretary, Great Western Railway, Paddington Station, London.

**HIGHLEY.**—May 19.—For erection of a new mixed and infant school at Highley, near Bridgnorth, in the county of Salop. Messrs. R. Scrivener & Sons, Howard Place, Hanley.

**HOLDSWORTH.**—May 18.—For erection of barn and mistal, &c., at Holdsworth House Farm. Mr. Medley Hall, architect and surveyor, 29 Northgate, Halifax.

**HORNCastle.**—May 17.—For repair of five bridges, viz. three in the parish of Wispington, one in the parish of Thimbleby and one in the parish of Edlington. Mr. J. E. Chatterton, clerk, Horncastle.

**HORSELYDOWN.**—May 30.—For erection of a laundry at Workhouse, Parish Street, Rotherhithe, and for repairing, painting, distempering, whitewashing, &c., the interior of the Infirmary, Lower Road, Rotherhithe. Messrs. Newman & Newman, architects, 31 Tooley Street, S.E.

**HUDDERSFIELD.**—May 18.—For erection of a dwelling-house in New Hey Road, Outlane. Mr. J. Berry, architect, 9 Queen Street, Huddersfield.

**IRELAND.**—For building a parochial hall at Knocknamuckley, co. Armagh. Mr. Wm. J. McKeown, architect, Banbridge.

**KEIGHLEY.**—May 22.—For erection of club premises in Devonshire and Scott Streets. Messrs. John Judson & Moore, York Buildings, Cavendish Street.

**KENDAL.**—May 22.—For alterations to the National Schools, Sedburgh. Mr. John F. Curwen, architect and sanitary engineer, 51 Highgate, Kendal.

**KILKENNY.**—For cottage and repairs of out-offices on farm within one mile of Kilkenny. Mr. Edw. Dunphy, Mount Sion, Kilkenny.

**LARNE.**—May 17.—For building additions, &c to church, for the committee of Raloo Presbyterian Church. Rev. Ewing Gilfillan, Raloo Manse, Larne.

**LEEDS.**—For erection of a villa at Roundhay. Mr. C. Fowler, surveyor and architect, 24 Basinghall Street, Leeds.

**LEVENSHULME.**—May 31.—For erection of new council offices, stables, &c., at Levenshulme. Mr. James Jepson, architect, Union Road, Stockport.

**LONDON.**—May 19.—For the construction of two underground public conveniences, No. 1 in High Street, opposite Shoreditch Church, and No. 2 at the junction of East Road with New North Road. Mr. J. Rish Dixon, engineer and surveyor, Town Hall, Old Street, E.C.

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MANCHESTER.—May 20.—For boundary walls, wrought-iron railing and cast-iron posts, &c., at the recreation ground, Oak Road, Crumpsall. City Surveyor, Town Hall, Manchester.

MANCHESTER.—May 27.—For erection of vagrant wards at the workhouse, Crumpsall. Messrs. W. Telford, Gunson & Son, architects, 10 Marsden Street, Manchester.

MIDDLESBROUGH.—May 17.—For erection of three houses in Clareville Road, Grove Hill. Mr. J. Mitchell Bottomley, architect, Middlesbrough.

MIDDLESBROUGH.—May 21.—For erection of a large block of buildings in Linthorpe Road, comprising four shops, show-rooms, offices, warehouses, public hall, &c. Mr. Walter G. Roberts, architect, 61 Albert Road, Middlesbrough.

MONAGHAN.—May 24.—For building a chapel at Monaghan district lunatic asylum. Sir M. Deane & Son, architects, 3 Upper Merrion Street, Dublin.

MORECAMBE.—June 7.—For erection of a brick chimney 129 feet in height, engine and boiler-houses, and other offices for generating station of the electric-light works. Mr. John Bond, surveyor, Council Offices, Morecambe.

NEUBIGGIN-BY-SEA.—For erection of new grocery and hardware stores, warehouses, bakery and public hall. Messrs. Davidson & Bendle, architects, Gas Company's Buildings, Grainger Street W., Newcastle-on-Tyne.

NEWBURY.—May 18.—For erection of a billiard-room, bath-rooms, &c., at the premises of the Guildhall Club, Bartholomew Street. Mr. Walter Henry Bell, architect, Market Place, Newbury.

NEW TREDEGAR.—May 17.—For erection of 33 houses on Cwmsifog Farm, New Tredegar. Mr. G. Kenshole, architect and surveyor, 26 Duffryn Terrace, New Tredegar.

NORDEN.—For erection of a Liberal club at Norden, in two sums, viz. (1) for mason and brickwork, and (2) for all the other branches. Messrs. S. Butterworth & Duncan, 4 South Parade, Rochdale.

OAKWORTH.—May 21.—For erection of a residence. Messrs. John Judson & Moore, architects, Oakworth.

OCKBROOK.—For reseating parish church. Rev. L. Lewis, Ockbrook Vicarage, Derbyshire.

OLD CHARLTON.—May 18.—For erection of a club, for the Charlton Conservative Club. Mr. John Rowland, architect, 24 The Village, Old Charlton.

PENARTH.—For erection of a chimney-stack at the Cement Works. Plan and specification may be seen at the Works.

PONTEFRAC.—May 17.—For erection of two cottages in Monkhill Lane. Mr. Wm. Hurst, architect, Pontefract.

POULTON.—May 18.—For erection of a police station. Mr. Henry Littler, architect to the Standing Joint Committee, 21 Pitt Street, Preston.

PUDSEY.—May 18.—For erection of a shed. Mr. T. Leadley, architect, 3 Coleridge Place, Bradford.

REDRUTH.—May 18.—For rebuilding premises in Higher Fore Street. Mr. Sampson Hill, architect, Green Lane, Redruth.

RYTON-ON-TYNE.—May 22.—For building colliery shops and eight houses at Clara Vale. Mr. F. R. Simpson, Hedgefield Offices, Blaydon-on-Tyne.

SACRISTON.—For new south aisle, nave, arcade, porch and other works in connection with St. Peter's Church. Messrs. Oliver & Leeson, architects, Bank Chambers, Mosley Street, Newcastle-on-Tyne.

SANDBACH.—May 22.—For alterations to the Common House, Sandbach, for the purpose of adapting it for a technical school. Mr. A. E. Stringer, Wheelock Road, Sandbach.

SCOTLAND.—May 19.—For erection of house in High Street, Rothes. 10 Seafeld Square, Rothes.

SHEFFIELD.—May 15.—For erection of sale shops, stores, &c., in Owl Lane, Firvale. Mr. Henry Webster, architect, 86 Queen Street, Sheffield.

SHOREHAM.—May 18.—For erection of two dwelling-houses and shops. Mr. W. H. Harker, Shoreham.

SHREWSBURY.—May 18.—For painting the inside of the general market. Mr. W. Chapple Eddowes, borough surveyor, The Square.

SKEGNESS.—May 21.—For erection of residence, South Parade. Messrs. Sheppard & Harrison, architects, 17 Kirkgate, Newark.

OWERBY BRIDGE.—May 24.—For pulling-down of the old stone tannery, Gratrix Lane, Sowerby Bridge, and rebuilding the same three storeys high in brickwork. Mr. S. Wilkinson, architect, Sowerby Bridge.

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ST. LEONARDS-ON-SEA.—May 31.—For erection of a school for infants at Bopeep. Messrs. Elworthy & Son, architects, London Road St. Leonards.

STOCKPORT.—May 17.—For erection of two-horse stable and cart-shed in Vernon Park. Mr. John Atkinson, borough surveyor, St. Petersgate, Stockport.

STOTT HILL.—May 17.—For erection of St. Mary's school, Stott Hill. Mr. E. Simpson, architect, 12 Cuncliffe Terrace, Manningham.

SWANSEA.—For erection of premises in Caer Street and Goat Street, Swansea, for Messrs. B. Evans & Co., Limited. Messrs. J. P. Jones & Rowlands, architects and surveyors, 58 Wind Street, Swansea.

SWANSEA.—May 18.—For erection of an additional cottage or block at the Union Cottage Homes, Cockett, near Swansea. Mr. G. B. Haynes, clerk, 8 Fisher Street, Swansea.

TAUNTON.—May 24.—For building six almshouses in St. James's Street. Mr. J. Houghton Spencer, architect, 8 Hammet Street, Taunton.

THORNE.—May 25.—For renovation of Thorne Wesleyan chapel. Mr. G. Wills, Derby.

TICEHURST.—May 19.—For erection of a Wesleyan chapel to seat about 200, with a schoolroom, vestries, &c., at Ticehurst, Surrey. Rev. J. L. Grice, Clare House, Ticehurst.

WALES.—May 19.—For erection of new Congregational chapel at Brynamman. Mr. John Harris, Penybont House, Brynamman (R.S.O.).

WALES.—May 17.—For erection of a new schoolroom and alteration of Mount Zion Chapel, Troedyrhiw. Mr. Arthur Daniel, 67 Cardiff Road, Troedyrhiw.

WALES.—May 26.—For erection of infants' and mixed schools at Evans Town, Gylfachgoch. Mr. J. Rees, architect, Pentre Rhondda.

WALTON-LE-DALE.—May 18.—For alteration to a police-station. Mr. Henry Littler, architect, 21 Pitt Street, Preston.

WEST HAM.—May 25.—For erection of sewage pumping engine and boiler-houses and electric-lighting buildings, at the Abbey Wharf, Stratford, E. Mr. Lewis Angell, engineer to the Corporation, Town Hall, Stratford, E.

WESTON-SUPER-MARE.—May 18.—For erection of van-house, cottages, &c. Mr. S. J. Wilde, architect, Boulevard Chambers, Weston-super-Mare.

WEYBRIDGE.—For erection of shops and premises. Surrey House, Church Street, Weybridge.

WIGTON.—May 28.—For erection of Nelson Grammar School. Mr. George Dale Oliver, architect, 5 Lowther Street, Carlisle.

WIMBLEDON.—May 17.—For construction of an underground convenience in the Broadway. Clerk to the Council, Broadway, Wimbledon.

WINCHESTER.—May 21.—For erection of a sanatorium, for the Council of the Winchester High School for Girls. Mr. Thomas Stopher, architect, 57 High Street, Winchester.

WINSFORD.—May 17.—For alterations and structural fittings, repairs and other works in High Street Schools. Mr. J. H. Cooke, clerk, High Street School Board.

WORKINGTON.—May 17.—For enlargement of classrooms of boys and girls' departments of Victoria Board school. Messrs. W. G. Scott & Co., architects, Victoria Buildings, Workington.

WITHINGTON.—May 17.—For erection of the following buildings in the town's yard:—(a) Conversion of existing buildings into 10-stalled stable with loft over; (b) erection of work-shops, 10-bay shed and store-rooms. Surveyor to Council, Town Hall, Withington.

YORKS.—May 21.—For erection of three dwelling-houses in Handel Street. Mr. Arthur Shaw, architect, Golcar.

## TENDERS.

### ALDERSHOT.

For forming and draining, &c., a new road through Elm Farm Estate. Mr. S. FRIEND, surveyor, Aldershot.

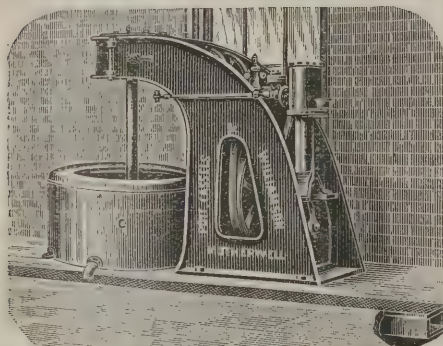
G. Kemp	£725 0 0
T. Turner	695 19 0
MARTIN, WELLS & Co., 133 Victoria Road, Aldershot (accepted)	599 0 0
W. Norris	411 0 0

### ANDOVER.

For alterations, conservatory, &c., at Earl's Field.

F. BEALE (accepted)	£323 4 6
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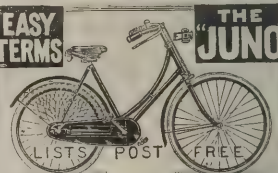
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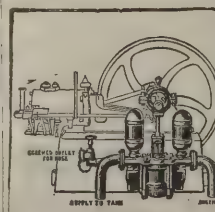
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S. Howes . . . . .	£530	0	0
W. E. Cocks . . . . .	520	0	0
J. Hargreaves & Co. . . . .	445	0	0
Cardigan Engineering Company . . . . .	352	10	0
Holmes & Sons . . . . .	342	10	0
T. Course & Son . . . . .	308	0	0
J. J. Armfield . . . . .	297	0	0
W. R. Dell & Son . . . . .	292	15	0
E. R. & F. Turner . . . . .	275	0	0
Whitmore & Binyon . . . . .	255	0	0
G. Groom . . . . .	250	0	0
J. LAMPITT & Co., Banbury (accepted) . . . . .	237	10	0

**BEDFORD.**

For supply and erection of two water-tube boilers, fitted with Vicar's mechanical stokers, alternating-current motor and steam-piping, for the electric light committee.

Hornsby & Sons, Limited . . . . .	£1,517	0	0
Brush Engineering Co. . . . .	1,488	0	0
BABCOCK & WILCOX, Limited (accepted) . . . . .	1,415	0	0

**BEESTON.**

For proposed public offices for the District Council.

T. Cuthbert . . . . .	£1,171	0	0
F. Lee . . . . .	1,110	0	0
J. J. Adams . . . . .	1,075	0	0
J. Hodson & Son . . . . .	1,055	0	0
A. G. Bell . . . . .	1,043	0	0
H. Williamson . . . . .	1,015	0	0
W. Turner . . . . .	998	10	0
W. FLETCHER, Beeston (accepted) . . . . .	920	0	0

**BEXLEY.**

For repairs to house and premises at Bexley, Kent. Mr. J. J. DOWNES, architect, 199 Lewisham High Road.

Brightling . . . . .	£200	0	0
Best . . . . .	175	0	0
ELLINGHAM (accepted) . . . . .	173	0	0

**BULLINGTON.**

For stables and cottage, for Mr. Henry Nicholl.

F. BEALE, Andover (accepted) . . . . .	£499	10	0
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**BUXTON.**

For residence, Maison Rouge. Messrs. WM. SUGDEN & SON, architects, Leek and Hanley. Quantities by the architects. GROOME & Co., Bakewell (accepted) . . . . . £3,173 0 0

**CARDIFF.**

For extension of Albany Road Board school. Mr. S. ROONEY, architect, Cefn Mably Chambers, Quay Street, Cardiff.

S. Shepton & Son . . . . .	£6,733	7	0
Powell & Mansfield . . . . .	6,720	0	0
W. Thomas & Co. . . . .	6,678	0	0
Cox & Bardo . . . . .	6,641	0	0
A. J. Howell & Co. . . . .	6,543	8	0
Cadwallader & Hockridge . . . . .	6,530	0	10
H. Gibbon . . . . .	6,500	0	0
J. Allan . . . . .	6,395	0	0
Knox & Wells . . . . .	6,390	0	0
Lattey & Co. . . . .	6,348	0	0
D. Davies . . . . .	6,136	0	0
C. C. DUNN (accepted) . . . . .	5,995	0	0

**CHESHAM.**

For erection of hotel and stabling, Vale Road. Mr. GEORGE H. GREEN, architect, 21 High Road, Willesden Green, N.W., and 47 High Street, Chesham.

A. MEAD, Chesham (accepted) . . . . .	£1,190	0	0
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Lowest of nine tenders received.

**CHESHIRE.**

For providing and fixing about 600 yards ornamental wrought-iron railing on existing boundary wall to Eastham Woods. Mr. PRESCOT, architect.

WORRALL & Co., Liverpool (accepted).

**COVENTRY.**

For repair of the waterworks engine at Spon End. Mr. HAWKSLEY, engineer.

FLETCHER & Co., Poplar and Derby (accepted) . . . . .	£1,959	0	0
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**DARLINGTON.**

For painting the various buildings, &c., at the Cattle Market. Mr. T. SMITH, borough surveyor.

W. ROBERTS, Darlington (accepted) . . . . .	£38	0	0
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Two other tenders received.

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R. Holbrook	375	0	0
E. Harland & Sons	265	0	0
A. E. Lister	200	0	0
T. H. Hewitt	198	0	0
F. H. Smith	185	0	0
J. NICHOLSON, Chapeltown, Pudsey (accepted)	192	10	0

## FEATHERSTONE.

For erection of two villas. Messrs. GARSIDE & KEYWORTH, architects, Ropergate, Pontefract.

A. SUTCLIFFE, Castleford (accepted).

## HEMEL HEMPSTEAD.

For erection of eight houses, Waymouth Street, Two Waters. Mr. GEORGE H. GREEN, architect, 21 High Road, Willesden Green, N.W.

T. WILSON, Northwood (accepted) . . . . . £1,760 0 0  
Lowest of seven tenders received.

## HIGHGATE.

For erecting iron studio at 58 North Hill.

J. MITSON, Brixton (accepted) . . . . . £43 10 0

## IPSWICH.

For rebuilding the tower, Swiland Church. Mr. J. S. CORDER, architect, Tower Street, Ipswich.

ENGLISH, Coddensham (accepted) . . . . . £270 0 0

## JARROW.

For additions to premises, Bede Burn Road. Mr. J. WALTER HANSON, architect, South Shields and Jarrow.

Couper & Henderson	£347	3	2
R. Summerbell & Son	336	0	0
W. B. Ingram	331	16	1
J. McHarg	299	15	0
W. H. BROWN (accepted)	283	19	9

## KENDAL.

For erection of Victoria mills and offices in Sandes Avenue. Mr. ROBERT WALKER, architect, Windermere.

Accepted tenders.

W. Dixon & Sons, mason (walling-in).

Nelson Bros., joiner.

W. Jackson, plumbing, painting and glazing.

W. Knight, plastering and concreting.

All of Kendal.

## LEWISHAM.

For stabling and coach-house, Lucas Street, Lewisham High Road, S.E., for Plummer's Stores, Limited. Mr. J. J. DOWNES, architect, 199 Lewisham High Road.

Jerrard & Son . . . . . £530 0 0  
S. R. BEST (accepted) . . . . . 501 10 0

## LIVERPOOL.

For taking-down present stand and erection of new grand stand, for the Everton Football Club Company, Limited. Mr. HENRY WOODHOUSE, architect, 19 Sir Thomas Street, Liverpool.

ROBERTS & ROBINSON, LIMITED, Gardener's Row (accepted).

Also tendered.

J. Paterson & Sons.

P. Tyson.

S. Webster.

J. Holme.

Raffle & Campbell.

J. & D. Rimmer.

J. Dillworth.

T. Spencer.

J. Joynson.

G. Rutherford.

Architect's estimate, £3,600.

Tenders ranged from £3,200 to £4,100.

## LONDON.

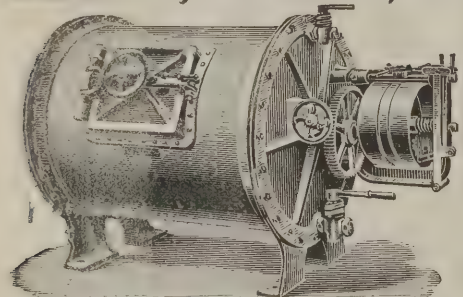
For engineering works at the Western Hospital.

Clements, Jeake & Co.	£5,250	0	0
Benham & Sons	4,849	10	0
J. C. & J. S. Ellis, Limited	4,520	0	0
J. C. Christie	4,500	0	0
Wenham & Waters, Limited	3,985	0	0
BURN BROS., Charing Cross, S.W. (accepted)	3,979	0	0
Architect's estimate	3,985	0	0

For supply and fixing of boilers for heating and electric-lighting works at the Grove Hospital.

Leeds and Bradford Boiler Co.	£3,200	0	0
Yates & Thom	2,980	0	0
A. Anderton & Sons	2,644	0	0
Davey, Paxman & Co.	2,501	0	0
R. Taylor & Sons	2,130	0	0
J. FRASER & SON, Millwall, E. (accepted)	1,960	0	0
Architect's estimate	2,151	0	0

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## LONDON—continued.

For supply of two hot-water boilers to the Eastern Hospital.	
W. J. Fraser & Co.	£226 10 0
Clements, Jeakes & Co.	220 0 0
Emley & Sons, Limited	186 10 0
S. Hodge & Sons	170 0 0
G. & E. BRADLEY (accepted)	150 0 0

For supply of electric day plant, for the Vestry of St. Mary, Islington.

CROMPTON & CO., for Brotherhood engine and Crompton alternator and dynamo (accepted).

For rebuilding Nos. 10 and 11 Aldermanbury, E.C., for Messrs. Bradbury Greatorex & Co., Limited. Mr. HOWARD CHATEFIELD CLARKE, architect, 63 Bishopsgate Street Within, E.C.

## Contract No. 1.

Brown, Son & Blomfield	£11,830 0 0
Nightingale	11,812 0 0
Rider & Son	11,673 0 0
Clarke & Bracey	11,470 0 0
C. Lawrance & Sons	11,405 0 0
Woodward & Co.	11,169 0 0
Hall, Beddall & Co.	10,925 0 0
Holland & Hannen	10,613 0 0
ASHBY & HORNER (accepted)	10,340 0 0

## Contract No. 2.

For rebuilding No. 1A Fountain Court, Aldermanbury, E.C. ASHBY & HORNER (accepted) £2,800 0 0

For rebuilding No. 29 Wood Street, E.C. Mr. HOWARD CHATEFIELD CLARKE, architect, 63 Bishopsgate Street Within, E.C.

Brown, Son & Blomfield	£2,495 0 0
Spiers & Son	2,374 0 0
C. LAWRENCE & SONS (accepted)	2,064 0 0

For erection of lavatories at Albion House, 326 City Road. J. MITSOM, Brixton (accepted) £102 8 0

## LOWESTOFT.

For sewers and sewer outfall works. Mr. C. H. HAWLEY, C.E., engineer.

B. COOKE & CO., Westminster (accepted) £7,837 0 0

## NEWPORT.

For erection of Maindee Municipal Buildings. Mr. R. H. HAYNES, borough surveyor.

## Red brick facings.

J. Francis & Son	£4,980 0 0
D. J. Davies	4,130 0 0
E. C. Jordan	4,100 0 0
J. Charles	3,998 10 0
J. T. Morris	3,900 0 0
A. Hazell	3,874 0 0
T. Westacott	3,840 0 0
A. Lawson & Co.	3,834 0 0
C. H. Reed	3,741 0 0
W. A. Linton	3,740 0 0
D. PARFITT (accepted)	3,573 0 0
Borough engineer's estimate	3,900 0 0

## Stone facings.

J. Francis & Son	5,043 0 0
D. J. Davies	4,240 0 0
E. C. Jordan	4,200 0 0
J. Charles	4,099 10 0
H. Hazell	3,997 0 0
T. Westacott	3,932 0 0
A. Lawson & Co.	3,894 0 0
J. T. Morris	3,890 0 0
W. A. Linton	3,850 0 0
C. H. Reed	3,809 0 0
D. Parfitt	3,673 0 0
Borough engineer's estimate	4,140 0 0

## Hollow brick external walls.

J. Francis & Son	5,000 0 0
D. J. Davies	4,130 0 0
E. C. Jordan	4,100 0 0
J. Charles	4,028 10 0
A. Hazell	3,924 0 0
J. T. Morris	3,900 0 0
A. Lawson & Co.	3,894 0 0
T. Westacott	3,846 0 0
C. H. Reed	3,761 0 0
W. A. Linton	3,760 0 0
D. Parfitt	3,593 0 0
Borough engineer's estimate	3,940 0 0

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MORLEY.

For erection of eight scullery houses in Bridge Street, Morley.  
Mr. T. A. BUTTERY, architect, Queen Street, Morley.  
*Accepted tenders.*  
J. & J. Sugden, mason.  
N. Holroyd, joiner.  
W. H. Jackson, plumber.  
E. Wilson, plasterer.  
Sharp & Harper, Leeds, slater.

NANTWICH.

For erection of a bridge over the river Weaver to carry the ordinary traffic of the district at a point called Longhill and connecting the townships of Audlem and Buerton.  
Mr. J. R. WHITTINGHAM, district surveyor, London Road, Stapeley, near Nantwich.  
J. MATTHEWS, Nantwich (*accepted*) . . . £81 0 0

PETERBOROUGH.

For erection of a Victoria Diamond Jubilee Wing at the Infirmary.  
J. THOMPSON, Peterborough (*accepted*) . . . £1,720 0 0

PONTYPOOL.

For erection of infants' school and other alterations at Park Terrace Board schools. Messrs. LANSLOWNE & GRIGGS, architects, Newport.  
W. & A. DAVIES, Abersychan, near Pontypool  
(*accepted*) . . . £1,120 0 0  
Eight tenders were received, ranging from £1,375 to £1,120.

PURLEY.

For erection of a detached villa residence and billiard-room. Messrs. DALE & GADSDON, architects, 8 Union Court, Old Broad Street, E.C.  
Cubitt & Co. . . . £5,860 0 0  
Hoare & Sons . . . 5,354 0 0  
West . . . 5,134 0 0  
Marriage . . . 5,075 0 0  
WALLIS (*accepted*) . . . 4,959 0 0  
Bulled & Co. (*withdrawn*) . . . 4,684 0 0

PURSTON.

For erection of three villas in Ackworth Road, Purston. Messrs. GARSIDE & KEYWORTH, architects, Ropergate, Pontefract.  
*Accepted tenders.*  
A. Taylor, Pontefract, brickwork.  
F. Foulstone, Featherstone, joiner.  
S. Evison, Castleford, slater.  
Keighley & Westwood, Pontefract, plumber.  
J. Jones & Son, Featherstone, plasterer.  
R. Wheatley, Pontefract, painter.

SANDWICH.

For erecting small iron chapel.  
J. MITSON, Brixton (*accepted*) . . . £98 0 0

SCOTLAND.

For heating the Milton of Balgonie Church.  
W. COOK & SONS, Roseburn Ironworks, Edinburgh (*accepted*).  
For erection of house in High Street, Buckie. Mr. JAMES PERRY, architect, Buckie.

*Accepted tenders.*

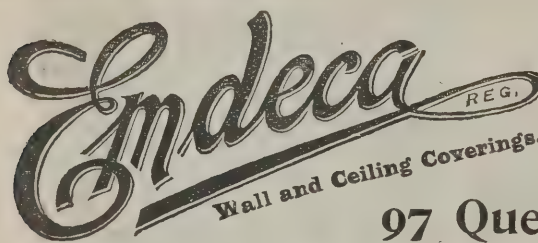
A. Hendry & Son, carpenter . . .	£124 10 0
A. Morrison, mason . . .	111 16 0
J. Barclay, slater and plumber . . .	49 17 0
R. Hume, plasterer . . .	27 0 0
C. Nicol, painter and glazier . . .	6 10 0

SEVENOAKS.

For laying about 3,250 feet run of 9-inch stoneware pipe sewers, of which about 1,140 feet run is in tunnel, with circular shafts, manholes, lampholes and gullies. Mr. JABEZ MANN, surveyor.  
T. Adams, Wood Green, N. . . . £1,538 5 6  
E. Iles, Mitcham Common \* . . . 1,163 14 9  
Surveyor's estimate . . . 1,214 17 5  
\* Accepted per schedule of prices.

SUTTON ST. EDMUNDS.

For erection of school and teacher's residence at South Eau Bank. Mr. R. H. H. HAND, architect, Spalding.  
Wadsley & Co. . . . £1,348 0 0  
Watson . . . 1,174 0 0  
Fawn & Bone . . . 1,146 14 0  
E. Girling & Co. . . . 1,145 0 0  
S. Hipwell . . . 1,052 10 0  
S. ALLISTER, Sutton St. Edmunds (*accepted*) . . . 997 0 0



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<i>Prince George Road.</i>			
Imperial Stone Co.	£339	8	0
W. B. Wilkinson & Co., Limited	335	17	3
C. W. Hobman & Co.	318	13	9
Patent Indurated Stone Co.	296	19	6
PATENT IMPERVIOUS STONE CO. (accepted)	293	8	10
<i>Wiesbaden Road.</i>			
Imperial Stone Co.	312	8	0
W. B. Wilkinson & Co., Limited	309	2	11
C. W. Hobman & Co.	292	17	6
Patent Indurated Stone Co.	273	7	0
PATENT IMPERVIOUS STONE CO. (accepted)	270	1	11

TANSHELF.

For erection of thirteen houses in Tanshelf. Messrs. GARSIDE & KEYWORTH, architects, Ropergate, Pontefract.			
<i>Accepted tenders.</i>			
H. Taylor, Pontefract, brickwork.			
H. Wright, Pontefract, joiner.			
W. Atkinson, Leeds, slater.			
Keighley & Westwood, Pontefract, plumber.			
J. Wilde, Knottingley, plasterer.			
G. Shackleton, Pontefract, painter.			

TENBURY.

For installation of a water supply and reconstruction of the drainage at the Workhouse.			
W. Howells	£178	18	0
J. Ford	155	10	0
H. HEWITT & SONS, Tenbury (accepted)	148	15	0

WALTON-ON-THAMES.

For forming and making-up road and footpaths at St. George's Avenue, Hersham, for a length of 570 feet. Mr. R. F. HANKINS, surveyor, Cornwall House, Hersham Road, Walton-on-Thames.			
E. Cherrett	£190	0	0
G. HEBBURN, Hersham, Walton-on-Thames (accepted)	149	0	0

WALWORTH.

For erection of postmen's office.			A.
T. & A. Raikes	£3,045		£50
B. E. Nightingale	2,215		40
Barlow & Roberts	2,135		35
W. Downs	2,017		—
Chessum & Sons	2,000		50
J. G. Minter	1,981		80
A. J. Thompson	1,962		48
W. H. Lorden & Son	1,941		100
J. Marsland	1,897		18
H. Brown	1,865		25
R. H. Galbraith	1,863		15
H. LENEY (accepted)	1,836		40
A. Allowance for old materials.			

WEST HARTLEPOOL.

For erection of a post-office.			
T. Dickenson	£9,030	0	0
J. HOWE & Co., West Hartlepool (accepted)	8,878	0	0

WOLVERTON.

For additional storm-water works, consisting of screening tank, culvert, well, &c., in connection with the Wolverton sewerage system.			
Kemp & Sons	£702	0	0
J. E. Wilson	657	0	0
T. P. ROBINSON, Wolverton, Bucks (accepted)	639	0	0

THE Shelley Road Mill, Preston, the property of Messrs. Hartley Bros., which was totally destroyed by fire on Sunday night, contained 46,000 spindles on forty pairs of mules, and the damage, which is covered by insurance, is estimated at over 40,000*l*. The cause of the outbreak is not definitely known, but up to six o'clock in the evening mechanics had been working in the topmost storey but one, and it was here, so it is stated, that the fire was first seen, shortly after eight o'clock. The building was one of five storeys, and was built in 1856. It was fitted throughout with patent automatic sprinklers, which, however, failed to prevent the fire getting such a hold that by the time the brigade arrived their task of saving the building was a hopeless one.

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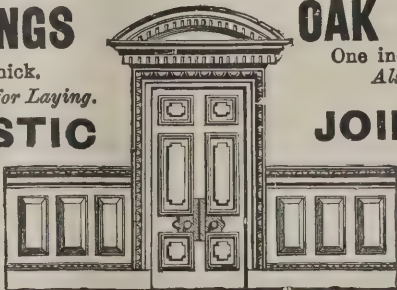


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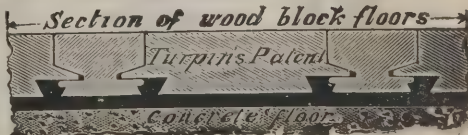
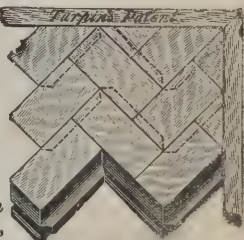
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## ILLUSTRATIONS.

CLARIDGE'S HOTEL.

49 PRINCE'S GATE.

IN THE VILLAGE OF BUSCOT, BERKS.

CATHEDRAL SERIES.—NORWICH: THE NAVE.—THE CHOIR.

## TRADE NOTES.

THE Huton Infirmary, Banbury, is being warmed and ventilated by means of Shorland's patent Manchester grates.

A HANDSOME stone reredos with marble and alabaster enrichments has just been erected in St. Mark's Church, Bath, to the design of Mr. S. J. G. Stone, architect, of 13 Orange Grove, Bath. The reredos has been carried out at Messrs. Jones & Willis's Works, Hornsey.

MESSRS. BERRY & CAMPBELL, warming and ventilating engineers, of 17 Ridge Road, Hornsey, N., have opened City offices and showrooms at 62 Watling Street, Queen Victoria Street, where they are exhibiting specimens of their improved radiators, hot-air and hot-water heaters, &c. They are prepared to estimate for warming and ventilating churches, schools, hospitals, manufactories, offices, and public and private buildings.

THE electric-light fittings of Mr. Beerbohm Tree's new and elegant theatre were supplied by Messrs. Höfler Raum & Co., of 25 Bartlett's Buildings, who have carried out this portion of the decorative scheme in a manner worthy of all praise. Among the pieces calling for special note are the large central chandelier in Louis XV. style in bronze, with rock crystals and sixty imitation candles; various smaller chandeliers, a large number of 3-light brackets after the famous wall lights by Cafieri in the Castle of Fontainebleau, beautiful hammered iron brackets in Italian Renaissance, from the design of Mr. Romaine-Walker, and the five iron braziers in Classic style between the columns of the façade.

THE Barkston Gardens Hotel, South Kensington, just opened under the management of Mr. John R. Roberts, has been furnished in substantial and artistic style by Messrs. Oetzmann & Co. of 62-79 Hampstead Road, N.W. The first impression upon entering the hotel is agreeable, and the impression deepens on inspection of the dining-room, which looks

cosy and warm in walnut and terra-cotta; the drawing-room in gold and white, with Chippendale furniture, Vernis Martin cabinets and a carpet of vieux rose ground and a rich floral design; the pretty bedrooms, in many of which Messrs. Oetzmann have introduced handsome Chippendale wardrobes and other articles of furniture; and the comfortable smoking and reading-rooms in saddlebags and warm colouring, and the daintily-equipped lounges. The billiard-room, ball-room and the bath-rooms call also for a word of commendation.

MESSRS. JEFFREY & CO., of Essex Road, N., have sent us some samples of their Royal Jubilee wall-paper, which they have designed expressly to commemorate the Diamond Jubilee. It consists of a wall-paper and frieze. The scale of the design is sufficiently large to make it appropriate for the decoration of public rooms and mansions, but the details are so full of interest that it is equally suited for rooms of more moderate size. The two large panels, which are the chief ornaments in the frieze, are emblematic of her Majesty's titles, the Queen of Great Britain and Empress of India, the Victorian Cross and the motto "Honi soit qui mal y pense" being introduced into the one, while the star of India, tiger, lotus, and the motto "Heaven's light our guide," form the other. Pendant from the ornamental foliage are two small panels representing the colonies, by "Commerce" and "Agriculture," while "Fishery" and "Manufacture" find appropriate emblems in the dolphin and the fly-wheel. The words "Annus jubileus." run under the central panel, and the notes of "God save the Queen" are introduced as the ornamental banding which divides frieze and filling. In the chief panel of the wall paper is introduced the British crown and lion, and the star of the Order of the Garter, supported by rose, shamrock and thistle, with its motto "tria juncta in uno," framed in by a broad soft banding in which the same emblems are entwined. Through this run ribbons with the words "Annus jubileus, 1897," and "Regina, uxor, mater, prestans." India is represented by the elephant, its architecture and the star of India; and closely bound into the one general design are panels representing the colonies—Australasia by the kangaroo, Canada by its wheat, South Africa by the ostrich, and other distant possessions by the ship and lighthouse. This design, which can be had in various colourings, has been selected for the decoration of the royal boxes at the Crystal Palace, and is likely to be extensively employed for that of the various structures which will be erected along the line of route of the Royal Procession, for which purpose it is eminently suitable.

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**BUILDING AND BUILDERS.**

THE Hampstead Guardians have resolved to apply to the Local Government Board for permission to borrow 15,000*l.* for the purpose of erecting the proposed additions to the Hampstead Workhouse, and, when permission is obtained, to borrow the money from the London County Council at 2½ per cent.

THE memorial-stones of a new Wesleyan Methodist chapel, to be erected at a cost of 2,250*l.*, were laid at Brightside, Sheffield, on the 6th inst.

THE memorial-stones of a new English Calvinistic Methodist chapel were laid at Rhosyllen, near Wrexham, on the 9th inst. It is to cost 1,200*l.* and to seat about 400 persons.

MEMORIAL-STONES in connection with an extension of the Wesleyan chapel and Sunday school at Marsden were laid on the 8th inst. The cost of the work will be about 2,000*l.*

WHILE a number of workmen were building a wall to the rear of Central Buildings, just erected in Main Street, Stonefield, Blantyre, about 25 feet of the wall fell, and three of the workmen were injured.

AT a meeting of the Liverpool watch committee a letter was read from the Local Government Board sanctioning the borrowing of 2,500*l.* by the Corporation to enable the committee to carry out the additions and alterations to the police station at Lark Lane, in order to meet the requirements arising from the extension of the city.

**ELECTRIC NOTES.**

THE Corporation of Hastings and St. Leonards have resolved to buy the Electric Light Works of the local company and carry them on as a town concern; 58,000*l.* is the price agreed upon, so that the shareholders will receive a premium of 15*s.* 8*d.* on each of their 10*l.* shares. The plant includes the mains, standards, &c., utilised in the lighting of the parades, which are three miles in extent. It is estimated that if the first year's business is only equal to that of 1896 the profit to the ratepayers, after the repayment of principal and interest on the loan which will have to be raised, will amount to 1,500*l.*, which is equivalent to a penny rate.

THE electric-lighting committee of Glasgow Corporation are considering three new sites for electric power and distribution stations, but have delayed making a final selection pending the receipt of a report from Professor Kennedy, the expert employed in connection with the proposed extensions.

**VARIETIES.**

LADY MEXBOROUGH has a private church at St. Raphael's, Kingston-on-Thames, which she keeps up at a cost of 500*l.* a year.

A NEW church, to be known as the Morison Memorial Evangelical Union Congregational church, was opened at Clyde Bank, Glasgow, on May 8.

A NEW Volunteer drill-hall for the Sandhurst Company of the Royal Berkshire Regiment at Camberley was opened on Wednesday by the Duchess of Connaught.

THE memorial-stone of Westminster College, the new home of the Theological College of the English Presbyterian Church, will be laid in Cambridge on the 25th inst.

ALTERATIONS and additions are being made to the general offices of the Lambeth Water Company, Mr. J. A. Gill Knight, of 21 Godliman Street, being the architect engaged. A tender for 4,135*l.* has been accepted.

A NEW volunteer drill hall for Paisley is to be built on the site of the old establishment at an estimated cost of 8,000*l.* The hall proper is a spacious apartment, 130 feet by 80 feet, and the building will also contain a reading-room, a billiard-room, committee-rooms, armoury and every convenience and accommodation for both officers and men.

AN appeal has just been issued on behalf of the restoration fund of St. Mary's Church, Birmingham. At present a good deal of the structure is in a crumbling state, and the necessary work will not cost less than 1,500*l.* The value of the living from all sources is only 220*l.* a year, and there is no repair fund.

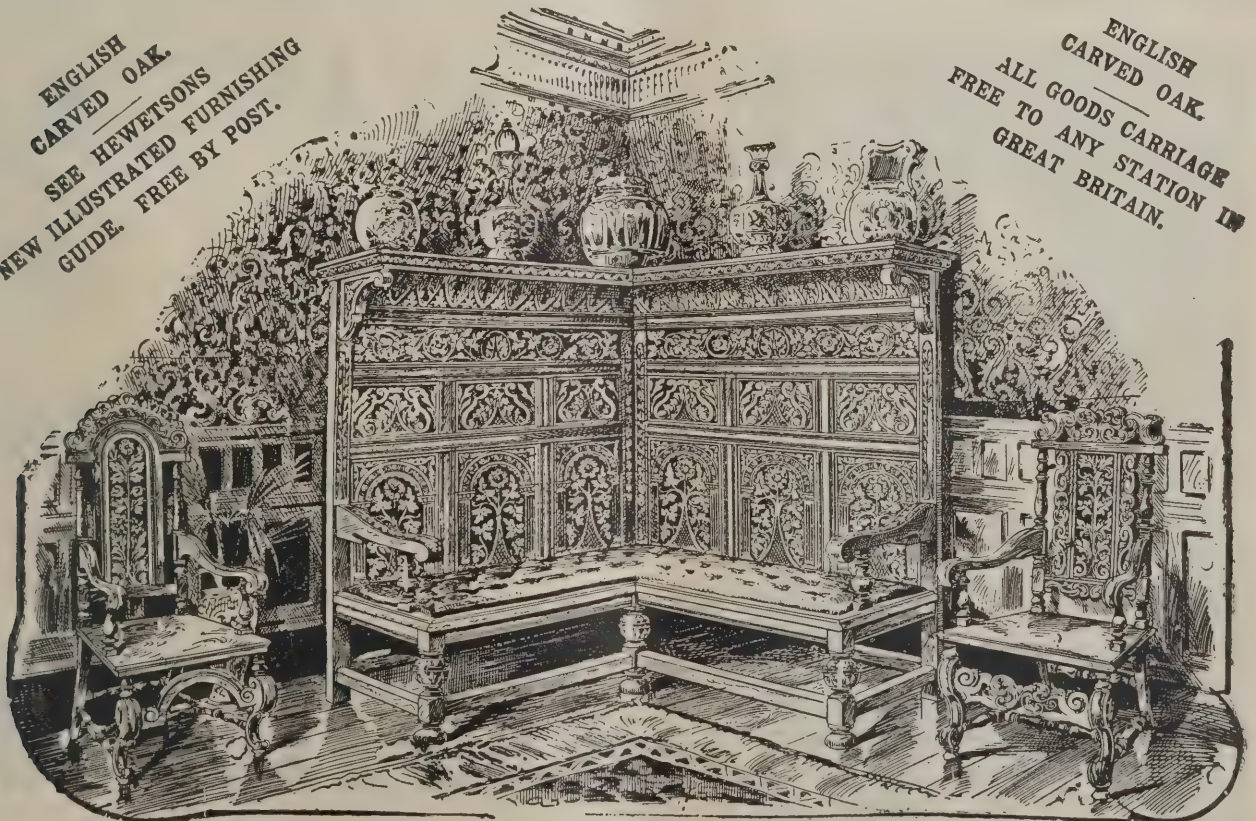
THE new Queen's, at Crouch End, is to be opened on the August Bank Holiday. It will seat some 1,500 persons. Mr. Beerbohm Tree, it is stated, has promised, if he is in England at the time, to give an opening matinée, supported by Mrs. Tree and the company of Her Majesty's Theatre.

THE Crown Theatre in Peckham High Street will be a two-tier house, with a frontage of 146 feet. The dimensions of the auditorium are:—Height 48 feet, width 63 feet, depth 60 feet; and those of the stage, height to grid 64 feet, width 117 feet, depth 42 feet, proscenium opening 34 feet.

THE club-rooms of the Galashiels Liberal Club in Bank Street, which have been closed for some considerable time have been reopened after being improved and enlarged. The billiard-room has also been reconstructed and a new heating apparatus provided. The cost of the improvements is estimated at about 1,100*l.*

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THE North-Eastern Railway Company have issued a neat guide containing particulars of farmhouse, hotel, seaside and country lodgings to be obtained during the holiday season, in Northumberland, Cumberland, Westmoreland, Durham and Yorkshire. The book contains a capital introduction describing all the principal tourist resorts in the North-Eastern district of England, as well as a number of well-executed illustrations of places of interest on the North-Eastern Railway.

THE Corporation of Brighton are about to offer a new issue of stock, amounting to upwards of 300,000*l.* Over 70,000*l.* of this will go for extensive and new machinery for the electric service, which has proved a most profitable undertaking, and another 60,000*l.* will be devoted to improving the water supply. These are the chief remunerative items. Not less important for the health of the town is the expenditure of 21,000*l.* on an improved sanatorium; 24,000*l.* go for altering the town hall, which has been outgrown by the great expansion of municipal work during the last twenty years or so; 18,000*l.* are allocated for the new technical institute now being built.

UNDER the title of *The London Argus* will be published, early in May, a penny weekly illustrated paper, exclusively devoted to the local concerns of the Metropolis. The new journal will deal comprehensively with the doings of the various public bodies engaged in municipal work, giving particular attention to the vestries and boards of guardians. It will also contain several interesting special features, including a weekly signed article by a leading public man on some question of current interest. In politics the paper will be uncompromisingly Unionist, and will be published by Messrs. J. S. Virtue & Co., Limited.

NEW police buildings are to be erected at Govan, N.B. They are to be situated in a new street to be called Russel Street. The buildings when completed will cover 3,055 square yards, and are estimated to cost about 11,000*l.* The new street will be 45 feet from the wall of the present buildings, and along the southern side there will be three tenements of houses for the accommodation of firemen and policemen. The fire station will be situated at the corner of Russel Street and Albert Street, and in close proximity there will be workshops, firemen's recreation-rooms, baths and stables. In the new block will also be the police muster-hall, sergeants'-room, &c. The court hall and magistrates'-rooms will be above the administrative department, as they now are, and underneath will be the chief constable's-room, lieutenants'-room and general offices. In an entirely new block there will be twenty-six cells, and the light-

ing department will be accommodated in a single-storey building overlooking a courtyard.

THE top stones of a monster chimney connected with the destructor and sludge-pressing machinery were on May 8 placed in position by Mr. Alderman C. Brierley (chairman of the Bury sewage committee, and the representative for Bury on the Mersey and Irwell joint committee) and Miss Dennis (daughter of the contractor for the chimney, Mr. C. Dennis, of Bury). There was a large gathering of members of the Bury Town Council and prominent residents in the borough, and considerable interest was evinced in the ceremony. About a dozen persons, including Mr. J. Kenyon, M.P., ascended to the top of the chimney, and when the stones had been declared well and truly laid loud cheers were raised, and success to the sewage works and the Bury Corporation was drunk. The chimney, it is said, will rank amongst the largest structures of the kind in the country. It measures 300 feet in height from the ground line, the diameter at the bottom being 28 feet 6 inches, and at the top 10 feet 4 inches. The foundation covers an area of 44 square feet, and is 18 feet below the ground line. The total weight of the structure, including the cast-iron cap and terra-cotta top, is 5,000 tons, which gives a pressure of 5,631 lbs. to each square foot of the foundation. About 200,000 bricks were used in the foundation, and 800,000 bricks in the whole structure. The cost is about 3,000*l.*

THE Scottish National Gallery in Edinburgh, which has been closed for nearly a twelvemonth, was reopened to the public on Monday last. Many alterations and improvements have been carried out in the interval. In the Galleries, as they have remained since 1859, the first room used to be devoted to portraiture, the second and third rooms to pictures of the English and Scottish schools, and the two last rooms to the old masters. Now the works are being arranged according to schools. In the first room are to be found the works of Dutch and Flemish painters, in the second those of the Italian and French masters, and in the other three the works of British artists. The sculpture has been very artistically arranged throughout the Galleries, and the bronzes and little marbles are shown in tasteful little ebonised cases placed at suitable intervals.

THE sea wall in front of the Grand Hotel at Lowestoft which was damaged by the gales in January, has been restored. The new concrete wall is strong and massive. The foundation is taken down 6 feet into the beach, and the structure is strengthened by iron piles driven to a depth of 17 feet.



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**THE INSTITUTION OF CIVIL ENGINEERS.**

A CONFERENCE of the members of the institution will be held in London this year under conditions which, it is hoped, may be convenient to many who are precluded from attending the weekly meetings during the session, and may prove serviceable to all by the discussion of a wider range of subjects than can be dealt with on ordinary occasions. It is intended that the business of the conference should differ from the ordinary proceedings of the institution, in that papers descriptive of works executed should give place to brief statements concerning important debatable matters in engineering science and practice, introduced with a view to elicit discussion on the questions raised. This conference is fixed to occupy May 25, 26 and 27, the morning of each day being devoted to the consideration of the above statements, and arrangements being made for inspections of engineering works in the afternoon. The work of the conference will be carried out under the direction of the council, with the assistance of seven sectional committees consisting of members of the institution representative of various localities in the United Kingdom and identified with the several branches of engineering. The sections are:—Railways, Sir Benjamin Baker, K.C.M.G., chairman. Harbours, Docks and Canals, Mr. Harrison Hayter, chairman. Machinery and Transmission of Power, Sir Frederick Bramwell, Bart., chairman. Mining and Metallurgy, Mr. T. Forster Brown, chairman. Shipbuilding, Sir William White, K.C.B., chairman. Waterworks, Sewerage and Gasworks, Mr. Mansergh, chairman. Applications of Electricity, Mr. W. H. Preece, C.B., chairman.

**NON-INFLAMMABLE WOOD.**

A VERY interesting demonstration of the practical value of an ingenious system of rendering wood incombustible was given on May 11 on the waste ground at the rear of the new British Art Gallery, now being erected on the site of Millbank Prison, in the presence of H.R.H. the Prince of Wales, who, accompanied by Prince Edward of Saxe-Weimar, watched the experiments with evident interest.

The experiments in question subjected the invention to an extremely severe test, and it is only fair to say that it came through the ordeal with the most perfect success. They were as follows:—Two pavilions, precisely alike in all details, were erected on the site above mentioned, one constructed of ordinary timber, and the other of timber rendered incombustible

by the new process. The dimensions of both buildings were identical, *i.e.* 11 feet square at the base and about 30 feet high to the top of the wooden chimney. The kinds of timber entering into the construction of both buildings were the same, *viz.* the frame and covering of pine, the interior finish of ash, oak, birch and mahogany.

Both buildings were attacked simultaneously by flames produced by setting fire to equal quantities of dry timber thoroughly saturated with petroleum (about four gallons to each pile) stacked against corresponding sides of the two buildings.

The fires were started at 12.45, and by 1.20 the untreated building was a heap of smouldering ashes, while that which had been treated was intact. An attempt was afterwards made to fire the latter by piling up dry timber, thoroughly saturated with petroleum, against its inside walls and setting fire thereto; but although the fire raged and roared until it had burnt itself out, the building was still unharmed, although of course scorched and blackened. An interesting feature at this stage was the taking out from the building of a box made of the treated wood, and containing souvenirs consisting of leather-bound booklets descriptive of the system. This box, which had been in the midst of the blazing heap, was found to be only slightly calcined on the outside, whilst its contents were absolutely unimpaired, in fact, they were not even warm, notwithstanding that the fire by which they had been encompassed had made itself unpleasantly felt at a distance of several yards.

From the booklet in question we make the following extract:—By means of this new process timber of all kinds can be rendered absolutely non-inflammable, *i.e.* incapable either of supporting or of conveying flame. Under the fiercest heat there occurs merely slow carbonisation of the part actually in contact with the flame. There is no spreading of flame by the treated wood, which is therefore practically fireproof. Nor is the process limited to timber of any particular size, but boards, planks, joists—in fact, timber of any dimensions can be treated with equal success.

The process, which has already been patented in nearly all countries of the world, consists of a series of careful manipulations whereby timber becomes uniformly impregnated throughout its entire bulk and texture with a fire-resisting compound which securely protects it from all danger of combustion. And this protection, too, is permanent, since the fireproofing substance with which the cells and tubes of the wood are impregnated is not affected by any change of climate or tempera-

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ture ; in fact, age adds to the degree of firmness with which the fire-resisting crystals adhere in the cells of the wood. It should be stated, moreover, that the fire-treating compound is colourless, odourless and absolutely harmless to health. It does not attract moisture ; it does not discolour the wood ; it does not affect materially the working of the wood ; it merely adds a little to its weight. In general it may be stated that treated wood can scarcely be distinguished from non-treated wood.

There is no doubt that the patent is a valuable one and one that should be widely known. The tests to which it was subjected on Tuesday were very severe and were rendered more so by the strong wind which was blowing, but the preparation fully justified its inventor's belief in it. It has, moreover, made its *début* in England (its *pays natal* is America, where it is already well known and largely employed) under excellent auspices, as in addition to the Prince of Wales there were present the Lord Chancellor, the Austrian Ambassador, the United States Ambassador, Lord Tweedmouth, the Hon. R. B. Brett, Lord Londonderry, Lord Claud Hamilton, the Hon. Ivo Bligh, Sir Arthur Sullivan, Vice-Admiral Sir John Fisher, Sir Douglas Fox, General Russell, M.P., General D. Manuel de la Camara, Sir Edward Hamilton, Prince Blucher de Wahlstatt, Lord Portarlington, Baron Fersta, Sir Norman Pringle, Viscount Llandaff, Count Lavison, Mr. M. F. Williams, M.P., Mr. J. Penn, M.P., Mr. C. McLaren, M.P., Mr. R. G. Webster, M.P., and Mr. Sydney S. Gamble, of the Metropolitan Fire Brigade.

### ASBESTOS AND ASBESTIC.\*

WHEN the Canadian form of asbestos, which is technically named chrysolite, was first discovered, about a score of years ago, I had occasion to go over to Quebec to examine what, for all intents and purposes, was a new mineral, and report upon its qualifications and capabilities. I then became so impressed with its manifest importance that I determined to make a special study of it, as well as of asbestos generally.

My inquiries after, and searches for, asbestos have naturally led me into many remote and untravelling parts of the world ; and some few years ago I published a book on the subject, since which time, whenever any new discovery has been made, I am frequently sent for to advise on the special quality found,

\* From a paper by Mr. Robert H. Jones, read before the Society of Arts on April 28.

the best mode of working it, and the proper channels in which to dispose of its produce.

Asbestos in modern times was first brought into experimental use in Italy, and soon afterwards the United Asbestos Company, having acquired the Italian works and mines, started the manufacturing business in England.

It was not long afterwards that there appeared amongst us a totally distinct variety of the mineral, which had not long before been discovered in a wild and unpopulous part of the province of Quebec, in Lower Canada, and though it was not very favourably received at first, its economic value could not long be ignored, and experience has shown that while the two varieties are totally and curiously unlike, each has certain special uses and advantages, and indeed a combination of both is occasionally to be preferred to the use of either one of them separately.

The difference between the two forms of mineral is remarkable. The asbestos of Italy is asbestos properly so called. It is a variety of hornblende or pyroxene, while that of Canada is nothing more than serpentine, which occasionally, but only rarely, assumes a fibrous character. When it so occurs its mineralogical name is chrysolite. In form, structure and general appearance the two are as strangely dissimilar as any two minerals can possibly be ; yet in chemical composition they are remarkably alike, and in many of the uses to which they are put they may be said to be absolutely identical. Indeed, to such an extent is this the case, that by far the larger part of what is sold and used for asbestos is in reality chrysolite, which is so used and sold with full knowledge of the fact that it is so, and without any pretence of concealment or disguise whatever. The essential difference between the two is that Italian asbestos is anhydrous, while the Canadian chrysolite, being serpentine, is invariably hydrous, its water of composition amounting to between 13 and 14 per cent.

The first Italian mine was opened in Lombardy in 1866, and the first Canadian mine at Thetford, in Lower Canada, in that part of the country which is known as "The Eastern Townships of Quebec," about the year 1877. Some considerable time before this date the existence of the mineral there was known to geologists, and it was also exhibited at the International Exhibition in London as early as 1862, though at that time it was not much regarded, except by scientists, and by them chiefly as a mineralogical curiosity. But this first mine was no sooner opened, though its success at first was by no means promising, than others quickly followed, and prospecting



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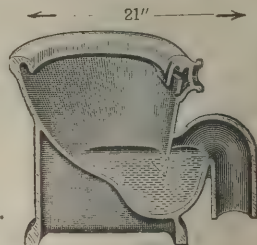
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for fresh finds was extensively carried on in every part of the province.

I have here for your inspection a sample of the most useful of the Italian ores, with a specimen or two of Canadian ore from Thetford and East Broughton, so that you may see the strange mineralogical difference between the two species, also a sample of the Danville ore and fibre, with a lump of asbestic, which is the rock which carries the latter, and also a sample of the cleansed material, just as it falls from the cyclone, ready for use by the manufacturers. To these I would presently call your special attention in order that you may see in particular the wonderful nature of the rock itself, which is found at Danville. No lens is required, its very peculiar character being sufficiently obvious to the unaided eye.

In the Italian deposits one often finds minute crystals of green-coloured garnet, which the miners call the asbestos seeds (*semenze dell' amianto*). None of these are ever seen in the Canadian mines, but at Danville I have frequently found remarkable specimens of clear light-coloured translucent serpentine. I will show you a specimen of this, being part of a vein of pure silky fibre covered or protected by a rich delicate skin of a charming tint of light green as lovely as that of a newly-expanded willow-leaf in spring, yet this is in itself as clearly and compactly fibrous as that which is held compressed in the vein.

Well, what after all is asbestic? A dictionary will tell us that the word is an adjective, meaning something "of or belonging to asbestos;" but, as used here, it is a substantive, applying to that part of the rock which remains after the richer veins of asbestos have been extracted from it. This remainder is purely a fibrous material, which clearly shows its serpentine origin.

Now a few words on the particular uses of asbestic as apart from asbestos. The first idea which occurred to the discoverer was to pulverise it, and to convert it in its pulverised state into a cement or plaster. A few bags were sent to the manufacturing firm of H. W. Johns & Company for trial, when they found it to be so admirably adapted for this special purpose, and so unique from many points of view, that it was at once named "the king of wall-plasters." In its manufacture it requires the use of neither hair nor sand, its own fibres furnishing a perfect substitute for the former, and the pulverised rock supplying all that may be required of the latter. During the short time since its introduction, although the number of men employed in procuring it is unusually large, and the machinery

employed in its preparation entirely automatic, the supply is found to be unable to meet the demand. This plaster, being composed exclusively of asbestos, is both fireproof and a non-conductor of heat, so that a room plastered with it is not only protected from fire, but at the same time is kept warmer and more comfortable than if dressed with any other known plaster. It also effects a saving of something like 25 per cent. in the fuel employed; and being also a non-conductor of sound, bedrooms may be relied upon, if the spaces beneath the floors and over the ceilings be filled with rough asbestic, to be free from overhead or internal noises. Its use also is invaluable, for the same reason, in hospitals and sick rooms, as well as in music and concert-rooms. It is moreover odourless and vermin proof, and being a natural filter, if a pail be upset in the room above so that the underneath ceiling be wetted, it dries again as before and leaves no mark or stain. It is also as elastic as fibrous, so that there is no fear of any crumbling, chipping, fracture or displacement. Even if a nail be driven into it it will enter as readily as into a deal board. Neither the heat from any stoves or furnaces, nor even the "settling" of a building, will have any effect upon the asbestic. It will adhere to metal or glass, and I have seen it applied as a covering to a tin pipe, its adhesive nature preventing any crack or split when bent round the pipe; and when walls are papered or painted with it all danger from fire from that source is entirely avoided. When walls are plastered with it, no sooner does it become dry than all danger of having to do it again after the settlement of the building is entirely done away with.

I called at many of the huge buildings now rising about New York and Montreal, following the example of Chicago, and saw its practical use while building was going on. A coating of rough asbestic was first applied with a trowel, just as it would be with any other plaster, it might be on brick, laths, or plain boards; and, when this is dry, it forms a coating very much like the asbestos felt-board now so much in use in America and Canada. This rough coating is then surfaced over with a superior quality of asbestic called the "Finish," which dries with a fine appearance not unlike marble, and with a good polish. Its cost is about the same as that of good sand and lime plaster, which its covering capacity greatly exceeds, while its mixing is so simple, and its application so easy, that it is found to be practically cheaper.

There is a peculiar danger to be feared in all these lofty buildings, which are now so much the fashion over yonder, which specially arises from their framework. Both iron and

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steel are so much affected by heat that, if a conflagration should occur near to one of these Babel-like buildings, the girders would become so affected that they would be likely to bend downwards, in doing which they would assuredly draw the uprights towards them, and cause a general collapse of the whole structure. I saw the action of this immediately after the destruction of the Tuileries and other large buildings in Paris in the time of the Commune. The plan adopted was to pile the furniture, and such other combustible matter as was at hand, in the centre of the principal room, pour petroleum over it and then set fire to the heap. The great heat soon caused the girders to sag downwards, drawing the sustaining walls inward, so as to cause speedy and irretrievable ruin. In the case of the monster buildings alluded to, if the metal skeleton were protected by brick, and the brick plastered with asbestic, all danger from the source indicated would be avoided. This is the plan adopted at the Waldorf Hotel in the Fifth Avenue, and many of the modern buildings in New York.

Asbestic is also applied, by the manufacturers already mentioned, to the making of a special roofing material of a perfectly light and cool character, which is so effectually proof against burning sparks and cinders that in every case of exposure to fire it has proved to be a complete protection. It is specially applied to the steep or flat roofs of factories, foundries, warehouses, railway buildings, cars, &c. It is suitable for all climates, has been used in every part of the States, and in parts of South America and Europe, for a sufficient length of time to show its superiority over corrugated-iron wherever used.

In 1861 the roofs of Kingsford's Oswego starch factory were covered with the original asbestos roof coating, which is still in good condition. This is now vastly improved in strength and durability by the use of asbestic, and specially improved asbestic roofing has now become so important, and in such rapidly increasing demand, that it is manufactured at the enormous rate of over two miles per day.

Mr. James Cunningham, of Montreal, said he was intimately acquainted with the Danville mines and deeply interested in the subject of asbestic. As Mr. Jones had told them, being composed of pure asbestos, a non-combustible material, asbestic was fireproof, in confirmation of which he would mention a test made in Washington at which he was present. Last year the United States Government, being desirous of securing a fireproof plaster for a new building being erected for the post-office, and asbestic being brought to their notice, determined to test it. A small structure was built and plastered with asbestic

half an inch thick, filled with firewood, and then a fire was lit and allowed to burn for half an hour; when, on the plaster still glowing from the intense heat, a stream of water from a 1½-inch nozzle was turned without having the slightest effect. A similar experiment had been recently made in Montreal with equally satisfactory results, and he hoped before long to see one in London. Mr. Jones said that asbestic, being fibrous, was elastic and was also a capital non-conductor of heat and sound, and would keep a house warm in winter and cool in summer, and all that he could vouch for. It had been his privilege from the inception of this discovery to visit the chief cities of the United States and Canada and interview the principal architects and builders; it was a radical innovation, and like all new materials, was quite justly subject to criticism and opposition, but he had invariably found a keen interest displayed, and wherever it had been specified and used, both architect and builder had been astounded at the work performed. Of the hundreds of buildings plastered with asbestic which he had reported upon, there was not one which had not borne out all that had been claimed for it. He had just returned from Glencoe, where Sir Donald A. Smith was building a mansion, and so thoroughly had he been convinced of the superior qualities of asbestic, that he insisted on the contract for parian being cancelled and asbestic used in its stead; and there, as everywhere else, all were astonished at its beauty, elasticity and strength. From the great success achieved in so short a time in the United States and Canada, he felt sure that in a year or two the demand would be very great indeed, and it was well that the supply was practically inexhaustible. One important feature was the impossibility of adulteration and consequently inferior work. Any architect specifying asbestic must get it and nothing else.

Captain Fox (London Salvage Corps) said that this substance appeared to be a most estimable article, well worthy the attention of architects and all interested in buildings. As he had listened to the paper he almost felt that his occupation was gone, for it seemed that even if a fire did break out it might be kept within reasonable limits by the use of this material. He did not say that it would reduce warehouse fires, but it would confine within reasonable limits fires which broke out in private houses. Besides, it seemed capable of thoroughly artistic treatment; the surface was most beautiful, taking a high polish, or it could be painted upon. He could certify to its fireproof qualities, having made a small experiment for his own satisfaction.

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## LONDON COUNTY COUNCIL IMPROVEMENTS.

THE consideration of the Improvements Bill promoted by the London County Council came before the select committee of the House of Commons on Monday, the 10th inst. The purpose of the Bill was explained by Mr. Freeman, Q.C. It was, he said, to authorise the County Council to make four improvements at Chelsea, the Tower Bridge, the Strand and Tottenham Court Road. The first was to make a new embankment at Chelsea in connection with widening a part of Cheyne Walk. The present embankment abruptly terminated a few yards beyond Battersea Bridge, and it was proposed to carry it across the deep bay formed by the river until it reached the point on the bank where Lott's Road and Cremorne Road met, and where several large buildings extended into the river. This would enable Cheyne Walk, which was very narrow, and had a great deal of traffic along it, especially since the opening of Battersea Bridge, to be considerably widened. The foreshore between the line of embankment and Cheyne Walk at low water was a mud-bank. The medical officer of health to the local authority had frequently reported upon the insanitary state of this bit of the river, and the local authority was, therefore, very desirous to do away with it. The proposal of the Council was to fill the space between the embankment and Cheyne Walk with earth, and probably to form it into a pleasure. In order to meet a local fear that the Council might build on this space words were put in the Act expressly forbidding that. The total area of mud-bank intended to be salvaged was about  $3\frac{3}{4}$  acres. The Chelsea Vestry were so favourable to the scheme that they had taken the almost unprecedented course of agreeing to contribute one-fourth of the total cost. The only objection really to this scheme came from certain residents who were afraid that what was proposed by the County Council would interfere with the picturesqueness of this part of Chelsea. The Thames Conservancy were perfectly satisfied with the way in which it was proposed to carry out the work. The next improvement was that for making a northern approach to the Tower Bridge. The great difficulty was that at the north of the bridge, though the streets were very narrow and congested, they were passed over by exceedingly important railway work, which he believed was now used by the Blackwall Company, the Great Northern, the London and North-Western, the Tilbury and the Midland Companies. This locality could not be avoided in any scheme in this direction. The County Council, however, took the advice of the best engineers, and they were informed that the improvement could be carried out, but that it would take a long time, and that the cost would be great. The most beneficial street for carrying the traffic was one leading from the bridge by Little Tower Hill to Great Prescott Street, whence at a subsequent date it would probably be extended and form part of the scheme for getting to Whitechapel High Street. This street, as originally laid out, would have taken a large slice of the Royal Mint, which could only be done with the assent of the Office of Works; but he was glad to say that after discussion this matter had been satisfactorily arranged. As to the next improvement, it was perfectly well known to the committee that for a considerable number of years past a very prominent question had been the absolute necessity of obtaining a new street from Oxford Street or Holborn to the Strand, and there was a pretty general consensus of opinion that that street should pass into the Strand somewhere near Waterloo Bridge. Up to the present time enormous difficulties had intervened, partly physical and partly financial. In addition to the fact that such a scheme would involve considerable engineering work and enormous expense connected with theatres and other large buildings, there was the fact that there were very large areas of insanitary and bad property to the rear of the Strand and Wellington Street which, before carrying out the great scheme, it was thought should be dealt with under the Artisans' Act. The present proposal, which was rather an instalment, was to sweep away the whole of the island of houses between the churches of St. Mary-le-Strand and St. Clement Danes, and between Holywell Street on the north and the Strand on the south. The present was a very fitting time to carry it out, for it so happened that most of the leases of that island of houses were now falling in, and if they were to be purchased it was very desirable that they should be purchased before new interests were created. The last of the improvements was of similar character, but related to the island of houses at the corner of Tottenham Court Road and Oxford Street, known as Bolter's Court, which formed an exceedingly objectionable block to traffic and which could be very easily dispensed with. The road was very narrow there, and there seemed to be no question that it would be an exceedingly desirable thing that the island should be removed, the only point being who should pay for it. After discussion with the local authorities the County Council came to the conclusion that they would be justified in effecting the improvement and in charging it upon the metropolitan rates. Counsel proceeded to explain to the committee the part of the Bill relating to the raising of a large portion of the cost by

what was generally known as the betterment clause, which applied to all four improvements. He went on to trace at great length the history of the introduction of this principle into Parliament. He read the report of Lord Halsbury's committee on the subject, and directed attention to the provisions of the present Bill relating to the procedure for putting the betterment principle into force, which, he said, were identical with those of the Southern Approach Act of 1895. One feature which he emphasised was the fact that the onus of proof was on the persons seeking to impose the charge. When the charge was imposed, power was taken to enable it to be redeemed by payment of a sum equal to thirty-three times the amount of such charge. He also pointed out that, although a property might be included in the betterment area, it did not necessarily follow that it would be subject to the charge. If it were found that it was not improved the property would not be charged. Only one-half of the benefit supposed to come to the property was to be intercepted—thus, if a house were improved 50 per cent. the County Council would only seek to charge 25 per cent. of the improvement upon the property, and they would collect it at the rate of 3 per cent. per annum. The arrangement came to with regard to Crown property was that where it belonged to the Crown, and was let by them, the betterment principle should not apply, but that where the property was actually used, as well as owned, by the Government it should. In conclusion, he dealt with the various petitions against the Bill which had been presented.

Mr. A. R. Binnie, engineer to the County Council, said the foreshore where it was proposed to place the embankment consisted of mud, which was always dirty, not to say disgusting, and being in a kind of bay was not subject to the scour of the tide. Very frequently an unpleasant smell arose. Of the  $3\frac{3}{4}$  acres that would be reclaimed about 66 per cent. consisted of mud-bank. Under the present proposals the roadway at Cheyne Walk would be widened from 26 feet at some places to not less than 60 feet. The embankment would be of concrete, faced with granite, and it had been designed with a view to further extension if necessary. Granite was most durable, and, in the long run, would be the cheapest material to use. His estimate of the cost was 38,000*l*.

## THE IRON AND STEEL INSTITUTE.

AT the first sitting of the twenty-eighth annual meeting of the Iron and Steel Institute of Great Britain on Tuesday, the 11th inst., in the lecture theatre of the Institution of Civil Engineers, Westminster, Mr. Edward Pritchard Marten delivered his inaugural address. He first referred to the Diamond Jubilee of the Queen. Drawing upon his past and present experience, he proceeded to show the great progress that had been made under difficulties in every department of iron and steel manufacture during the past 100 years. From the earliest records of iron-making in South Wales it appears that in 1791 the quantity of coal consumed per ton of pig iron at Dowlais averaged 8 tons 1 cwt., whilst the average make of pig iron per furnace per week was 20 tons. Tracing the increase of output and the reduction of fuel at intervals through successive periods, the President stated that in 1896 the maximum makes of blast furnaces had increased to upwards of 1,600 tons per week, with a consumption of coke of about 19 cwt., equal to about  $1\frac{1}{2}$  ton of coal per ton of pig. The enormous advances which have been made in the manufacture of iron and steel were noticed by the President, who especially alluded to the inventions of Bessemer and Siemens, which had done so much to develop the steel industry. As an example of the rapidity with which steel can now be produced, he stated that at the Dowlais-Cardiff works iron ore can be discharged from the docks, passed through the blast furnaces, the pig iron made and treated by the Siemens process, and rolled into steel plates within forty-eight hours. The make of pig iron in 1896 was 8,563,209 tons, being the largest quantity ever produced in this country in a single year. The production of steel in the same year was 4,133,397 tons, of which 1,815,842 tons were Bessemer and 2,317,555 Siemens steel. The output of steel rails in 1896 was 847,534 tons, being an increase of 213,396 tons on the previous year. The make of manufactured iron in the same year was 1,198,584 tons, being an increase of 50,572 tons upon 1895. Whilst congratulating British manufacturers upon these statistics, the President, from personal observation, complimented our continental competitors on the great progress they were still making in iron and steel manufacture. The advanced competition of America with Europe was referred to at considerable length, the enormous outputs of the leading American steelworks being given. With regard to the tinplate industry, the President observed that it had recently suffered from American competition, and had thus practically lost its best market. He hoped, however, that the ever-increasing demand for tinplates by other countries would restore it to something approaching its former prosperity. New uses for steel were being sought, but in this country little progress was being made as compared with the progress of the United States. There it



was utilised in the construction of large buildings. In Chicago the steel skeleton of a building thirteen storeys high was erected in twenty-five days. The hotel built for Mr. John Jacob Astor in New York had sixteen storeys, all the main structural work being of steel, of which material the building contains 10,000 tons. Another large building in Park Row has thirty storeys, utilising 9,000 tons of steel. Wages and labour cost were discussed, the President observing that in steel manufacture the introduction of appliances for dealing with heavy masses of metal which could not be handled by manual labour had tended more than anything else to reduce labour cost. Turning to railway rates, the President referred to the very low rates charged in the United States as compared with those prevailing in Germany and Belgium, and more particularly in our own country. He dwelt, amid applause, upon the vital importance to the iron and steel industry of a reduction in the cost of transport, pointing out that if we could obtain low rates of freight similar to those current in America, or even in Belgium and Germany, there was no country in the world where materials for iron and steel making could be assembled more cheaply than Great Britain. In conclusion, the President referred to strikes and labour disputes which caused enormous loss to both sides. Heartily concurring with Sir David Dale, who in his inaugural address said, "Neither capital nor labour can afford to do anything which tends to hamper that cordial co-operation by which alone the well-being of the community can be secured," the President added, "Whoever discovers a means by which disputes can be fairly and honestly settled will deserve well of his country and of the world at large."

At the conclusion of the address a vote of thanks was accorded to the President on the motion of Mr. E. Windsor Richards, seconded by Sir Lowthian Bell.

### STEEL CAISSONS FOR FOUNDATIONS.\*

In the case of the Manhattan Life Building in New York—the first of the very high office buildings where the caisson method was resorted to—the architects, Messrs. Kimball & Thompson, found that enough piles could not be driven in the lot to properly support the loads, and that to float the building on grillages was out of the question, because of the danger that the soft material beneath would escape laterally under its great load. To make open excavations to the bed-rock, some 54 feet beneath the street surface, was not safe, if possible, because of the danger of undermining adjacent buildings. To obviate all this, it was decided to sink steel caissons by the pneumatic process, as is done in obtaining foundations for most of the great bridges. Thus was inaugurated, four years ago, the caisson method now coming into extensive use for buildings.

A pneumatic caisson is simply a diving-bell, on top of which the pier or foundation structure is built. It consists usually of a rectangular or round box made of boiler-plate steel. It is 7 or 8 feet high and without bottom, and of length and breadth in accordance with the size of foundation pier required. After being set in position on the lot, the construction of the brick or concrete pier upon its roof is commenced. A passage-way through this latter and the roof of the caisson is provided by means of an iron tube, usually 3 feet in diameter. This is closed by means of an immense double valve, or air-lock. Men enter the caisson beneath the pier and commence undermining it, the material being hoisted out through the tube. When the water-level is reached and the excavators are troubled by the gradual entrance of the water into the working-chamber of the caisson, air is blown in through a pipe. This air is supplied by powerful steam air-pumps, and its pressure holds the water down to a level with the bottom or cutting-edge of the caisson. The men and the excavated material can pass through the tube without relieving the air-pressure, because the air-lock has two doors, only one being opened at a time, and the pressure between them being regulated slowly to avoid injury to the workman by the sudden transition to or from the compressed air.

The operation of undermining the caisson and building upon it is continued until the cutting-edge reaches bed-rock. This latter is then cleaned, and, if sloping, is stepped off; then the entire chamber is filled solidly with concrete. The pier then consists, first, of the concrete base or filling of the caisson surrounded by the walls of the working-chamber; next, above this, and forming part of the permanent work, the metal roof, a fraction of an inch thick, of the caisson; and, above this, the pier proper, of brick or concrete.

The speed of building foundations in this way is much increased by the fact that, while the excavation is being made, the pier itself is being built, so that it is actually finished within a few hours after the excavation is completed. The weight of the masonry and metal, and additional temporary load when

needed, force the caisson down against the upward pressure of the air against its roof, and, when properly conducted, the sinking results simply in pressing an immense plug into a passage-way cut for it through the earth to the bed-rock, thus permitting no flow of material into the excavation to endanger the support of the adjacent buildings.

The cellar floors of the new buildings are almost invariably placed at a lower level than the foundations of the older buildings adjoining, and for this reason, if for no other, it has been the custom to shore the adjoining building. The favourite method of doing this now is to cut notches in the wall, and in these to sink pipes built up of sections screwed on as sunk, taking the weight of the building on these pipes. In the case of the great building about to be put up facing Trinity Church at Broadway and Rector Street, the adjoining building is being thus supported before the buildings to be torn down are removed. Some very valuable time will be saved in this way. The work is done from the basement of the building to be removed, without disturbance to anyone, by cutting openings through the walls of the building to be removed and opposite to each of the notches in which pipes are being sunk under the adjoining building. In some cases it may prove economical and entirely feasible to build the foundations for a new building before removing the old buildings. When tenants of the old building cannot be induced to give up their leases on reasonable terms before the end of the regular term—in New York on May 1—such a procedure might enable a new building to be completed by the beginning of the next rental year.

The time required now to build the foundations for a large building by the caisson method is from two to three months, but this time will doubtless be lessened with increased experience.

Cylinders within which to build foundation-piers for buildings have been sunk without the use of compressed air, by simply loading them and easing up the friction and resistance by jets of water. This method has very great limitations, and because of the liability of endangering near-by buildings by disturbance of the material and of the uncertainty of getting the cylinders to the proper position and depth, so that they can be cleaned out and the foundation well built, the method seems likely to be used only when the conditions are particularly adapted to it.

It is probable that in some cases, rather than sink isolated caissons, or rows of them, it would be better to sink one or more caissons to cover the entire lot, not filling these with masonry, but using them merely as shells or coffer-dams, by which the exterior walls of the building and its columns could be carried downward to the rock and the entire space utilised for storeys below ground. The walls of the caissons may become the walls of the building, in part or wholly, and its roof may be one of the floors. With ample fresh air brought by flues from the roof of the building; with white tile finish and electric light; with absence of the usual basement masses of masonry, since the columns themselves would be carried down, and with the elevators running down to them—I believe that for safety-vaults, restaurants, barber shops, &c., the rental of such storeys would, on the most valuable sites, pay a fair return on the cost of the entire foundations. In this craze for high building, when we contemplate the possibilities of having ere long to go to the country or the roof to find out if the sun shines, is it not time to make this plea for additional depth rather than increased height?

It is the great misfortune of the substructure engineer that his work is not in evidence. He may build well, but he must bury his work, and unless the space be utilised as just suggested, the money he spends brings no apparent revenue. Hence, doubtless, the hesitation of many owners to go to the expense of supporting their buildings on a rigid foundation, and yet the cost of this, as compared with that of the cheapest possible foundation, generally would not exceed it by 5 per cent., and seldom, if ever, by 10 per cent., of the cost of the building. To offset this there would be in most cases reduced cost of repairs from cracking of plaster, settlements, &c., a longer life of the structure, and in New York city the consequently higher rental value. In an advertisement of the highest office building in the city it was lately set forth in large type that the building stands on solid bed-rock, whereas in reality it is floated on fine sand, and has been provided with an ingenious arrangement by which any of its columns can be lifted and shimmed up by means of hydraulic jacks inserted in the pedestals beneath the columns.

The investor who builds a great building to-day must bear in mind that we cannot expect these twenty-storey buildings to be outgrown in a few years, as the four or five-storey buildings have been. They should be built to last; the steel and wood, when hidden, should be protected from decay; and the metal and masonry should not be overstrained. He should also remember what the value of the structure may be ten, twenty, or thirty years hence; and what its reputation is likely to be in the light of that day's knowledge of high buildings.

\* From an article by Mr. Charles SooySmith in the *Engineering Magazine*.



A structure just finished may have defects which seem of little commercial consequence now, because serious consequences from them are twenty, thirty, or forty years off. Ten or twenty years hence they may be visibly impending. As yet there have been no disasters or conspicuous failures of any of the finished high buildings; doubtless in the main they have been too well built for us to anticipate any; and, happily for static conditions, the factors of safety have very large margins. Yet it is more than possible that some one or few, through faulty design or careless or dishonest construction, may fail; and, whether the particular imperfection causing the failure be quicksand under the building, rust or overstrain of some of its members, or something else, the value of every structure having the same possibility will be materially affected. If a single one of the prominent new buildings on a floating foundation were to threaten to give way, the selling value of every large structure in the city on a similar foundation would decrease to an extent far greater than the sum it would have cost originally to support it on a trustworthy stratum.

This plea for the building of the best foundations is made to owners, who are the ones who need to be reminded of their interest in them. The architect will, as a rule, be only too glad to have them, but he is generally under injunctions of economy, and, unless encouraged by a proper attitude on the part of the owner, will often hesitate to urge the outlay necessary to provide foundations in keeping with the weight and cost of his building.

As the statutes now stand in New York city, the builder of a new edifice has to protect from settlement the adjoining buildings, when the latter have foundations more than 10 feet below the street level. This has been fair enough in the past, but during the last few years many very heavy buildings have been erected on shallow foundations with fine sand, in some places practically quicksand, beneath them. This has been put under so great pressure, and under such a tendency to seek lateral escape, that the owner of an adjoining lot, when he wishes to build, must either limit himself to a shallow foundation, which may mean a permanent improvement inadequate to the site, or meet the risk and heavy cost of protecting, by underpinning or otherwise, his neighbour's building. The law should be amended; either the excessive overloading of the soil at slight depths should be prohibited or the adjoining owners should be relieved from liability for settlements caused in carrying out with reasonable care the excavations necessary in improving their property.

The evolution of the new type of business buildings has been startlingly rapid. Probably the further advances to be made will not be in the direction of greater height, but in that of improved structural character and true economy of design. That greater attention to the matter of foundations is now a marked feature is shown by the fact that, of the six high office-buildings to be built in the coming season in lower Broadway, four are to have caisson foundations sunk to the rock by the pneumatic process, and foundations of the same kind are to be used in the new custom-house in Chicago.

### IMPROVEMENTS AT ROUEN.

THE British Consul at Rouen, in his last report to Lord Salisbury, says:—

The new quays, of which I reported the near completion in my last report, were placed last year at the service of shipping, making in all 441 metres (1,470 feet) of additional quay room, of which 252 metres are on the right and 189 metres on the left bank. The rails of the Northern Company have been extended upon the right bank, and those of the Western Company upon the left bank over these quays and the Chamber of Commerce has prolonged over the same quays the rails of their hydraulic and steam derricks. The new quay upon the northern bank will be lighted by electricity during the present year.

The junction of the termini at Rouen of the Western and Orleans lines of railways is approaching completion. I have in a previous report fully described the importance of this work to the commerce of Rouen. West Central France will then be in direct communication, through Rouen, with North Eastern, and the direct despatch of goods from one to the other will be greatly facilitated. The connection is made by a viaduct running through the populous quarter of St. Sever. The sandy nature of the soil, and the fact that water was reached a few feet below the surface, made the laying of the foundations a costly work, but all the pillars, which are of stone faced with granite, are now finished, and are ready for the placing of the girders on which the rails will run. The erection of the new goods station behind the Orleans terminus proceeds concurrently with this work, and when it is completed the service of despatching goods by rail that are discharged on the south quays will be much quickened. The delays in the clearance of goods from the south quays have lately caused much complaint

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from traders, and a great improvement is looked for from these works. The cost of the viaduct is about 160,000/.

There is another work just commenced, which I may describe, for it will form a most prominent feature in the harbour, and will be of great use to all frequenting the port who have business to do on both sides of the river. It is also of interest as the first of its kind in France, and I do not think anything like it has yet been constructed in the United Kingdom. It is called a "Pont Transbordeur," and it will serve every purpose of a third bridge over the Seine three-quarters of a mile below the lowest existing one, but its special feature is that it will not interfere in any way with the free passage of ships, even of those with masts 150 feet high. I shall perhaps give the best general idea of its appearance by saying that two diminutive Eiffel towers are to be erected, one on each river bank, and that a narrow iron bridge will be suspended by chain cables between their heads. This bridge, which will be not less than 160 feet above the level of the quays, is not, however, intended for the passage of carriages or even foot passengers. Several lines of rail will be carried along it, and upon these lines a skeleton carriage or platform on wheels will run. This will be dragged from side to side of the river by steel ropes passing over a driving-wheel, to be worked by a steam or electric engine upon one of the banks. To the skeleton platform will be hung by steel hawsers, at the level of the quays or 160 feet below the bridge, the "Transbordeur." The "Transbordeur" is the slung carriage within which passengers and carriages will be transported from one bank to the other. It will be of solid construction, and not less than 13 metres in width by 10 metres in length. As by the time the "Pont Transbordeur" is completed the electric tramways will be running on the south quays of the river, as well as on the northern, it is intended to make a connection between the lines at this point, and the "Transbordeur" will be fitted to carry the tramcars, so that passengers by them will cross the river without changing their seats. I believe that over only one other river in Europe a similar mode of transport has been adopted, that is over the Nièvrion a little distance below Bilbao. Unlike most such works in France this has been left to private enterprise, and it will be carried out by M. Arnodin, of Châteauneuf-sur-Loire, who is also the patentee. It will cost the Municipality of Rouen nothing, but they grant the concessionaire a monopoly for eighty years of the bridge traffic over the Seine at this point according to a very moderate pre-arranged tariff. Foot passengers are charged only 5 c. ;

animals, 5 to 10 c. ; carriages, from 10 to 25 c. ; and a tramcar, not weighing more than 5 tons, will be carried from bank to bank for 1 fr. The work is already commenced, and the outside time allowed for its execution is eighteen months. It will bridge the Seine at the foot of the Boulevard Coudreau.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

10287. Conrad Lash, for "Improvements in edges for asphalt and similar roofs."

10301. Robert Ewing, for "Improvements in the joints of earthenware and other pipes."

10329. Edward Martin, for "Improvements in or relating to gully traps and the like."

10374. Charles Hammon Davies, for "Improvements in hinges."

10409. George Jabez Beedham, for "New or improved taper spring wedge or door stop for holding doors in any required position."

10438. James Crum-Kahle, for "Improvements in and connected with window-sashes and frames."

10479. William Godfrey, for "Improvements in sewer traps for waste pipes and the like."

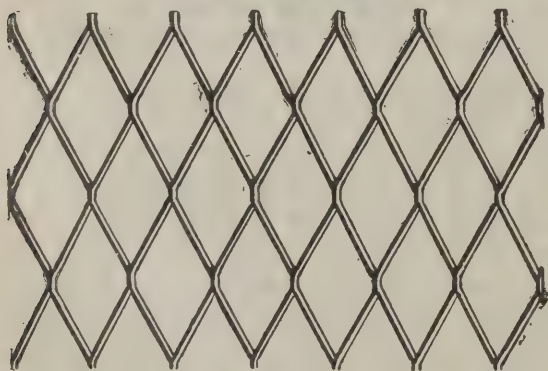
10493. Robert Armitage and John William Colt, for "Improvements in kilns and apparatus to be used in the manufacture of bricks and other articles."

10610. William Henry Walfer, for "Improvements in wedges to prevent the rattling of sashes."

10626. Mathieu Vhigen, for "Improvements in and relating to flushing apparatus."

TO INVENTORS.—Patents for Inventions, Trade-marks and Designs secured; every assistance given to inventors. Specialists in Building matters. Information free.—Messrs. RAYNER & Co., Patent Agents, 37 Chancery Lane, London, W.C.

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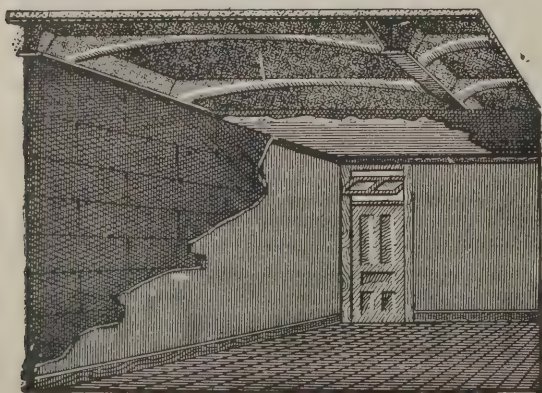
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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xv.*

## COMPETITIONS OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000l. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

MORECAMBE.—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000l., at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

## CONTRACTS OPEN.

ABERDARE.—May 25.—For altering the National Schools, Cardiff. Mr. T. Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

ASKAM-IN-FURNESS.—June 15.—For building a new classroom at the Ireleth School. Rev. J. A. Roberts, Ireleth Vicarage, Askam-in-Furness.

BALHAM.—June 8.—For erection of a branch library in Ramsden Road. Mr. Sydney R. J. Smith, architect, 14 and 15 York Buildings, Adelphi, W.C.

BARFORD ST. MARTIN.—May 25.—For building a school-room adjoining the chapel. Rev. R. Evans, 4 Grosvenor Terrace, Queen's Road, Salisbury.

BELFAST.—May 25.—For erection of goods warehouse in timber, 348 feet long by 66 feet wide, with steel principal and slated roof, for the Great Northern Railway Company (Ireland), Mr. T. Morrison, secretary, Amiens Street Terminus, Dublin.

BISHOP AUCKLAND.—May 25.—For erection of fifty dwelling-houses. Mr. Wm. Perkins, architect, Victoria Street, Bishop Auckland.

BISHOPTHORPE.—May 25.—For erection of a church. Mr. Noble, Precentor's Court, York.

BRIDGEND.—May 24.—For erection of Conservative Club premises. Mr. G. F. Lambert, architect, Bridgend.

BRIDPORT.—June 5.—For erection of an infectious disease hospital, caretaker's cottage, laundry, mortuary, and other works at North Allington. Mr. F. Cooper, borough surveyor.

BRIDGWATER.—May 26.—For various repairs, cleaning, colouring, painting, &c., of the borough police-station, property in Clare Street, property in Penel Orlieu, caretaker's house, Ashford Mills, market house, mayor's parlour. Mr. W. T. Baker, town clerk.

BRIGHOUSE.—May 25.—For erection of an engine, boiler and press-house, chimney-shaft and other buildings, also for large sewage-tanks, subway and other works. Mr. A. M. Fowler, 1 St. Peter's Square, Manchester.

BROCKHAMPTON.—For rebuilding Brockhampton Church, near Fawley. Messrs. Austin & Paley, architects, Lancaster.

BURY.—For erection of a mission-room, Clerk Street. Mr. Thomas Nuttall, architect, Market Street, Bury.

CANTERBURY.—June 3.—For erection of proposed buildings in Northgate Street. Mr. W. J. Jennings, architect, 4 St. Margaret Street, Canterbury.

CARNARVON.—May 27.—For erection of a chapel and schoolroom, Edeyrn. Mr. G. Hughes Roberts, Glanrhyd, Edeyrn, near Pwllhelli.

CASHEL.—May 29.—For erection of a National School. Mr. O'Connor, solicitor, Omagh.

CHESTER-LE-STREET.—May 26.—For erection of shop and tenement houses at Beamish. Mr. James Smith, 2 Mary Street, West Stanley, R.S.O.

COLCHESTER.—May 24.—For erection of a pavilion, lavatories and custodian's lodge on the Recreation Ground, Old Heath Road. Mr. Herbert Goodyear, borough engineer.

CORNWALL.—May 24.—For erection of a new mixed school at Porthallow, in St. Keverne. Mr. Thomas J. Joyce, clerk, St. Keverne.

DORSET.—May 28.—For erection of a new bridge at Little King's Mill, in the parish of Marnhull. Mr. Walter J. Fletcher, county surveyor, Wimborne.

DORSET.—For erection of four pairs of cottages on the asylum estate at Charminster. Mr. G. T. Hine, architect, Westminster.

DARTMOUTH.—May 25.—For repairs to market. Mr. T. O. Veale, borough surveyor.

DENHOLME.—For erection of boundary walls round the site of proposed new Wesleyan Sunday Schools. Messrs. John Judson & Moore, architects, Oakworth, near Keighley.

DORSET.—May 28.—For erection of a new bridge at Little King's Mill, in the parish of Marnhull. Mr. Walter J. Fletcher, county surveyor, Wimborne.

DROGHEDA.—June 1.—For erection of six workmen's houses on plot of ground at junction of Francis Street and Scarlet Street. Mr. Peter Connolly, town clerk.

DUBLIN.—May 26.—For erection of eight labourers' cottages. Mr. John O'Neill, clerk, North Brunswick Street, Dublin.

DUKINFIELD.—For alterations and additions to the Wellington Street Schools. Messrs. John Eaton, Sons & Cantrell, architects, &c., Ashton-under-Lyne.

DUKINFIELD.—For erection of semi-detached villa residences in Higher King Street. Messrs. John Eaton, Sons & Cantrell, architects, &c., Ashton-under-Lyne.



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**DUKINFIELD.**—For erection of a detached villa residence in Higher King Street. Messrs. John Eaton, Sons & Cantrell, architects, &c., Ashton-under-Lyne.

**DURHAM.**—May 26.—For erection of new business premises at Blackhall Mill. Mr. William S. Shell, architect and surveyor, Taylor Street, Consett.

**DURHAM.**—May 31.—For the enlargement of two classrooms at Crook Boys' School, Crook. Mr. Ralph Dixon, clerk of the School Board, Crook.

**EASTBOURNE.**—For extension to boiler-house, coal and coke houses, &c., at the Eastbourne Sanitary Steam Laundry. Messrs. Mitchell & Ford, architects, 2 Langney Road, Eastbourne.

**EBCHESTER.**—May 24.—For erection of sixteen houses. Hamsterley Colliery Offices, Ebchester, R.S.O.

**ELLAND.**—May 28.—For erection of four dwelling-houses in Gordon Street. Messrs. Richard & R. E. Horsfall, architects and surveyors, 15 George Street, Halifax.

**ELLAND EDGE.**—May 29.—For erection of stabling, cartshed and alterations to the Royal Oak Inn. Messrs. Chas. F. L. Horsfall & Son, architects and surveyors, Lord Street Chambers, Halifax.

**ELLENBOROUGH.**—May 26.—For enlargement and alterations to the Infant Board School, Ellenborough, near Maryport. Mr. C. Eaglesfield, architect, Maryport.

**ESSEX.**—May 29.—For enlargement of a bridge carrying the main road over Layer Brook in the parish of Layer Breton. Mr. Percy J. Sheldon, chief surveyor, County Offices, Chelmsford.

**FROME.**—For building a mission church at Trudoxhill, Nunney, near Frome. Mr. E. H. Lingen Barker, architect, 146 St. Owen Street, Hereford.

**GATESHEAD.**—May 26.—For erection of post office, Messrs. Gardner & Theobalds, 110 Great Russell Street, London, W.C.

**HANLEY.**—May 31.—For new shop fronts to Market Terrace Buildings. Mr. Joseph Lobley, engineer and surveyor, Town Hall, Hanley.

**HASTINGS.**—May 31.—For erection of girls and infants' departments, Priory Road School, West Hill. Mr. Frank H. Humphreys, architect, 6 Trinity Street, Hastings.

**HAVERTON HILL.**—June 2.—For erection of engine-shed, coaling stage, &c. Mr. William Bell, architect, York.

**HENWICK.**—May 25.—For erection of station buildings and other works at Henwick, Worcestershire. Mr. G. K. Mills, Secretary, Great Western Railway, Paddington Station, London.

**HEREFORD.**—For erection of eight cottages in Ryeland Street. Mr. W. W. Robinson, architect, 10 King Street, Hereford.

**HEYWOOD.**—May 25.—For construction of a brick and concrete culvert, manhole, &c., in Bradshaw Street. Mr. J. H. Baldwick, town clerk, Heywood.

**HORSELYDOWN.**—May 30.—For erection of a laundry at Workhouse, Parish Street, Rotherhithe, and for repairing, painting, distemping, whitewashing, &c., the interior of the Infirmary, Lower Road, Rotherhithe. Messrs. Newman & Newman, architects, 31 Tooley Street, S.E.

**HUDDERSFIELD.**—May 25.—For erection of outbuildings in Scotgate Road, Hanley. Mr. T. Bury, building surveyor, 9 Queen Street, Huddersfield.

**HULL.**—May 25.—For erection of smoke-houses, stables and foreman's residence in Flinton Street. Messrs. Freeman, Son & Gaskell, architects and surveyors, Albert Chambers, Carr Lane, Hull.

**HULL.**—May 26.—For erection of a junior department at the West Dock Avenue Board School. Mr. W. Botterill, architect and surveyor, 23 Parliament Street, Hull.

**IRELAND.**—June 8.—For erection of thirteen cottages for agricultural labourers. Mr. J. E. Sharkie, executive sanitary officer, Poor-Law Office, Strabane.

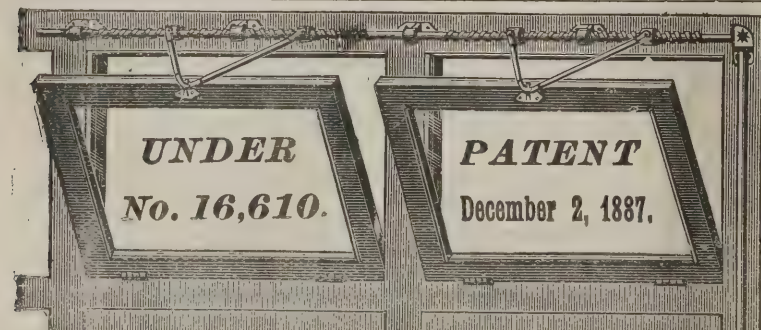
**KEIGHLEY.**—For building offices and storeroom. Messrs. Smith & Paget, Crown Works, Keighley.

**KNUTSFORD.**—June 2.—For alterations and additions to the hospital at the workhouse. Mr. Robert J. M'Beath, architect, Birnam House, Sale, near Manchester.

**LEEDS.**—For erection of ten houses at Holbeck. Mr. Fredk. W. Rhodes, architect and surveyor, Upper Wortley, Leeds.

**LEEDS.**—For erection of a battery station in connection with the tramways at Kirkstall. City engineer, Municipal Buildings, Leeds.

**LEEDS.**—For alterations, &c., at the new entrance, Roundhay Park, necessary for the formation of an electric battery station for the electric tramways. City engineer's office, Municipal Buildings, Leeds.



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LEEDS.—May 26.—For additions to St. Andrew's Schools, Burley Street. Messrs. Smith & Tweedale, architects, 12 South Parade, Leeds.

LEVENSHULME.—May 31.—For erection of new council offices, stables, &c., at Levenshulme. Mr. James Jepson, architect, Union Road, Stockport.

LLANGOLLEN.—June 4.—For additions and alterations to Llangollen Board Schools, and for fencing, &c. Mr. L. Lloyd John, solicitor, Corwen.

LONDON.—June 1.—For construction of underground conveniences for both sexes in Upper and Lower Thames Streets. Mr. H. Montague Bates, principal clerk to the Commissioners, Guildhall.

LONDON.—May 31.—For erection of workmen's dwellings (108 houses) at Nightingale Lane, Hornsey. Mr. E. J. Lovegrove, C.E., engineer, Southwood Lane, Highgate.

LONDON.—May 31.—For erection of stable building, children's lavatory, entrance gate, piers and dwarf fence-wall at the Paddington recreation ground. Mr. George Weston, Vestry Hall, Harrow Road, W.

LONDONDERRY.—June 3.—For erection of new premises at Ferryquay Gate, Derry. Mr. T. Johnston, architect, 11 East Wall, Londonderry.

LONDONDERRY.—May 24.—For erection of premises at James Street, for Messrs. Brewsters, Limited. Mr. T. Johnston, architect, 11 East Wall.

MANCHESTER.—May 27.—For erection of vagrant wards at the workhouse, Crumpsall. Messrs. W. Telford, Gunson & Son, architects, 10 Marsden Street, Manchester.

MANCHESTER.—May 26.—For erection of thirteen shops with dwellings, thirty-six lock-up shops, sundry workshops, offices and store-rooms, to be known as Trickett's Arcade, Victoria Parade, and Burnley Road, Waterfoot. Mr. Samuel T. Williams, architect, St. James's Chambers, Waterfoot.

MONAGHAN.—May 24.—For building a chapel at Monaghan district lunatic asylum. Sir N. Deane & Son, architects, 3 Upper Merrion Street, Dublin.

MONAGHAN.—May 24.—For building a chapel at Monaghan district lunatic asylum. Sir M. Deane & Son, architects, 3 Upper Merrion Street, Dublin.

MORECAMBE.—June 7.—For erection of a brick chimney 129 feet in height, engine and boiler-houses, and other offices

for generating station of the electric-light works. Mr. John Bond, surveyor, Council Offices, Morecambe.

NEWHAVEN.—May 27.—For extension of premises in Chapel Street. Mr. Edward John Hughes, architect and surveyor, Riverside, Newhaven.

NEW TREDEGAR.—May 25.—For erection of forty houses on Fothergill's Road, New Tredegar, for the Powell Duffryn Steam Coal Company, Limited. Mr. Geo. Kenshole, architect and surveyor, 26 Duffryn Terrace, New Tredegar.

PONTARDAWE.—May 27.—For erection of business premises, Pontardawe. Mr. W. W. Williams, architect, 63 Wind Street, Swansea.

PONTYPOOL.—May 31.—For erection of a partition and laying of wood block floors at the Abersychan Board Schools, for the Trevethin School Board. Messrs. Lansdowne & Griggs, architects, Newport, Mon.

POPLAR.—May 25.—For alterations to the Board's offices, 117 High Street. Mr. Wm. Henry Farnfield, clerk, 117 High Street, Poplar.

SALFORD.—May 27.—For repairing the spires of the three chapels at the cemetery. Mr. Saml. Brown, town clerk, Town Hall, Salford.

SOWERBY BRIDGE.—May 24.—For pulling-down of the old stone tannery, Gratrix Lane, Sowerby Bridge, and rebuilding the same three storeys high in brickwork. Mr. S. Wilkinson, architect, Sowerby Bridge.

ST. HELENS.—May 26.—For erection of two cottages at Kirkby pumping station. Mr. J. J. Lackland, water engineer, Town Hall, St. Helens.

ST. LEONARDS-ON-SEA.—May 31.—For erection of a school for infants at Bopeep. Messrs. Elworthy & Son, architects, London Road St. Leonards.

STOCKTON-ON-TEES.—May 25.—For alterations and additions to the houses and shops, 1, 2 and 3 Bishop Street. Mr. Jno. Sanderson, architect, 134 High Street, Stockton.

STRATFORD-UPON-AVON.—May 25.—For erection of a cottage at Shipston Road crossing, near Stratford-on-Avon. Mr. G. K. Mills, secretary, Great Western Railway, Paddington Station, London.

SUSSEX.—May 24.—For erection of a corrugated iron engine-shed, in the parish of Midhurst. District Surveyor, Granville Mansions, Midhurst.

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**TAUNTON.**—May 24.—For building six almshouses in St. James's Street. Mr. J. Houghton Spencer, architect, 8 Hammet Street, Taunton.

**THORNE.**—May 25.—For renovation of Thorne Wesleyan chapel. Mr. G. Wills, Derby.

**THORNABY-ON-TEES.**—May 29.—For completion of the tower and the erection of a spire to St. Paul's Church. Messrs. T. H. & F. Healey, architects, 42 Tyrrel Street, Bradford.

**TREGERRICK.**—June 2.—For erection of a piggery at Tregerrick, in the parish of Merther. Mr. George Gow, Tregothnan Office, Truro.

**TROWBRIDGE.**—May 24.—For alterations, &c., at Market Street. Mr. Walter W. Snailum, architect, Church Street, Trowbridge.

**WALES.**—For pulling-down and rebuilding three shops at Pontnewydd. Mr. J. Poulton, Pontnewydd.

**WALES.**—May 26.—For erection of infants' and mixed schools at Evans Town, Gilfachgoch. Mr. J. Rees, architect, Pentre Rhondda.

**WALTHAMSTOW.**—May 28.—For erecting lavatories and executing sundry alterations at Grosvenor House, Hoe Street. Mr. Geo. W. Holmes, surveyor, Town Hall, Walthamstow.

**WARWICKSHIRE.**—May 28.—For enlarging schoolroom and repairs to church. Mr. A. J. Sinnett, London House, Southam.

**WELFORD-ON-AVON.**—May 25.—For erection of dwelling-house. Mr. Thos. T. Allen, architect and surveyor, Stratford-on-Avon.

**WEST ARDSLEY.**—May 28.—For erection of stables, coach-house and other buildings in connection with Boyle Hall. Messrs. C. S. Nelson & R. W. Savage, architects, Sun Buildings, 15 Park Row, Leeds.

**WEST HAM.**—May 25.—For erection of sewage pumping engine and boiler-houses and electric-lighting buildings, at the Abbey Wharf, Stratford, E. Mr. Lewis Angell, engineer to the Corporation, Town Hall, Stratford, E.

**WEYBRIDGE.**—For erection of shops and premises. Surrey House, Church Street, Weybridge.

**WIGTON.**—May 28.—For erection of Nelson Grammar School. Mr. George Dale Oliver, architect, 5 Lowther Street, Carlisle.

**WILLOUGHTON.**—May 21.—For enlargement of Willoughton School. Vicar, Willoughton, Lincoln.

**WOKING.**—June 3.—For schools at Goldsworth. Mr. Gilbert H. White, clerk, 4 The Broadway, Woking.

**WORKINGTON.**—May 31.—For alterations and extension, to accommodate 420 additional scholars, of the Board School, Guard Street. Mr. Jos. Eden, architect, Carlton Road.

**WORSBOROUGH.**—May 27.—For alterations at the infants' school at Blacker Hill. Mr. W. E. Raley, clerk, 5 Regent Street, Barnsley.

**WORSBOROUGH.**—May 26.—For taking-down old buildings and re-erecting four cottages and other works at White Cross and Swaith. Messrs. Wade & Turner, architects, 10 Pitt Street, Barnsley.

**WREXHAM.**—May 27.—For erection of a Welsh Baptist Chapel at Pentre Broughton. Messrs. Davies & Moss, architects, 11 Regent Street, Wrexham.

**WRITTLE.**—May 29.—For alterations to the girls' and infants' schools of the Writtle School Board. Mr. F. Whitmore, architect, 17 Duke Street, Chelmsford.

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" " Orchard Street	43	15	6

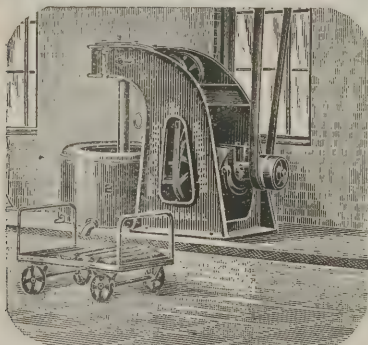
### ALDEBURGH.

For constructing new road on Aldeburgh Park Estate. Messrs. WOODCOCK & SON, surveyors, Aldeburgh.

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J. Ford	810	0	0
G. Double	760	0	0
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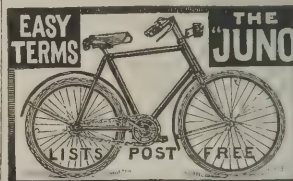
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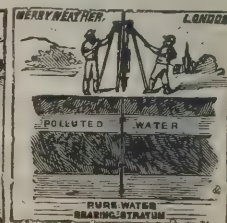
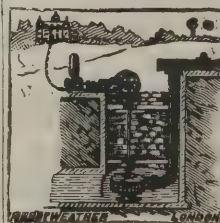
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Surveyor's estimate . . . . .	901	13	2

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E. J. BURNAND, Wallington (accepted) . . . . .	1,938	0	0

**BARNSELY.**

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*Accepted tenders.*

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 Duncan & Jones, Stairfoot, joiner, &c.  
 M. Fleming, Eastgate, slater and plasterer, &c.  
 Snowden & Son, plumber, &c.  
 Stephenson & Son, painter, &c.  
 J. Barraclough, Old Foundry, ironfounder, &c.  
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HEATHER, Battersea (accepted) . . . . .	78	0	0

**BEDFORD.**

For carrying-out paving and roadmaking in Cardington Road, College Road and Kempston Road.

*Kempston Road.*

R. Black, Croft Adamant . . . . .	£175	14	11
S. W. JARVIS & SON, Bedford, Croft Adamant stone (accepted) . . . . .	173	8	4
Patent Victoria Stone Company, indurated concrete slabs . . . . .	170	18	4

*Cardington Road.*

R. Black, Croft Adamant . . . . .	83	19	8
S. W. JARVIS & SON, Croft Adamant stone (accepted) . . . . .	82	14	8
Patent Victoria Stone Company, indurated concrete slabs . . . . .	81	4	5

*College Road.*

E. Pacey, blue bricks . . . . .	162	10	0
S. W. JARVIS & SON, blue bricks (accepted) . . . . .	145	11	3

**BELFAST.**

For erection of the West Belfast Orange Hall and caretaker's residence on Shankhill Road. Mr. WILLIAM BATT, architect, Garfield Chambers, Royal Avenue, Belfast.

J. Kidd . . . . .	£2,550	0	0
J. Killett . . . . .	2,500	0	0
W. Campbell & Son . . . . .	2,500	0	0
Fitzpatrick Bros. . . . .	2,490	0	0
M. Hearst . . . . .	2,450	0	0
J. Hemingway . . . . .	2,413	0	0
CAMPBELL & LOWRY, Belfast (accepted) . . . . .	2,301	0	0

**BLACKFRIARS.**

For new warehouse, Green Dragon Court, for Messrs. Corby. Mr. W. H. PUNNETT, architect.

Spencer & Co. . . . .	£2,150	0	0
W. Shurmur . . . . .	2,142	0	0
Blyton . . . . .	1,910	0	0

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HUNTER, architect, Bridge Street, Belper.	Quantities by
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A. Hingley	7,132 7 0
Bodell & Sons	7,008 15 0
Ford & Co.	6,850 0 0
Walker & Slater	6,800 0 0
J. F. Price	6,780 0 0
MOSS & SONS, Loughborough (accepted).	6,480 0 0
H. Robinson (withdrawn)	6,466 5 6
H. Jordan	6,123 10 0
W. E. Shaw	5,550 0 0

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Dare & Son	£75 0 0
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E. Walters	£2,995 0 0
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E. Gay	2,840 0 0
Cowlin & Son	2,799 0 0
Wilkins & Gosling	2,555 0 0
H. Forse	2,400 0 0
Hughes & Weeks	2,347 0 0
G. Downs	2,300 0 0
J. PERROT (accepted)	2,298 0 0

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F. & F. J. Wood	£21,098 0 0
Maid & Morpew	20,485 0 0
Wallis & Son	20,400 0 0
W. Shurmur	19,890 0 0
F. & H. Higgs	19,480 0 0
R. Hannen	18,970 0 0
W. Downs	18,690 0 0
Crosby	18,450 0 0
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Hollingsworth	2,337 0 0
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For taking up, reconstruction and enlargement of about 1,600 lineal yards of brick sewer, known as the Roath outfall sewer, with the necessary contingent works. Mr. W. HARPUR, borough engineer.	
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W. Shurmur . . . . .	1,188 0 0
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For excavating, forming, sewerage, levelling, Victoria Stone Company's concrete paving, metalling, channelling, &c., Urban District Council. Mr. EGBERT RUSHTON, surveyor, Poplar Road, Cleethorpes.

A. Brunton & Son . . . . .	£1,045 6 11
Hewins & Goodhand . . . . .	899 12 6
L. N. DAVISON, Grimsby (accepted) . . . . .	865 8 1

**CLEVEDON.**

For building Constitutional Club at Clevedon. Mr. HENRY TAYLOR, architect, 16 Lower Queen's Road, Clevedon.

W. A. Green . . . . .	£2,888 0 0
T. HILL, Clevedon (accepted) . . . . .	2,590 0 0

**CORNWALL.**

For erection of the King Arthur's Castle Hotel at Tintagel. Mr. SILVANUS TREVAIL, architect, Truro.

A. CARKEEK, Perwenton, Redruth (accepted).

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For sewerage, forming, macadamising, footpath paving, kerbing and channelling of Bright and Lincoln Streets. Mr. GEORGE EATON-SHORE, borough surveyor.

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F. Lunt . . . . .	638 4 6
J. Johnson . . . . .	627 3 0
F. T. BENNIE, 80 Liverpool Road, Warrington (accepted) . . . . .	626 14 4
Borough surveyor's estimate . . . . .	656 5 8

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For paving of the approaches to Morice Square and Ker Street. Mr. J. F. BURNS, borough surveyor.

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T. Shaddock . . . . .	£502 5 9
C. L. DUKE, Plymouth (accepted) . . . . .	467 14 7
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C. L. Duke . . . . .	212 17 8
T. SHADDOCK (accepted) . . . . .	208 7 0

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For provision and fixing in the old burial-ground, Church Street, of fifteen garden seats.

T. Moore & Son . . . . .	£28 10 6
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Wooller & Hardman . . . . .	22 10 0
W. WARD, Monton Road (accepted) . . . . .	21 10 0

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For erection of business premises and manager's house. Mr. WILLIAM HURST, architect, Pontefract.

*Accepted tenders.*

A. Sutton, bricklayer and mason . . . . .	£425 0 0
D. Jackson, carpenter and joiner . . . . .	424 0 0
J. Snowden & Son, plumber, &c. . . . .	100 0 0
G. Spurr, slater . . . . .	72 0 0
T. W. Senior, plasterer . . . . .	20 0 0

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C. Jupe . . . . .	78 10 0
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R. W. Lowe . . . . .	64 5 0
J. CROAD, High Street (accepted) . . . . .	62 0 0

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For erection of shop-front, Cleethorpe Road. Mr. GEO. W. FROST, architect, 174 Heneage Street, Grimsby.

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W. Matthews, joiner . . . . .	494	0	0
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J. Bailey, Penrith, slater . . . . .	107	4	8
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W. Cox . . . . .	1,710	0	0
J. Haines . . . . .	1,581	0	0
Cadwallader & Hockridge . . . . .	1,400	0	0
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Edwards & Medway . . . . .	5,677	0	0
Parker . . . . .	5,587	0	0
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G. E. Wallis & Sons	9,483	0	0	105	0	0
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Killby & Gayford	9,225	0	0	109	0	0
G. S. S. Williams & Son	8,998	0	0	98	0	0
R. A. Yerbury & Sons	8,954	0	0	107	0	0
B. E. Nightingale	8,945	0	0	106	0	0
Stimpson & Co.	8,857	0	0	100	0	0
W. Shurmur	8,828	0	0	105	0	0
G. Munday & Sons	8,718	18	2	104	15	8
Treasure & Son	8,700	0	0	95	0	0
C. Cox *	8,496	0	0	94	0	0

A. Extra for brickwork in cement.

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J. C. & J. Ellis, Limited	85	0	0
J. & F. May	79	10	0
Price, Lea & Co.	75	0	0
W. G. Cannon & Sons	70	0	0
J. F. Clarke & Sons	64	0	0
Vaughan & Brown	50	10	0
J. WONTNER-SMITH, GRAY & Co. (accepted)	49	0	0

For provision of half-glazed partition, Auditor's Room at Head Office of the Board.

W. Hornett	£102	0	0
T. Cruwys	98	0	0
Lathey Bros.	64	0	0
Lilly & Lilly, Limited *	55	0	0

For erection of two iron buildings, Edgecombe Road, Site, Camberwell Grove.

Humphreys, Limited	£938	0	0
Croggon & Co., Limited	927	10	0
T. Cruwys	770	0	0
W. Harbrow	740	0	0
J. Mitson	734	19	8
T. J. Hawkins *	690	0	0

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Lathey Bros.	£174	0	0
E. T. FOLLEY (accepted)	157	0	0

For painting exterior, Marsh Lane.

W. Hornett	£153	10	0
C. Foreman	144	0	0
G. Barker	130	0	0
W. Banks	115	14	6
W. Holding & Son	98	10	0
JONES & GROVES (accepted)	62	14	0

For exterior painting, Monson Road.

A. Black & Son	£430	0	0
S. E. Musgrove	245	13	0
G. Barker	190	0	0
H. J. Williams	182	10	0
J. & A. Oldman	168	0	0
W. Banks	164	19	6
Holliday & Greenwood	161	0	0
JONES & GROVES (accepted)	121	8	0

For painting exterior, Nynhead Street.

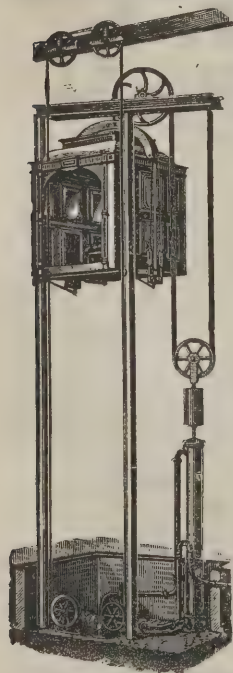
J. & A. Oldman	£130	0	0
S. E. Musgrove	128	13	6
A. Acworth	98	0	0
W. Holding & Son	92	15	0
JONES & GROVES (accepted)	67	6	0

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Rice & Son	58	0	0
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For painting exterior, Capland Street.

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W. Hornett	197	0	0
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H. C. Clifton	190	0	0
F. T. Chinchin	179	0	0
W. Brown	170	0	0
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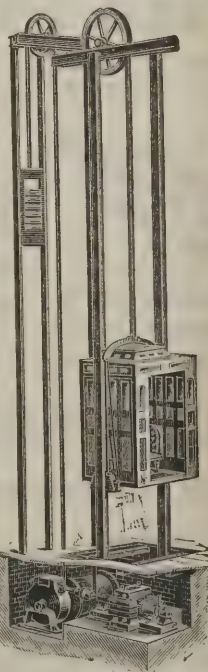
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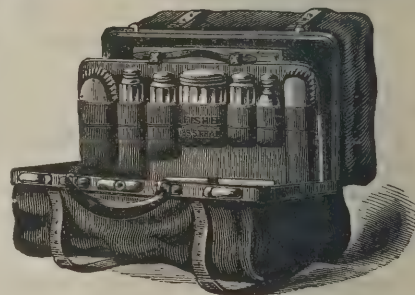
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E. Triggs . . . . .	682	10 0	17 10 0
W. Shurmur . . . . .	676	0 0	16 0 0
C. Cox . . . . .	674	0 0	14 0 0
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J. Wontner-Smith, Gray & Co. . . . .	163	0 0	
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H. Webber & Sons, Paignton . . . . .	3,540	0 0	
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Seager & Co. . . . .	1,298	0 0	
J. BLIGH, Eastchurch, Sheppey (accepted) . . . . .	1,087	0 0	

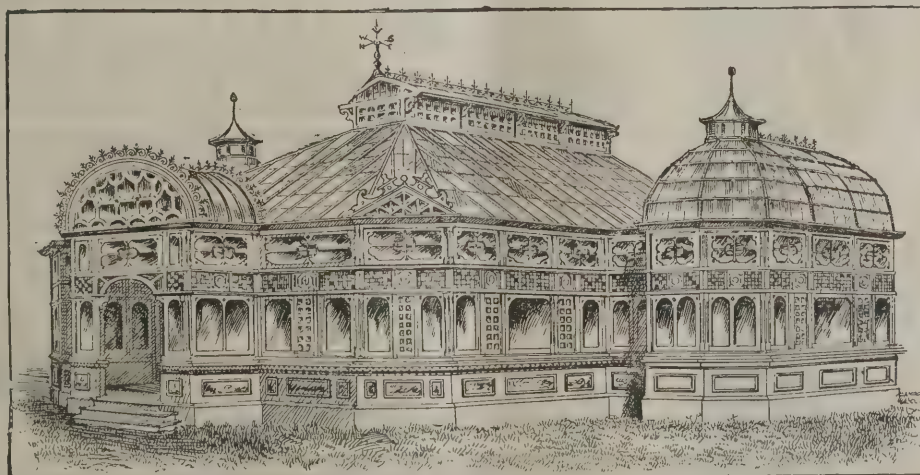
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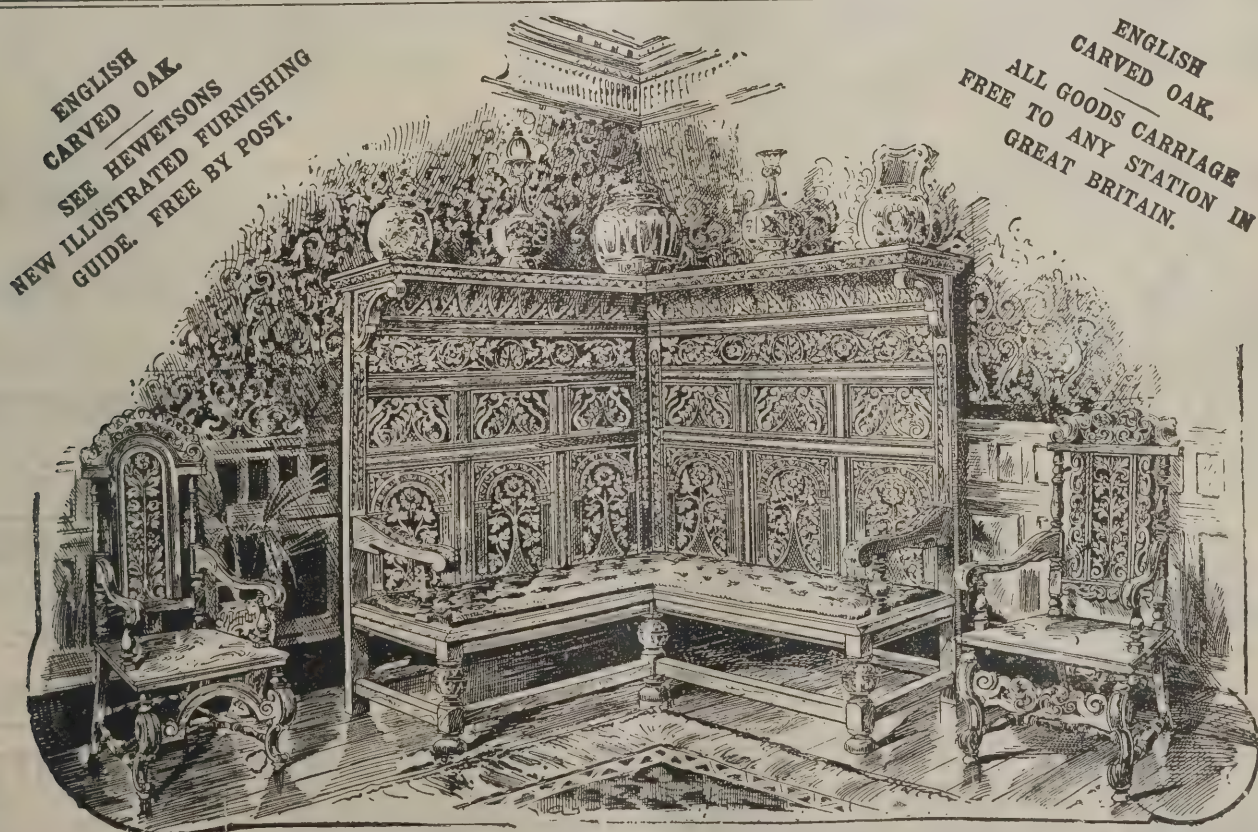
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## CORRESPONDENCE.

## Exits from Buildings.

SIR,—Is not foolhardiness a virtue in the eyes of Englishmen? My reason for troubling you with this letter is chiefly to get a reply to this question. I notice that notwithstanding the most awful disasters and panics—as for instance, that at Paris in the early part of this month—English folk continue to frequent churches, theatres, and in fact every description of place of amusement and of worship in the most approved happy-go-lucky style. Look at theatres, for instance. Which of them provides ample exits in case of fire or panic? Does the Opéra Comique? Does the Criterion? With regard to churches, which of these sacred edifices is provided with at least three exits per side wall with one exit at the western end? I know of none. I know of plenty of theatres where there is a single staircase leading to the dress circle, another solitary staircase to the gallery and so on. I know of plenty of theatres where the occupants of the stalls, dress and upper circles come down (possibly) separate staircases all converging into one corridor, which certainly is provided with swing doors opening out on to the street; but what would be the result in case of a panic? Turning to churches, I know of any number unprovided with swing doors, any number reckoned to seat 1,500 worshippers with one solitary door at the western end or possibly with only two doors—both extremely narrow—facing each other; and I have before me a catalogue of an enterprising firm of iron-church builders whose extremely elegant plans are certainly not assuring so far as the bodily safety of worshippers is concerned, though perhaps their spiritual safety was all that the firm in question thought of.

And yet this state of things is allowed to pass unheeded and uncared for. Architects go on constructing and planning edifices that repel one with horror as the thought of a panic rises to one's mind on contemplating these designs. Worshippers and theatre-goers all frequent their respective rendezvous without taking so much as an iota of thought at the possibility of danger, and the county councillors of our land read of horrors such as this century has amply begotten at theatres and bazaars, and yet allow the possibility of their recurrence to continue.

Speaking for myself, I have for long given up attendance at church on Sundays and other holy days—though not at other times—merely because I see for myself how utterly indifferent my spiritual pastors and masters are to my bodily

welfare; and as to other public rendezvous—well, I have not set foot in one for years, merely because I see how utterly indifferent the authorities are for the safety of persons there assembled.

Perhaps some county councillor may see this letter—and you kindly print it—and inform me whether foolhardiness is not a virtue, and one which all county councillors should encourage.—Yours faithfully,

HENRY CUNLIFFE.

Hove Club, Hove: May 17, 1897.

## TRADE NOTE.

ST. MICHAEL'S SCHOOL, Bristol, is being warmed and ventilated by means of Shorland's patent Manchester grates.

## VARIETIES.

MR. JAMES STIFF, of the London Pottery, Lambeth, died at Swanage on the 18th inst. in his eighty-ninth year.

AN English Presbyterian church, capable of seating 250, was opened on the 13th inst. at Saltney Ferry.

A NEW Board school at Walworth, which is to be known as the Michael Faraday School, was opened on the 13th inst.

THE foundation-stones of a new Wesleyan mission hall were laid at Derby on Saturday last.

DEAN FARRAR on Saturday inaugurated the handsome pulpit erected in the nave of Canterbury Cathedral in memory of the late Dean Payne Smith.

It is intended to erect a new church (in the place of the present structure in Denmark Road) for the use of the Welsh members of the Church of England in Manchester, if possible during the present year.

THE new marine biological station at Millport was formally opened on May 15. The building, which has already been described, is situated at Keppel Pier, and has been erected and equipped at a cost of about 1,500*l*.

THE Northern Lighthouse Commissioners' steamer *Pharos* sailed from Granton on Saturday last with several of the Commissioners on board, for the purpose of selecting and deciding upon a suitable site for the erection of a lighthouse on the Berwickshire coast.

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WHILE some workmen were excavating sand and gravel at Belfield, Musselburgh, they came across a stone cist in which were found a well-preserved human skeleton and an urn, which were acquired for the Edinburgh University Anatomical Museum by Mr. Simpson, who states that they date back to the Bronze Age.

A MOVEMENT for the restoration of the Twickenham old parish church tower, all that remains of the original building erected, it is supposed, under the superintendence of William of Wykeham, about the middle of the fourteenth century, has been set on foot in celebration of the Queen's reign.

THE foundation-stone of the nave of St. Luke's Church, Deeplish, Rochdale, was on Saturday last laid by Bishop Cramer-Roberts. The eastern portion of the church was erected some ten years ago, when a portion was erected to serve until the state of the funds would allow the building to be completed in suitable style.

It is understood that the return of works executed by the County Council Works Department and completed during the six months between September 30, 1896, and March 31 last will disclose further large and serious losses. The total estimated value of the works is about 75,000*l.*, and it is believed that this estimate has been exceeded by nearly 19,000*l.*

A MONUMENT to Maria Theresa at Pressburg was unveiled on the 16th inst. by the Emperor Francis Joseph, as King of Hungary. The King, who was accompanied by all the arch-dukes and archduchesses at present in Vienna, subsequently attended the dedication of the newly restored Franciscan church on the Hauptplatz, which dates from A.D. 1290.

A FIRE broke out in the east building of the General Post Office, St. Martin's-le-Grand, on the 14th inst., the result of a lighted match thrown into the area by a passer-by. A quantity of waste paper and other rubbish was set alight, but the firemen being soon in attendance, the outbreak was extinguished before much damage was done.

THE completion of the St. Andrew's Fish Dock extension was celebrated on Saturday at Hull by a dinner to the employes of Mr. A. Kellett, the contractor. Twelve months since an accident to the gates occurred, and had it not been for this unfortunate mishap the work would have been completed some ten months ago. Altogether about two and a half years have elapsed since the work was commenced, and much-needed facilities to the fish trade of the port will now be afforded.

THE six months' notice given by the operative stonemasons in Colne for an advance of from 8*d.* to 9*d.* per hour, and the furnishing of a code of working rules as at Nelson, expired on the 14th inst. The masters have expressed their determination, on account of the bad trade, not to concede the advance. The men are almost all members of their trades union. The dispute will affect about 300 men.

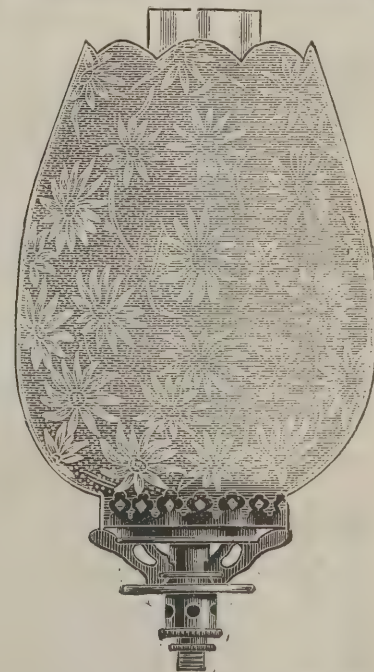
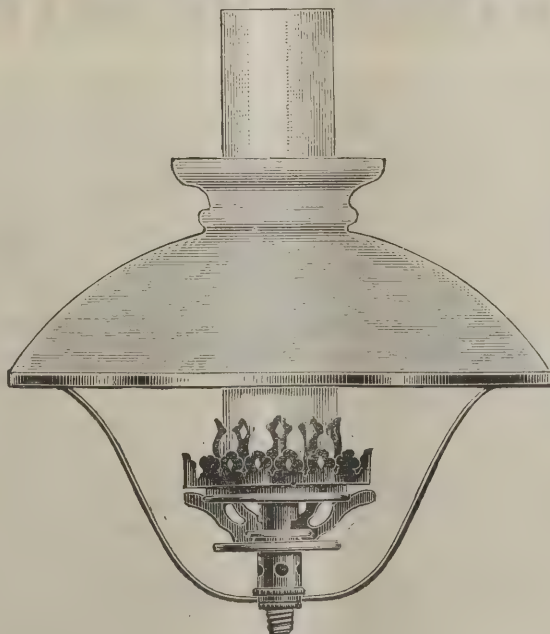
THE Sanitary Inspectors' Association of Scotland having been invited to hold their next annual conference in Aberdeen, the Town Council have resolved to give the use of the Town Hall for the meetings, which will commence on June 17 and extend over two days. It was also remitted to the public health committee to make arrangements for the meetings and the entertainment of the delegates.

THE extensive premises of Messrs. Siemens Bros. & Co., Limited, telegraph and electrical engineers, New Charlton, were the scene of an outbreak of fire between four and five o'clock on Tuesday morning, the 18th inst. The fire originated from an unknown cause in a pile of timber in the yard, which, when first discovered, was blazing furiously. Fortunately a hydrant was fixed in the immediate vicinity of the fire, and was promptly brought into use by some of the workmen employed by the firm, and in the space of half an hour the outbreak was extinguished.

THE engineering experts engaged by the Tyne Commissioners to report on the huge breach in the great north pier at the mouth of the Tyne, caused by the severe gales of last winter, have reported that it will be necessary to take down and reconstruct the whole of the pier from the damaged portion to the seaward end, a distance of 750 feet, at an estimated cost of 300,000*l.* The pier itself is 3,000 feet in length, and has been forty years in constructing, being only completed last year.

THE roof of a block of four houses in Victoria Avenue, Lichfield Road, Aston, suddenly collapsed on the 17th inst., occasioning great consternation to the occupiers, but fortunately doing no harm to anyone. The immediate cause of the accident appears to have been the slipping forward of the front wall-plate, which does not appear to have been properly "tied." The misplacement not only resulted in the collapse of the roof, bringing it flat down on to the four walls, but forced over the cornice, the bricks of which fell with a crash along the front of the houses. Happily no one was near at the time. The interiors of the houses sustained but little damage.

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THE memorial-stone of the new infirmary being erected in Paisley was formally laid on Saturday, May 15. The building, which we have already described, is being erected in Barbour Park (lately known as Egypt Park), Calside, from plans prepared by Mr. T. Graham Abercrombie, Paisley. It consists generally of two storeys and attics, with the front portions of the wings, and also the central block, slightly jutting out from the main building. The number of beds provided will be between 140 and 150, and there are different departments for children, and for men and women. All the general arrangements, such as heating, ventilating and lighting, and arrangements in wards have been carried out on the most approved systems, every detail having been carefully studied and attended to, so as to have the building complete in every respect as a first-class hospital. The cost, it is understood, will be 72,000*l*.

OWING to the death of Mr. Charles Hall, the managing partner of the Rugby Portland Cement Company, the position of works manager became vacant, and the directors of the company unanimously selected Mr. Isaac Brooks for the post. Mr. Brooks had been actively engaged assisting Mr. Hall for upwards of twenty-five years, and the unqualified success of the firm is in no small measure due to his energy and enterprise. Recognising that, the authorities, without hesitation, offered him the managership, and he has the best wishes of a very large circle of friends for his continued success and prosperity.

THE Western Baths, Cranworth Street, Hillhead, Glasgow, which have been closed for upwards of three months, have again been opened. The interval has been occupied in decorating and generally renovating the interior. No structural alterations have been made, but the decoration has been entirely altered. The prevailing tones are sage green and cream colour. The entrance-hall is now lighted by a polished brass electrolier and graceful branches on the walls. In the great bath-room the dressing-boxes, the entrances to which form an arcade at each end of the pond, have been reconstructed. The most important change which has been made, however, is in the Turkish cooling-room, the walls of which have been entirely covered with white enamelled tiles, the upper portion of the apartment being finished with a floriated cornice in coloured enamel. The reading-room is specially effective. The walls are covered with figured green hangings for rather more than half their height, and above them there is a deep frieze with a conventional flower design indicated in light sepia colour.

The coved cornice is gilded in dull gold, and the floor is covered with sage green carpet with lighter coloured border specially woven to match the wall-hangings.

### BUILDING AND BUILDERS.

THE plans for the erection of the proposed Empire Palace Theatre, two arcades and a number of shops upon a site on the east side of Briggate have now practically received the approval of the Leeds building clauses committee.

THE foundation-stone of the new Congregational church at Crosby will be laid to-morrow afternoon, the 22nd instant.

PLANS of the new church of St. Martin, Roath, the proposed memorial to Bishop Smythies, have been prepared. The building will accommodate 1,000 and the estimated cost is within 10,000*l*.

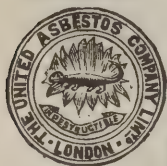
THE memorial-stones of a new church were laid on the 15th inst. at Park Hills, Bury, in connection with the United Methodist New Church. The building is to cost about 2,500*l*., towards which 1,600*l*. has been already raised. Mrs. Hall, mother of the ex-mayor, laid the principal stone. The building has been designed by Mr. J. D. Mould, of Manchester. It is to be modern Gothic in style, and will seat 470 persons. A school-chapel was erected about fourteen years ago, which is to be used as a school only in future.

ON Saturday afternoon the foundation-stone of Weston Jubilee church, near Runcorn, was laid by the Dean of Chester (Rev. J. L. Darby). According to the plan, the church will consist of nave, chancel, with tower and spire at the west end. Owing to the fall of the ground, the vestries are placed under the chancel. The style is Early Gothic in design, the walls furnished, interior and exterior, with Runcorn red sandstone, being chiselled and more finely finished. The accommodation provides for 350, and the cost will be about 3,000*l*.

### PLASTERERS' STRIKE, LIVERPOOL.

THE plasterers in Liverpool gave six months' notice, expiring on May 1 last, to the employers for an advance of  $\frac{1}{2}$ *d*. per hour, from 9*d*. to 9 $\frac{1}{2}$ *d*., and a new code of working rules, chief amongst which were clauses limiting the number of apprentices, no person other than a plasterer to be allowed to do plasterer's

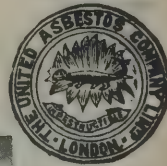
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work (which the operatives contend includes cement flooring, floating for tiles and wood blocks). Several meetings have been held between the masters and men, and as a result thereof the employers made an offer to the operatives for an advance in wages to 9½d. per hour, the present code of rules as worked to by the other trades being offered with an undertaking that only plasterers be employed by master plasterers to do plasterer's work, concrete and cement flooring, floating for tiles and wood blocks to be considered the work of specialists, and that all apprentices be bound. This was refused, and the men to the number of about 150 ceased work on May 1. A further offer by the masters to submit the whole matter to arbitration was also declined.

### JUBILEE STANDS.

ST. PAUL'S at the present moment, says the *Daily Telegraph*, is the busiest scene in London. Perhaps the usual quietness and solemnity of the place—a quarter of the metropolis given over to the cooings of pigeons, too fat and certainly too lazy to fly away from the passer-by—and the silent reverential manners of the pilgrims to this shrine have something to do, by force of contrast, with the impression of activity that one gets from a visit to St. Paul's just now. There is nothing but jubilee in the air of the neighbourhood. The workmen tearing down Messrs. James Spence & Co.'s premises are taking night and day turns. Opposite, at the big Pawson & Leaf building, all the windows, except those on the ground-floor, are being taken out, and preparations are rapidly going forward to receive a crowd estimated at 2,000 persons. St. Paul's itself resembles a beleaguered fortress, around which the enemy has pressed his earthworks and mines right up to the last moat, so that the garrison must starve, surrender or make a desperate sortie. The scaffolding high up on the front of the cathedral is not in the way of Jubilee preparation—many doubtless wish it was—but on the south side and the eastern end, where the parade will sweep round into Cheapside after the ceremonies, there is a regular series of barrack-like, woodwork fortifications. The City Corporation platform, on the east end of St. Paul's southern face, will seat, it is calculated, 2,600 of the officials and their families. West of the central porch, on the south side, there will be places for at least 4,000 more, and another 1,000 to 1,500 City authorities and their friends will be able to watch the brilliant procession as it turns into Cheapside, from the stockade-like structure at

the north-east corner of St. Paul's Churchyard. These people, however, will miss what is taking place almost within hearing of them on the other side of the church.

The big pavilion erected on the site of Messrs. James Spence & Co.'s building is rapidly taking shape. It will have four storeys or tiers, and each tier will have twelve rows of seats, with places on every one for from forty to fifty people. The work in this instance is being done with special speed, the builder being under contract to complete his task before June 17, in order that the work of decoration may be commenced.

Messrs. Pawson & Leaf's premises have only just been leased by a syndicate of well-known public men, and rows of places are being built in all the floors, 193 windows being taken out temporarily. The six-storey edifice, which is fireproof, bears directly on the steps by which Her Majesty's carriage will be drawn up, facing the south, and is furnished with lifts. It has the further advantage of an entrance on Godliman Street, so that spectators may come in by the rear at their own convenience from Victoria Street. The alterations are being so arranged that there will be several private rooms from which all that goes on may be seen. The refreshments will be served by the Imperial Institute staff and chef. Although the City Fathers and their friends on the south of St. Paul's will not be able to see the cortège at rest, their view of the starting of the parade immediately after and its slow winding into Cheapside will be almost enough to make up for the deprivation. Only about 10,000 people altogether will witness the solemnities at St. Paul's.

Following the route of the procession, after leaving St. Paul's, but little further preparations for witnessing it can be found until the Borough is passed. Cheapside does not lend itself to more than tasty decorations and watching the spectacle from the windows. The prospects of a stand at the church as the carriages enter King William Street are dubious. This place of worship, it will be remembered, has just passed into the hands of the railway company, who want its site for a station. Preparations are scarcely active yet on this side of London Bridge.

St. George's Circus will be a great point for massed spectators. A fine platform is going up at the School for the Indigent Blind. Facilities for between 1,500 and 1,700 onlookers will be provided, extending along the front and the Lambeth Road side of this building, an excellent sight of the parade being afforded. Tickets are being snapped up at from one to five guineas each, the proceeds being devoted

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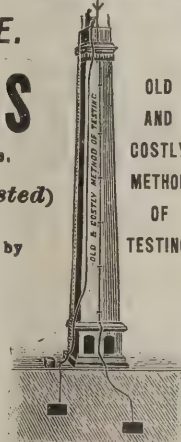
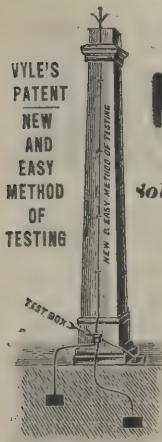
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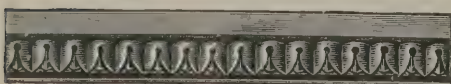
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to a deserving charity, as the chaplain and secretary, the Rev. St. Clare Hill, insisted on going into the speculation himself, in order to raise every possible penny, rather than to let the premises for a lump sum. The Royal Eye Hospital, almost exactly opposite the School for the Indigent Blind, will not order anything too large to interfere with the fine view from its large windows. It is calculated that, with the roof, 500 holiday-makers will see the parade from the Royal Eye Hospital. A little further along Westminster Bridge Road are the Yorkshire Schools. This location has been sold for 700%, the money to be used for educating Yorkshiremen's children; but it is noteworthy that there are 602 seats, and that, allowing for the cost of erecting seats, 500% appears to be lost. The site at the Roman Catholic Club, near by, has also been sold to speculators for a good figure; the sum will go to support the members' interests.

At St. Thomas's, almost opposite the Southwark Cathedral, where preparations are also going forward rapidly, accommodations estimated to seat 800 people are being erected. The work on the staging at Christ's Church, at the corner of Kennington Road, giving on the procession as it turns up to Westminster Bridge, was begun yesterday. The church people are letting their own stalls, and expect to reap a nice sum with which to do good. No. 232 Westminster Bridge Road is being pulled down, and a neat box erected which will probably hold about 500 people. The work in front of and at the corner of St. Thomas's Hospital is progressing steadily. The 1,300 seats provided here were nearly all taken by the governors of the institution. There will be eleven tiers of spectators in front of St. Thomas's and eight rows at the Lambeth Palace Road corner, with a refreshment tent upstairs. The cards are already being sent out.

The Office of Works is doing so well for the members of Parliament and their friends that the efforts promise to take in every man who ever represented a constituency. There is a huge network of timbers in front of St. Stephen's, just above the clock tower, and another below it, even larger, to say nothing of a commodious pavilion in Parliament Square. All are particularly substantial-looking. Some arrangements are being made at St. Stephen's Club, at the corner of the Thames Embankment, probably only for members. The Whitehall Club, in Parliament Street, is getting up a strong outside balcony capable of seating between 300 and 400 people.

Opposite the Home Office a well-planned structure, capable of seating 1,000 persons, is going up. The carpenters are also

at work in front of Montagu House. A private party of 300 people are here to be the guests of their Graces of Buccleuch. Next to the Commissioner of Charities another good-sized stand is building, and seats are being placed over the Scottish Office opposite. The most important of the Whitehall platforms is the one at the corner of Horse Guards Avenue. This structure has room for 5,000 chairs, which are selling fast, at from four to twenty guineas each. There will be four sloping tiers on each floor, including the roof, the ground level being let in stalls.

At the south side of Constitution Hill will be one long grand stand from which to view the parade. The tiers of seats are already almost fit to receive the boards on the Buckingham Palace end, and the line will extend right up to the arch at Hyde Park Corner. It is estimated that there will be places for close on 15,000 people. Balconies and stagings will be erected at St. George's Hospital, the work being already begun. There are no indications as yet of any arrangements for seeing the parade, as it passes along Piccadilly, being made in the park on one side. In front of the National Gallery, and over a portion of Trafalgar Square, the arrangements are fast approaching completion. At St. Martin's Church the preparations will soon conceal the lower side and almost the front of the building. This pavilion extends all the way down Duncannon Street, and up at the back of the houses on the Adelaide Street side. Advantage is taken of the fact that the Royal cortège will come straight down Duncannon Street to erect a large platform in the cab yard at the Charing Cross station. The two churches in the Strand will reap a benefit from their fortunate position, both putting up substantial and comfortable accommodation for visitors. The building at the corner of Norfolk Street also offers a prospect of a good view of the Queen as Her Majesty goes by, and the lower floor is being turned into a grand stand. A like structure is also being erected at the Law Courts.

### THE NORTH SHORE SCHEME, BLACKPOOL.

A CORRESPONDENT of the *Leeds Mercury* writes:—No more enterprising community than that of Blackpool is to be found within these sea-girt isles. The progress which it has made, and is still making, is simply amazing. The success has been well earned. Dependent for their prosperity upon the visitors who come to the town each season, the inhabitants have spared no pains in their efforts to make the place attractive. Improve-

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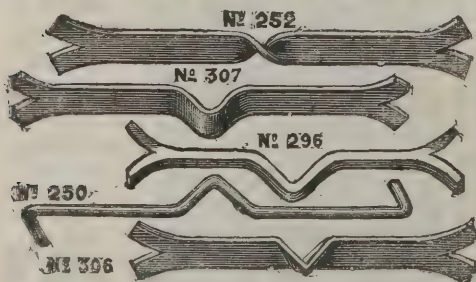
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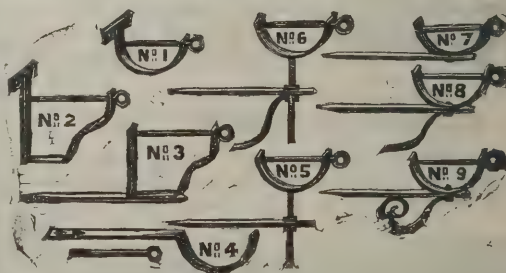
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ments have followed one another in rapid succession. The ratepayers have never grudged the money spent in this wise. They have the good sense to realise that though the amounts disbursed are large, the investments will bring in an adequate return. As a matter of fact, the inhabitants have not much cause for complaint on the score of rates, their liabilities being within five shillings in the pound. An exception must be made of those who occupy property "on the front," for they have the privilege of paying a special parade rate—but they get a very fair *quid pro quo*. Is this parade rate peculiar to Blackpool? It seems a distinctly just and reasonable imposition, because at all seaside resorts the houses from which a sea view is obtainable naturally do the biggest business. The improvement of the parade enhances the value of the property abutting on it, and at Blackpool the occupiers of the property have to pay for the betterment. Of course, every care is exercised by the authorities to insure the whole of the proceeds of the parade rate being devoted to the purpose for which it is levied.

At the present moment the Corporation have on hand what is known as the North Shore Scheme. This is a gigantic undertaking, and will entail an expenditure of 90,000*l*. It comprises the construction of a sea-wall three-quarters of a mile in length. The north end of the wall is close to the Gynn estate. The work is not being carried out a minute too soon. All the world has heard of the fury of the Blackpool tides. These form very fine spectacles when viewed at a respectable distance, but they are uncommonly destructive. The cliff at this particular point was being rapidly washed away, and some fine new houses built near the front were more than once in serious danger. That danger happily exists no longer. The contractor, Mr. R. Finnegan, of Northampton, made a start with the North Shore scheme in November 1895, and the bulk of the heavy work is now completed. There is still, however, much to be done, and another twelve months will elapse before the undertaking receives its finishing touches. The operations have at times been carried on under great difficulties. Two or three terrific storms have wrought an immense amount of damage. Mr. Finnegan tells some stories about the power of the waves which seem well-nigh incredible. Huge blocks of concrete and granite, which no three men could lift, have been hurled great distances by the angry tides. Despite these tempests, however, steady progress has been made. The work is of a most substantial character. Mr. J. Wolstenholme, C.E., the borough surveyor, is responsible for the plans, and he has taken every

possible precaution to prevent the happening of anything untoward. The wall is built of concrete, is faced with concrete blocks, and is 7 feet 6 inches thick. It assumes a gracefully curved form, so as to lessen, as far as possible, the force of the waves. In front of the wall there is what is known as a "sea defence." This is a slope running down into the solid clay, formed of granite hulkings stones laid in concrete. Some people may be interested in knowing that the granite has come from Shap in Westmoreland, from Threlkeld in Cumberland, from Penmaenmawr in North Wales, and from Cornwall—14,000 tons of it altogether. Immediately behind the sea-wall there will be a concreted promenade 5 yards wide, which is certain to prove a very popular place of resort. There is to be a seat running the whole length. From this promenade an embankment will spring, forming a slope which is to be covered with rustic work and grass. At the top there will be another promenade 50 feet wide, and made of asphalt. Beyond this, again, is another slope, which is to be laid out with flower-beds, grass plots and walks. Then comes the Queen's Drive, which is to be greatly improved. On the westerly side of it there will, for example, be a footpath 4 yards in width. This, roughly, is a description of the North Shore scheme.

### COUNTY COUNCIL CONTRACTING.

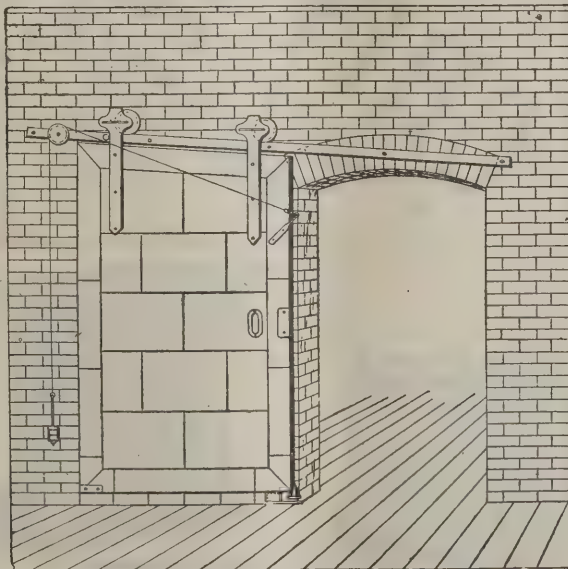
A RETURN has been prepared by the works committee of the London County Council showing the cost of works completed and certified between March 31 and September 30, 1896. The return of estimated works so completed shows that some very large and serious losses have been made. It relates to fifteen works, in only six of which has the actual cost been below the final estimate, the aggregate saving amounting to 734*l*. On the remaining nine works there has been a total loss of 8,260*l*. The most serious loss shown is that upon the execution of some temporary buildings at Colney Hatch Asylum, where the actual cost of the work has exceeded the final estimate by 3,827*l*. The original estimate for the work as passed by the Council was 17,500*l*, the final estimate, which included certain additions, 19,114*l*, and the actual cost 22,942*l*. Originally the asylums committee advertised in the usual way for tenders for this work, but only one tender was received, amounting to 18,812*l*, which was considerably in excess of the resident engineer's estimate. The works committee were then approached, and offered to do the work for 17,500*l*. On

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completion of the job the works committee sent in a claim to the asylums committee for 2,920*l.* for extras, out of which the engineer of the asylum reported that he could only allow the sum of 310*l.* Arbitration was suggested, but ultimately, if the Council consents, the asylums committee, in addition to the 310*l.*, are willing to pay one-half of the balance for extras claimed. Mr. Adams, the manager of the Works Department, in his report upon the reasons for the large deficiency on this work, states that it was taken at too low a price, owing to successive reductions made by the late manager in his original estimate in order to bring his total down to the same amount as that presented by the resident engineer. The work, he says, was started hurriedly, no proper drawings had been supplied at the time of preparing the estimate, more materials were supplied than necessary and had to be returned, and owing to anxiety to meet the wishes of the asylums committee and to hand over the building as completed, block by block, more men were engaged on the work than could profitably be employed, having regard to cost of work only. The finance committee, reporting upon the application of the works committee for an excess vote of 3,827*l.* and of the asylums committee for an excess vote of 1,304*l.* for this work, state that it appears that no proper estimate was prepared or taken out. They call special attention to this point because the Council's control over expenditure largely rests upon estimates, and it is therefore important that all estimates should be carefully framed.

Another large loss is shown on the Shelton Street dwellings, where the deficiency amounts to 2,607*l.*, the final estimate for the work being 14,416*l.*, and the actual cost 17,028*l.* Commenting upon this loss the manager of the department states that there were considerable delays after the work was started in carrying it out for which the department was not responsible, and these delays enhanced its cost. The blocks of buildings were in very confined areas and separated from one another by intervening streets and houses, causing great inconvenience and increasing the cost for superintendence, lighting and watching. The works committee point out that the original estimate for the work was made in 1894 and a rise in value both of labour and materials took place in the course of the following year. The strike in the building trade, which was impending during the execution of the work, actually occurred before it was finished. In the opinion of Mr. Rowland Plumbe, one of the architectural officers of the Council, the loss on the work from delays, difficult conditions and the state

of the labour market was greater than a skilful contractor would have allowed himself to suffer, though a contractor of ordinary calibre would very likely have done as badly as the Council. The lesson, the committee think, to be learned from the job is one of caution in undertaking works which are not of a straightforward character. With reference to the excess vote of 2,607*l.* asked for in respect to these buildings, the finance committee state that they have already pointed out the exceptional inconvenience attending any excess of cost over estimate in respect of artisans' dwellings erected by the Council, because they are only agreed to by the Council upon carefully-prepared estimates with calculations to show the effect upon the county rate. The excess of cost of 2,607*l.* in the present case meant an addition of 103*l.* to the annual charge for interest on the sinking fund for capital outlay, which, unless it could be met by increased rents or savings in maintenance and management, would constitute an annual charge on the county rate throughout the loan period of upwards of 50 years.

The other losses shown in the return relate to the following works:—Crossness outfall gridiron, where the excess over estimate amounted to 1,078*l.* on work estimated to cost 3,219*l.*; Barking outfall, alterations to pier, excess, 206*l.*; Victoria Embankment storeyard wall, 98*l.*; Sandys Row improvement, 345*l.*; Battersea river-station causeway, 88*l.* There are also two other minor losses. The aggregate of the fifteen works reported upon shows—final estimate 52,133*l.*, actual cost 59,690*l.* This is an increase of 20 per cent. on the original estimates.

A summary of estimated works completed and reported to the Council since the commencement of operations by the works committee in March 1893 shows that the final estimates have amounted to 435,672*l.* and the actual cost to 437,334*l.*

The accounts for jobbing works executed during the half-year show that a considerable saving over schedule prices has been effected. The value at schedule prices of the work executed was 9,989*l.* and the actual cost 8,981*l.*, or a saving of over 1,000*l.* The largest savings are shown on work done for the main drainage, bridges and housing of the working classes committees.

In view of the facts disclosed in this report, Lord Onslow has given notice that when the report of the special committee on the Works Department comes up for consideration he will move as an amendment to the recommendations:—"That the Council, being satisfied from the evidence submitted and the further report of the works committee that work executed for it by the Works Department is not superior in quality to

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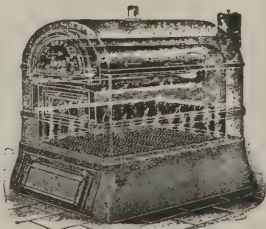
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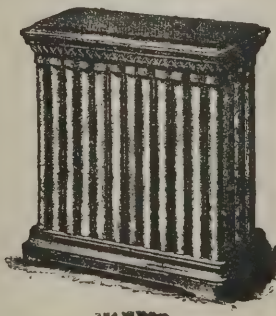
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that executed by contractors, and that considerable loss has been sustained in consequence of the operations of the Works Department, resolves that no further work be entrusted to that department, and that it be referred to the general purposes committee to consider and report as to the arrangements necessary for the due completion of the works in hand and for dealing with the central works in Belvedere Road."

### COMPENSATION CASE.

THE case of Reid v. Wallasey Urban District Council was heard at the Liverpool Law Association rooms. Mr. George Bradbury, F.R.I.B.A., president of the Liverpool Architectural Society, sat as umpire. Mr. Joseph Henry McGovern, F.L.A.S., Liverpool, was arbitrator for the claimant, Mr. Hugh Reid; and Mr. Henry Hartley, F.R.I.B.A., Liverpool, was arbitrator for the Council. Mr. Tobin, barrister, instructed by Messrs. Simpson, North & Co., represented Mr. Reid. Mr. Wm. Danger, law clerk, appeared for the promoters. The claim was made under Sec. 308, Public Health Act, 1875, and was in respect of damage done to the claimant's crops on the Model Farm, Mill Lane, Liscard, and for prospective damage which might arise owing to the easement which the construction of a sewer running through the farm would give. It appears that a 12-inch sewer had been laid by the local authority some sixteen to eighteen years ago with two lampholes, and now a 21-inch sewer with nine ventilating manholes had been substituted. The Council did not proceed under Sec. 18 of the Act which provides for a reconstruction, but did so under Sec. 16 which deals with new sewers. No evidence was tendered by the Council as to having purchased an easement from the owners of the fee-simple, or that compensation had been given to the previous tenant. Mr. Reid had a two years certain tenancy. The claimant was examined at length regarding the agricultural portion of his claim, which amounted to 21*l.* 9*s.* 4*d.* for present damage, in addition to which Mr. Thos. Cook, F.R.I.B.A., J.P., Liverpool, valued the future damage at 8*l.* 4*s.* 11*d.*, including some other items, viz. interference with the level of the ditch and subdrainage, in all 29*l.* 6*s.* 8*d.* Mr. Stretch, farmer and auctioneer, Aughton, Ormskirk, Mr. J. Wright, farmer, Walton, and Mr. Rainford, farmer, Altcar, corroborated the agricultural part of the claim. Mr. Danger, on behalf of the Council, said he had never heard of any sum being awarded

to a yearly tenant in respect of prospective damage; if Mr. Reid was injured in the future in any way he could make another claim. The Council had offered the claimant 50*l.*, which he thought was ample. He called Mr. T. T. Wainwright, F.S.I., Liverpool, who valued the damage at 46*l.* 9*s.* 11*d.*; Mr. J. Yeowart, farmer, Cheshire, thought 31*l.* 7*s.* 6*d.* sufficient; and Mr. Lamb, farmer, Cheshire, assessed the injury at 30*l.* Several of the Council's officials gave evidence as to the former levels of the ditch, construction of the sewer and position of the manholes, one of which interfered with the watercourse in the ditch. Mr. Tobin contended that both present and prospective damage had now to be assessed, as his client could not come before them again to make another claim. The easement would carry with it the substitution and repair of pipes and a right of way along the line of sewer and other privileges, and cited the case of Codack v. Somerville. Mr. Danger said if a sum for prospective damage was included in the award he would ask that it be mentioned separately, as in such an event he intended to state a case. The umpire and arbitrators visited the *locus in quo*. The umpire has since awarded the claimant the sum of 127*l.* 7*s.* 8*d.* and costs. No sum is included for prospective damage.

### COTTAGE SANITATION.

A MEETING of the Yorkshire Branch of the Sanitary Inspectors' Association was held in the town hall, Dewsbury, on Monday, the 10th inst. The subject discussed was cottage sanitation. Mr. Pridgin Teale, who presided, stated what had been done by the Royal Agricultural Society to have the subject properly dealt with in a pamphlet for public use in country places, and the part he himself, and others interested in sanitary science, had taken in preparing matter for the first and the second edition of that work. He said that one of their suggestions was that in rural places there ought to be committees formed, consisting in each of the squire, the clergyman, the non-conformist ministers and of other persons who took an interest in sanitation, and said a similar idea had been carried out in the formation of parish councils. Incidentally, he asked what was done in Dewsbury in the matter of back-to-back houses. He was told by the Mayor, and also by Alderman Kilburn, that such were prohibited being erected in Dewsbury, the latter, however, explaining how, by the construction of blocks of four cottages, cheap and yet sanitary dwellings could be built.

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The Mayor explained what had been done in Dewsbury to promote the health and well-being of the borough, mentioning especially the efficiency of the refuse destructor and of the sewage disposal works, and the excellence and magnitude of the public baths, which he stated were largely used, not only by people of the town, but those of the villages adjoining; the electric lighting and the waterworks were amongst the best in the country and had cost 334,374*l*.

### TUNNEL BETWEEN SCOTLAND AND IRELAND.

AT the quarterly meeting of the Belfast Chamber of Commerce on the 13th inst., Mr. James McConnell, one of the Belfast Harbour Commissioners, brought forward the subject of the proposed tunnel between Scotland and Ireland. He said:—It is held by the most eminent engineers that the scheme is quite feasible and practicable, and I believe there never was so favourable a time or opportunity as the present for enlisting the active support of the Government of this country. Mr. Arnold Forster, M.P., brought the matter very forcibly before the House of Commons two months ago, and obtained a promise from Mr. Balfour, the First Lord of the Treasury, that he would consult the President of the Board of Trade. The latter has expressed himself as not indisposed to carry the matter further. At present Mr. Forster is preparing a précis for Mr. Ritchie of the available facts and data connected with the enterprise. It is the duty of this Chamber to strengthen the hands of Mr. Forster, and to assist him to the utmost by bringing all the pressure possible on the Government to get them to undertake the trials without further delay. It is now nearly thirty years since Mr. L. L. M'Assey, B.L., C.E., brought before the public a scheme for making a tunnel from Tor Head to the Mull of Cantyre. Since then various schemes have been mooted, but of them all the best and most feasible are those of Messrs. Barton, of Dundalk, and Mr. McCullough, of Belfast. The scheme of Messrs. Barton is to connect Island Magee with Portobello, in Wigtownshire, some 26½ miles, by a tunnel. The greatest depth of water to be passed under would be 504 feet, with a ruling gradient of 1 in 75. The estimated cost of this is eight millions, some say ten millions. Their plan shows a sharp bend to avoid the deep part of the loch near the Scottish coast, but lengthens the tunnel by three miles. The other scheme is that of Mr. F. W. McCullough, C.E., of Belfast, which shows 23½ miles of sea tunnel, and land approaches 3½ miles. This

gives three miles less of sea and three miles less of land approach than Messrs. Barton's, but has a maximum depth of sea bottom of 650 feet, and ruling gradient of 1 in 52. The estimated cost of this is seven millions, some seven or eight millions. Both these schemes provide a double line of railway. We should take the advice so often given by prominent public men, and agitate. There cannot be two opinions as to the immense advantages, commercial and other, that would accrue to these countries, and especially to Ireland, through being united actually and practically by a tunnel, which would bring Belfast within four hours' railway of Glasgow, six and a half hours' of Leeds, and eleven hours' of London. The scheme—like the introduction of the railway system—would result in a vast increase of traffic and intercourse generally, and would by no means injure, but possibly help that by steamer. Belfast would gain largely by having not only English and Scottish buyers and visitors coming in vastly increased numbers. Legions of our American cousins would be induced to come our way, and possibly ere long the west of Ireland ports would be the terminal stations of the traffic between Europe and America. In addition to the improved and advantageous communication which the tunnel would secure between Europe and America, there would be, as has lately been pointed out in an article in the *Contemporary Review*, the benefits of having as an alternative to the existing overland route to India, Australia and the Far East, an equally expeditious route through British territory by this Irish route and British North America. The tunnel might not, commercially speaking, be a paying speculation, but as a scheme of great national importance the Government are well entitled to make this tunnel out of imperial funds, or to guarantee a fair interest on the cost. For, as was pointed out by Mr. McCrory at the Belfast town meeting in 1890, all the cost would be far more than compensated for by the Imperial and commercial advantages which it would bring. It is stated on good authority that the following statement in the *Nineteenth Century* for March is Lord Wolsey's:—"It is of great national importance that we should have the easiest possible means of communication between the two islands, and before we embark on any dangerous scheme for uniting us with France in the hope that increased means of communication between the two nations will reduce all hostility and enmity between them, let us try the experiment with Ireland. Let us try the effect of a tunnel on the Irish question, and see whether such a description of union might not be more successful in binding together the people of

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the two countries than was the political Union of 1800." I beg to move:—"That this Chamber believes the time has arrived when the Irish Channel Tunnel question should be vigorously pressed, and as it is of national importance the Chamber considers that the Government should arrange for having borings and soundings made in order to test its practicability, and that we should now appoint a committee which may send a deputation to wait on the President of the Board of Trade and Secretary of the Treasury to urge them to move in the matter at the earliest possible date."

The resolution was agreed to unanimously.

### PLUMBERS' REGISTRATION BILL.

THE Standing Committee on Trade have finally considered the Plumbers' Registration Bill.

On clause 11, which deals with the removal of names from the register for misconduct and the restoration thereof, incorporating for that purpose three sections of the Dentists' Act, Mr. Tomlinson, Mr. Samuel and Mr. Whittaker protested against this legislation by reference, Mr. Whittaker stating that it was ludicrous to expect a country plumber to master, not only this Bill, but an Act dealing with dentists. It was suggested that the sections referred to be incorporated in a schedule, but Mr. T. W. Russell said it was most unusual to do this, and he must decline to do it.

An amendment was made in this clause, on the motion of Mr. Ascroft, which enabled the Local Government Board to make orders as to their own costs, and as to the costs of successful party in any appeal to the Board against the removal of a name from the register. The clause as amended was then agreed to.

A discussion took place on clause 12 as to the qualification of persons who should be entitled without examination to be registered, and ultimately the committee agreed to the following definition:—"All persons who have been engaged wholly or partially in business as plumbers, or employers of plumbers in connection with the businesses of builders, ironmongers, sanitary engineers or other occupation of the like nature prior to March 1, 1892, who shall be entitled to be registered without examination under rules to be framed by the General Council, provided that no firm shall be entitled to be registered under this Act." The clause as amended was agreed to.

In the definition clause the following definitions were inserted:—"Master plumbers" means those employers of plumbers who have *bona fide* practised at the craft, or who have been registered by the Company prior to the passing of the Act; "operative plumbers" means those who have *bona fide* practised at the craft, or are practising, or who have been registered by the Company prior to the passing of this Act.

On the motion of Mr. T. W. Russell, the committee inserted a code of rules dealing with the election of members of the General Council.

The schedules having been dealt with, the Bill as amended was ordered to be reported to the House.

### SCIENCE AND ART GRANTS.

THE report of the committee appointed by the Duke of Devonshire, President of the Council, to inquire into the distribution of Science and Art grants, has been issued, together with a revised edition of the Science and Art Directory embodying the recommendations of the committee, as a Blue-book. The committee consisted of Sir J. Gorst, M.P. (chairman), Lord Balfour, Mrs. Sidgwick, Major-General Sir J. Donnelly, Sir H. Roscoe, Mr. G. L. Ryder, C.B., Professor Jebb, M.P., Mr. W. Armstrong and Captain W. de W. Abney, C.B. (who acted as secretary); and the order of reference includes sub-head D. of the Science and Art Vote and that part of the sub-head G. of the same vote which dealt with the payment for drawing and manual instruction in elementary schools. The combined grants referred to the committee now exceed 500,000/., and are increasing. The committee have had before them the report of the Secondary Education Commission and the evidence taken; also statements and suggestions from various educational bodies; and as a result of their investigation and deliberations they have revised the regulations in the directory which govern the grants made by the Science and Art Department.

The most important changes recommended may be given. Under the head of the "Management of Schools and Classes" the committee have inserted in the directory the following clause, which is founded upon a recommendation of the Royal Commission:—"In counties and county boroughs in England possessing an organisation for the promotion of secondary education, the authority so constituted may notify its willingness to be responsible for the science and art instruction within its area. In such case while the rights of the managers of

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existing schools and classes will be preserved, no managers of a new school or class will, except under special circumstances, be recognised unless they are responsible to such authority. In Wales the intermediate education authority is for this purpose regarded as the authority for the promotion of secondary education." This recognition of local authorities as those who should be responsible for secondary education will, in the opinion of the committee, simplify the work of central administration, secure greater efficiency in the schools, and be a protection against their undue competition and multiplication. As to "Literary Instruction" the Royal Commission, in dealing with the grants made by the Science and Art Department, stated that in order to meet the new conditions the Department needed to be more liberal in its recognition of literary subjects and to feel that they were essential to education and not alien to science. The committee have inclined to this view and in order to give a stimulus to students in evening science and art classes in England to improve their general education and to encourage the study of languages and literary and economic subjects they recommend that where any *bona-fide* student of these classes desires such instruction a grant should, under somewhat stringent conditions, be made on his behalf to classes held by University extension authorities. This, it is thought, will meet the objection that the science and art grants tend to encourage a one-sided education, while it is improbable that it will ever absorb more than an infinitesimal portion of the grants.

Hitherto it has been laid down that no payments can be made on account of students whose means do not come within certain categories. Such restrictions, the committee state, have been abolished in the case of elementary education as inflicting an undesirable stigma upon those whose education is assisted by the State, and they recommend the abolition of all restrictions of this kind, but to prevent abuse they have added a regulation that schools in receipt of payments must be "approved by the Department as suitable in character and financial position to receive aid from public funds." With the same object it is proposed to abolish the restrictions placed on persons eligible to hold certain scholarships and exhibitions, but a provision has been added that "the Department may refuse to fill them with persons whose circumstances do not appear to warrant such aid." With reference to drawing and manual instruction in elementary schools the committee recommend that the administration of the grant should be transferred in England and Wales and in Scotland to the English and Scotch Education Departments respectively. This is based on the grounds

that all the instruction in an elementary school should be under the same administration and inspection, and that in England and Wales drawing is a compulsory class subject.

All the members of the committee sign the report, Mr. G. L. Ryder (of the Treasury) adding the reservation that he was obliged to withhold his assent from that part relating to literary instruction as being apparently outside the terms of the order of reference.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

10929. Philip Louis Renouf, for "Improvements in and connected with the building of tubular frames."

10942. James Joseph Dixon, for "Window-locking attachment."

10953. Francis Johnson, for "Improvements in machinery for pressing bricks and other blocks."

10984. Percy Hubbard, for "An improved catch or fastening for doors, flaps, shutters and the like."

10991. Arthur Wakefield, for "Improvements in and relating to the joining of stoneware and other like pipes."

10993. Elemér Muranyi, for "Improvements in hinges for doors, windows and the like."

11011. Odelia Hitchen, for "Improvements in window-washers."

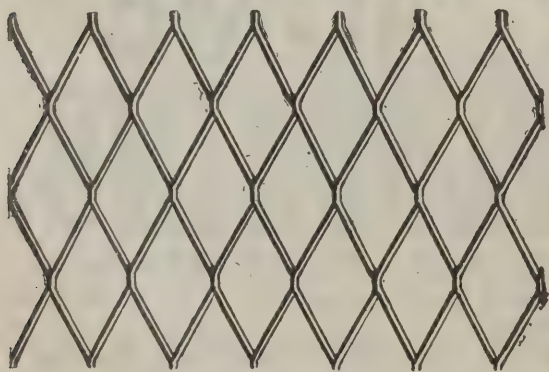
11050. James Miller Robb, for "Improvements in door-handles."

11069. Thomas Watson, for "Improvements in roofs or coverings for brick kilns."

11093. William David, for "Improvements in sash-fasteners."

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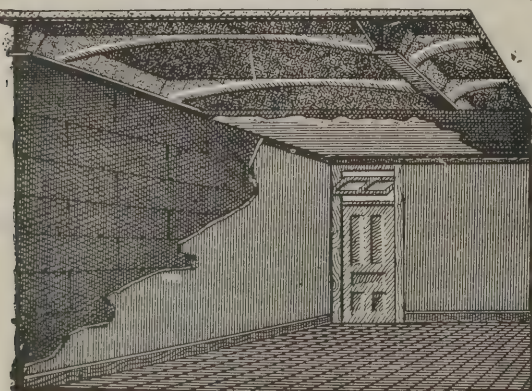
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## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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## COMPETITIONS OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l.* Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

MORECAMBE.—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000*l.*, at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

## CONTRACTS OPEN.

ABERDARE.—For building a new dormitory and dayroom at the training school. Mr. Thomas Roderick, architect, Ashbrook House, Clifton Street, Aberdare.

ADDLESTONE.—For addition to present collegiate building and erection of a small church, St. George's College, Addlestone.

ASHTON-IN-MAKERFIELD.—June 4.—For erection of buildings and sheds at dépôt, Bryn Street. Mr. John W. Liversedge, surveyor.

ASHTON-UNDER-LYNE.—For erection of one house in Grafton Street, and three houses in Currier Lane, and altera-

tion of two cottages. Messrs. Thomas George & Son, architects, Old Square, Ashton-under-Lyne.

ASHTON-UNDER-LYNE.—For erection of spinning sheds in connection with Oxford Mills. Mr. T. D. Lindley, architect and surveyor, Ashton-under-Lyne.

ASKAM-IN-FURNESS.—June 15.—For building a new classroom at the Ireleth School. Rev. J. A. Roberts, Ireleth Vicarage, Askam-in-Furness.

BALHAM.—June 8.—For erection of a branch library in Ramsden Road. Mr. Sydney R. J. Smith, architect, 14 and 15 York Buildings, Adelphi, W.C.

BARNSELY.—June 5.—For erection of a mission church in Farrar Street. Messrs. Hemsoll & Paterson, architects, 18 Norfolk Row, Sheffield.

BARTON-ON-HUMBER.—June 1.—For alterations and additions to St. Peter's Church. Mr. Horatio R. Dix, solicitor, Barton-on-Humber.

BELFAST.—June 10.—For erection of buildings at Donegall Square West and Wellington Place. Messrs. Stokes & Ferguson, 35 Royal Avenue.

BOURNE FEN.—June 1.—For construction and erection of a pair of pointing doors, together with the necessary abutments and wings, at Tongue End, on the Bourne Eau, in Bourne Fen. Mr. Herbert Clarke, surveyor to the Commissioners, Boston.

BRADFORD.—For taking-down mill premises, off Leeds Road. Mr. Fred Holland, engineer and architect, 11 Parkinson's Chambers, Hustlergate, Bradford.

BRIDPORT.—June 5.—For erection of an infectious disease hospital, caretaker's cottage, laundry, mortuary, and other works at North Allington. Mr. F. Cooper, borough surveyor.

BURNLEY.—For erection of two houses, Scott Park Road. Mr. Geo. Farrer, Nicholas Street, Burnley.

CANTERBURY.—June 3.—For erection of proposed buildings in Northgate Street. Mr. W. J. Jennings, architect, 4 St. Margaret Street, Canterbury.

CARDIFF.—June 3.—For erection of buildings for the girls' intermediate school in the Parade, Cardiff. Mr. Geo. Thomas, architect, Queen's Chambers, Cardiff.

CHAPEL-EN-LE-FRITH.—June 5.—For erection of new Board-room and receiving wards and other work at the workhouse. Messrs. Garlick & Flint, architects, 5 Terrace Road, Buxton.

CHELL.—For additions to the workhouse. Mr. W. H. Walley, architect, Burslem.

CHESHUNT.—For building three villas and offices at Cheshunt. Mr. James Bunce, Turners Hill, Cheshunt.

CHESTER-LE-STREET.—May 31.—For building sixteen houses and branch store shop (brick) at Co-operative Villas, Beamish. Mr. T. E. Crossling, architect, Front Street, Stanley, R.S.O.

COVENTRY.—May 31.—For erection of tables, seats, &c., in the Market Hall, for the dinner to be given to old people on June 22. Mr. E. J. Purnell, C.E., city surveyor, St. Mary's Hall, Coventry.

CUMBERLAND.—June 1.—For building a villa residence at St. Bees. Messrs. Moffat & Bentley, architects and surveyors, Whitehaven.

DEVON.—May 31.—For erection of a dwelling-house at Bradstone Mill. Messrs. Wise & Wise, architects, Launceston.

DROGHEDA.—June 1.—For erection of six workmen's houses on plot of ground at junction of Francis Street and Scarlet Street. Mr. Peter Connolly, town clerk.

DURHAM.—May 31.—For the enlargement of two classrooms at Crook Boys' School, Crook. Mr. Ralph Dixon, clerk of the School Board, Crook.

EGHAM.—June 12.—For pulling-down and rebuilding part of the Catherine Wheel Hotel, Egham. Mr. William Menzies, Englefield Green, Surrey.

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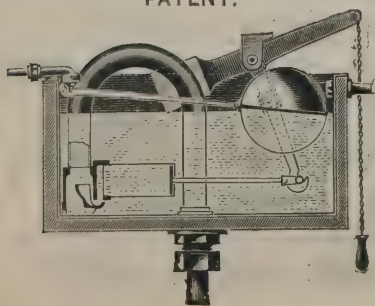
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FARINGDON.—June 5.—For erection of a post-office at Faringdon, Berks. Messrs. William Drew & Sons, architects and surveyors, 22 Victoria Street, Swindon.

FEATHERSTONE.—June 1.—For erection of two houses and shops in Green Lane. Mr. W. Hamilton Fearnley, architect, Station Lane, Featherstone.

FILEY.—May 31.—For erection of offices, stables, fire-engine station and depot. Messrs. F. A. & S. Tugwell, architects, 102 Westborough, Scarborough.

FOLKESTONE.—June 9.—For supply of desks and other apparatus to the new Board schools, Sidney Street. Mr. Ernest S. Wilks, architect, 2 Cheriton Place, Folkestone.

FOXFORD.—June 12.—For erection of a glebe house and offices, &c., at Foxford, co. Mayo. Mr. J. Gervais Skipton, architect, Northgate Street, Athlone.

GLAISDALE.—June 5.—For erection of school buildings and master's house at Glaisdale. Mr. Edward H. Smales, architect and surveyor, 5 Flowergate, Whitby.

GLOUCESTER.—June 8.—For new works at the Gloucester Municipal Technical Schools, Brunswick Road. Messrs. Waller & Son, architects, 17 College Green, Gloucester.

HALIFAX.—June 9.—For erection of three pairs of semi-detached villa residences at Savile Park. Mr. Medley Hall, architect, &c., 29 Northgate, Halifax.

HANLEY.—May 31.—For new shop fronts to Market Terrace Buildings. Mr. Joseph Lobley, engineer and surveyor, Town Hall, Hanley.

HANDSWORTH.—June 2.—For erection of lodge, boat-house and conveniences at Victoria Park. Mr. E. Kenworthy, surveyor, Council House, Handsworth.

HASTINGS.—June 1.—For building new schoolroom for infants at the Pett National School. The Rector, Pett Rectory.

HASTINGS.—May 31.—For erection of girls and infants' departments, Priory Road School, West Hill. Mr. Frank H. Humphreys, architect, 6 Trinity Street, Hastings.

HAVERTON HILL.—June 2.—For erection of engine-shed, coaling stage, &c. Mr. William Bell, architect, York.

HENGOED.—June 4.—For erection of council offices. Mr. P. V. Jones, architect, Wood View, Hengoed.

HIGH SPEN.—June 2.—For erection of a house, &c. Mr. J. R. Stewart, High Spen.

HORWICH.—June 3.—For erection of a Primitive Methodist Chapel. Mr. W. H. Dinsley, architect, Chorley.

HUCKNALL TORKARD.—June 3.—For erection of a block of schools for boys, &c., in Spring Street. Mr. Albert N. Bromley's Office, Prudential Buildings, Nottingham.

HULL.—For additions to Stepney paper mills. Mr. T. Brownlow Thompson, architect, 15 Parliament Street, Hull.

ILKESTON.—For erection of new schools in Regent Street. Mr. James Hart, architect, Corby, Grantham.

IRELAND.—June 8.—For erection of thirteen cottages for agricultural labourers. Mr. J. E. Sharkie, executive sanitary officer, Poor-Law Office, Strabane.

IRELAND.—June 5.—For works required to finish church at Aughebrack. Mr. E. J. Toye, architect, Strand, Derry.

IRELAND.—June 3.—For building chancel, &c. Mr. Geo. Leo. W. Blount, architect, Hampton Terrace, Lisburn Road, Belfast.

KEIGHLEY.—June 1.—For erection of a nurses' home at the infirmary, Fell Lane. Messrs. John Judson & Moore, architects, York Chambers, Cavendish Street, Keighley.

KILKENNY.—For alterations and additions to the Royal Oak, Upper John Street. Mr. James Byrne, C.E., borough surveyor, Carlow.

KIPPAX.—For erection of boys' school. Messrs. Bromet & Thorman, architects, Tadcaster.

KNUTSFORD.—June 2.—For alterations and additions to the hospital at the workhouse. Mr. Robert J. McBeath, architect, Birnam House, Sale, near Manchester.

LANCHESTER.—June 2.—For alterations and additions to the infirmary at the workhouse. Mr. J. Wm. Rounthwaite, architect, 13 Mosley Street, Newcastle-on-Tyne.

LEVENSHULME.—May 31.—For erection of new council offices, stables, &c., at Levenshulme. Mr. James Jepson, architect, Union Road, Stockport.

LIMERICK.—June 1.—For building a rectory for the parish of St. Munchin's. Mr. Robert Fogerty, architect, Henry Street.

LINCOLN.—For additions and alterations at Bracebridge Asylum, near Lincoln. Mr. F. H. Goddard, architect, Lincoln.

LLANGOLLEN.—June 4.—For additions and alterations to Llangollen Board Schools, and for fencing, &c. Mr. L. Lloyd John, solicitor, Corwen.

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LONDON.—May 31.—For erection of workmen's dwellings (108 houses) at Nightingale Lane, Hornsey. Mr. E. J. Lovegrove, C.E., engineer, Southwood Lane, Highgate.

LONDON.—May 31.—For erection of stable building, children's lavatory, entrance gate, piers and dwarf fence-wall at the Paddington recreation ground. Mr. George Weston, Vestry Hall, Harrow Road, W.

LONDON.—June 1.—For construction of underground conveniences for both sexes in Upper and Lower Thames Streets. Mr. H. Montague Bates, principal clerk to the Commissioners, Guildhall.

LONDON.—For building 117 cottages. Mr. F. Watts, 27 Lordship Lane, Tottenham.

LONDON.—June 14.—For erection of a greenhouse at Irish Corner, Muswell Hill, 60 feet by 12 feet. Mr. E. J. Lovegrove, C.E., engineer to the Hornsey Urban District Council, 99 Southwood Lane, Highgate, N.

LONDONDERRY.—June 5.—For building new library, recreation hall and baths at the college. Mr. Edward J. Toye, architect, Strand, Derry.

LONDONDERRY.—June 3.—For erection of new premises at Ferryquay Gate, Derry. Mr. T. Johnston, architect, 11 East Wall, Londonderry.

MANCHESTER.—June 2.—For erection of ten cottages and five farmsteads with outbuildings, and also for the supply of a five-ton locomotive steam crane. Mr. R. D. Callison, Town Hall, Manchester.

MONMOUTH.—May 31.—For enlarging the cloak-room at Glendower Street School. Mr. John W. Rodger, quantity surveyor, 14 High Street, Cardiff.

MORECAMBE.—June 7.—For erection of a brick chimney 129 feet in height, engine and boiler-houses, and other offices for generating station of the electric-light works. Mr. John Bond, surveyor, Council Offices, Morecambe.

MORLEY.—June 17.—For erection of Primitive Methodist chapel, Bridge Street. Mr. T. A. Buttery, architect, Queen Street, Morley.

NORFOLK.—May 31.—For erection of a boiler and exhaust-house, sheds over purifiers, and oxide floor and other work, for the Cromer Gas and Coke Company, Limited. Mr. Percy Griffith, engineer, 55 Parliament Street, Westminster, S.W.

NORFOLK.—For reflooring and altering the seating of the parish church of Terrington St. Clement. Messrs. Hicks & Charlewood, architects, 42 Grainger Street, Newcastle-on-Tyne.

OTLEY.—For pointing the spire at the Otley Cemetery. Particulars may be had from the Curator.

PETERBOROUGH.—For erection of a new entrance to the Agricultural Show, Peterborough. Mr. J. G. Stallebrass, architect, North Street, Peterborough.

PETERBOROUGH.—For erection of seven houses at Farcet. Mr. F. H. Cooke, surveyor, Peterborough.

PONTYPOOL.—May 31.—For erection of a partition and laying of wood block floors at the Abersychan Board Schools, for the Trevelthick School Board. Messrs. Lansdowne & Griggs, architects, Newport, Mon.

POOLE.—For erection of two semi-detached villas. Mr. A. Wyatt, 97 High Street, Poole.

PUDSEY.—May 31.—For erection of Primrose Hill Board School. Messrs. Paterson & Lawson, architects, 1 Bank Street, Bradford.

SCOTLAND.—June 19.—For building thirty-six dwelling-houses. Mr. Robert M'Lelland, architect, Motherwell Road, Bellshill.

SCOTLAND.—June 5.—For building a school house at Bridge of Orchy. Mr. Kenneth MacRae, 5 Argyll Street, Oban.

SILLOTH.—June 8.—For erection of a concrete wall and apron, about 200 yards in length, near East Cote. Mr. Robert Stubbs, surveyor, Abbey Town, Carlisle.

SOUTHAMPTON.—June 8.—For constructing a public convenience in the High Street, near the Town Quay. Mr. George B. Nalder, town clerk, Municipal Offices, Southampton.

ST. LEONARDS-ON-SEA.—May 31.—For erection of a school for infants at Bopeep. Messrs. Elworthy & Son, architects, London Road St. Leonards.

THRAPSTON.—For construction of two brick culverts (one in Chelveston and one in Clapton parish). Mr. George Siddons, surveyor, Thrapston.

TREGERRICK.—June 2.—For erection of a piggery at Tregerrick, in the parish of Merther. Mr. George Gow, Tregothnan Office, Truro.

WAKEFIELD.—For reseating, &c., Congregational chapel at Flanshaw, near Wakefield. Mr. Abraham Hart, architect, 21 Barstow Square, Wakefield.

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WHITLEY.—For erection of eight ten-roomed houses. Mr. J. Burnip, 1 South Parade, Whitley.

WHITEHAVEN.—June 9.—For erection of new post-office, Whitehaven. Mr. J. G. Dees, Somerset House, Whitehaven.

WITTON GILBERT.—For erection and completion of eight houses. Mr. Hunter, Three Tuns Inn, Witton Gilbert.

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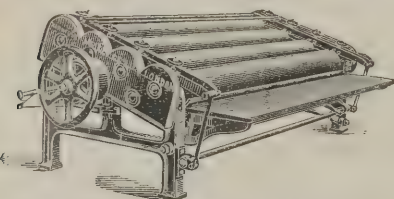
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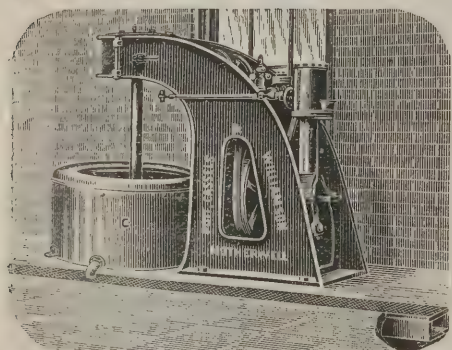
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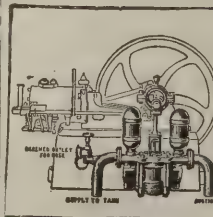
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R. WOOD, Bingley ( <i>accepted</i> )	774	17	6

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J. BLAKEBOROUGH & SONS, Brighouse (*accepted*) 110 11 3

**HUDDERSFIELD.**

For erection of boundary walls (1,150 feet long by 8 feet high) at Crossland Moor. Messrs. JOHN KIRK & SONS, architects, Huddersfield.

A. & T. HAIGH, Golcar (*accepted*).

**HUDDERSFIELD—continued.**

For erection of a shed, raising the packing shop, and other extensive alterations at Meltham Mills. Messrs. JOHN KIRK & SONS, architects, Huddersfield.

*Accepted tenders.*

J. Bottomley & Sons, mason.  
J. Blakeley & Sons, joiner.  
W. E. Jowitt, plasterer and slater.  
J. W. Kaye, plumber.  
A. Jackson, painter.  
H. Brook & Co. ironfounder.

For erection of two houses, Mount, Longwood. Mr. J. BERRY, architect, Queen Street, Huddersfield.

*Accepted tenders.*

Barrett & Harrison, Hoyle House, Linthwaite, mason.  
Taylor & Bowker, joiner.  
C. Dyson, plumber.  
S. Collins & Sons, plasterer and painter.  
J. Robinson & Son, slater.

Total, £550.

**ILFORD.**

For erection of new retort-house and coal store at gasworks.

Mr. PERCY GRIFFITH, engineer.

Gregar & Sons	£3,535	0	0
F. Willmott	3,288	0	0
J. S. Hammond	3,129	0	0
W. WATSON, Ilford ( <i>accepted</i> )	2,945	0	0

For erection of seven arches and three settings of retorts, condenser, two steel boilers, &c., at gasworks. Mr. PERCY GRIFFITH, engineer.

Newton, Chambers & Co., Limited	£2,470	0	0
S. Cutler & Sons	2,417	0	0
Ball & Hardy	2,371	0	0

**IRELAND.**

For erection at the workhouse of baths, lavatories, laundry and drying-room appliances, &c. Mr. L. A. MACDONNELL, architect, 1 Clare Street, Dublin.

HODGES & SONS, 16 Westmoreland Street, Dublin (*accepted*) £855 8 7

For erection of a dispensary house at Ballynoe.

D. Daly	£339	0	0
J. O'Keefe	311	0	0
D. Creedon	295	0	0
M. O'NEIL, Ballynoe ( <i>accepted</i> )	270	0	0

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**LANCASTER.**

For wrought-iron principals and galvanised-iron roof, 60 feet by 30 feet, for the streets committee.  
WALKER BROS., Walsall (*accepted*).

**LONDON.**

For alterations to the King's Arms public-house, Mile End Road, E. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, London, E.C.  
THOMAS OSBORN & SONS (*accepted*) . . . £1,750 0 0

**LONDON SCHOOL BOARD.**

For exterior painting, Lyndhurst Grove.

T. Hooper . . . . .	£225	0	0
H. Line . . . . .	222	0	0
J. F. Ford . . . . .	163	0	0
W. V. Goad . . . . .	149	0	0
E. Triggs . . . . .	145	0	0
H. Mallet . . . . .	140	0	0
Johnson & Co. . . . .	133	0	0
H. Somerford & Son . . . . .	121	0	0
J. Garrett & Son . . . . .	120	0	0
RICE & SON ( <i>accepted</i> ) . . . . .	119	0	0

For exterior painting, Oban Street.

T. H. Jackson . . . . .	£525	0	0
D. Gibb & Co. . . . .	338	0	0
J. T. Robey . . . . .	310	0	0
J. Kybett . . . . .	271	0	0
S. H. Corfield . . . . .	269	0	0
A. W. Derby . . . . .	265	0	0
C. W. WALES ( <i>accepted</i> ) . . . . .	261	0	0
J. T. Holliday . . . . .	255	10	0

For painting exterior, St. Clement's Road.

S. H. Sealey . . . . .	£225	0	0
R. E. Williams & Sons . . . . .	149	10	0
G. Neal . . . . .	135	0	0
C. Gurling . . . . .	119	0	0
E. T. Folley . . . . .	97	0	0
W. Brown . . . . .	94	0	0
E. Flood . . . . .	90	0	0
F. T. Chinchin . . . . .	80	0	0
W. Chappell . . . . .	72	10	0
W. R. & A. HIDE ( <i>accepted</i> ) . . . . .	71	16	0

**LONDON SCHOOL BOARD—continued.**

For exterior painting, Boundary Lane.

J. F. Ford . . . . .	£374	0	0
T. Hooper . . . . .	325	0	0
H. J. Williams . . . . .	315	0	0
W. V. Goad . . . . .	298	0	0
Johnson & Co. . . . .	296	0	0
Holliday & Greenwood . . . . .	239	0	0
E. B. TUCKER ( <i>accepted</i> ) . . . . .	228	0	0

**LONDONDERRY.**

For erection of dwelling-house at Argyle Street. Mr. T. JOHNSTON, architect, 11 East Wall, Derry.

J. Goligher & Co. . . . .	£166	12	6
J. A. Fulton . . . . .	165	0	0
R. Coulhoun . . . . .	158	0	0
A. Dunlop . . . . .	148	0	0
W. J. MAULTSAID, Rosemount ( <i>accepted</i> ) . . . . .	137	10	0

**MAIDSTONE.**

For levelling, paving, metalling, flagging, kerbing, channelling, &c., of Campbell Street, Maidstone. Mr. T. F. BUNTING, borough surveyor.

M. Batchelor . . . . .	£366	0	0
J. Bridge . . . . .	322	0	0
W. J. LOGAN, Maidstone ( <i>accepted</i> ) . . . . .	297	10	0

**NEWBURY.**

For erection of a billiard-room, bathrooms, &c., at the premises of the Guildhall Club. Mr. WALTER HENRY BELL, architect, Market Place, Newbury.

E. & H. James, Newbury . . . . .	£330	0	0
G. Elms & Sons, Newbury . . . . .	319	0	0

**PAIGNTON.**

For villa residence, Dartmouth Road, for Messrs. Bridgman & Bridgman. Messrs. NORMAN G. BRIDGMAN & WALTER H. BRIDGMAN, architects, of Torquay, Paignton, and Teignmouth. Quantities by Mr. VINCENT CATTERMOLLE BROWN, of Paignton.

E. Westlake . . . . .	£660	0	0
R. Harris . . . . .	620	0	0
G. Webber & Maunder . . . . .	600	0	0
H. WEBBER & SONS ( <i>accepted</i> ) . . . . .	589	0	0

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## OMAGH.

For supplying and fitting-up steam cooking and laundry appliances at the workhouse.

J. O'NEILL & Co., Georges Street (*accepted*) . £296 16 6

For erection of labourers' cottages.

J. CAMPBELL, Lisnamallard (*accepted*) . . . £223 0 0

## PORT TALBOT.

For erection of offices, for the Port Talbot Railway and Docks Company. Mr. FRANK B. SMITH, architect, Port Talbot.

Leverton Bros. . . . . £2,290 14 6

M. Cox . . . . . 2,285 0 0

S. Rees . . . . . 2,268 0 0

T. Jenkins . . . . . 2,256 14 0

G. & F. Gaen . . . . . 2,150 0 0

D. Davies . . . . . 2,095 0 0

J. DAVIES, Aberavon (*accepted*) . . . . . 2,080 0 0

Walters & Jons . . . . . 1,970 0 0

## PUDSEY.

For erection of a shed. Mr. T. LEADLEY, architect, 3 Coleridge Place, Bradford.

*Accepted tenders.*

F. S. Sowden, mason, carpenter and joiner.

J. Neal, plumber.

T. Pickles, plasterer.

T. Nelson, slater.

Roberts & Co., ironfounder.

Total, £552 8s. 11d.

## ROTHERHITHE.

For repairing, painting, distemping, whitewashing, &c., the interior, and repairing and painting the exterior of the infirmary, Lower Road. Messrs. NEWMAN & NEWMAN, architects, 31 Tooley Street, London Bridge, S.E.

J. Bullers, repairing, &c., infirmary.

M. Marshall, oak fencing.

W. Marshall, demolition of old workhouse.

## ROYTON.

For new chapel and Sunday school, for the Primitive Methodists. Mr. HENRY HARPER, architect, Market Place, Nottingham.

E. Whittaker . . . . . £2,700 0 0

J. J. D. Blunn . . . . . 2,625 0 0

W. Whittaker . . . . . 2,520 0 0

J. W. KENT (*accepted*) . . . . . 2,500 0 0

## RYTON-ON-TYNE.

For the widening of Stargate Lane, near Runhead. Mr. JOHN P. DALTON, engineer and surveyor.

M. A. Armstrong . . . . . £319 17 0

G. T. Manners . . . . . 288 0 0

B. Bahe . . . . . 263 4 7

J. Robson . . . . . 255 1 11

W. Sproat . . . . . 251 0 0

A. Tench . . . . . 241 19 2

J. Wardlaw . . . . . 219 6 9

W. CUMMINGS, Gateshead (*accepted*) . . . . . 194 15 2

Engineer's estimate . . . . . 226 9 2

## SAFFRON WALDEN.

For tar paving and other work in connection with the improvement of the footpath in High Street. Mr. G. WILLIAM LACEY, borough surveyor.

Glover, Sheppard & Co. . . . . £164 11 2

H. McCarthy . . . . . 145 15 7

A. C. W. HOBMAN & Co., South Bermondsey

(*accepted*) . . . . . 154 0 0

## SHOREDITCH.

For the following works:—(Contract No. 7) the construction of about 350 lineal feet of 12-inch pipe sewer in Anning Street; (Contract No. 8) the construction of about 256 lineal feet of 15-inch pipe sewer in New North Place, and about 277 lineal feet of 12-inch and 180 lineal feet of 9-inch pipe sewer at the rear of Granville Buildings, Luke Street; (Contract No. 9) the construction of about 100 lineal feet of 12-inch pipe sewer in Felton Street, and 294 lineal feet of 9-inch pipe in Felton Street and Holt Place; (Contract No. 10) the construction of about 370 lineal feet of 12-inch and 410 lineal feet of 9-inch pipe sewers in Long Street and Caesar Street. Mr. I. RUSH DIXON, surveyor.

E. Parry . . . . . £3,336 16 4

H. T. Cox . . . . . 3,114 19 1

F. Jackson & Son . . . . . 2,908 0 5

Pedrette & Co. . . . . 2,545 13 5

T. Adams . . . . . 2,293 19 3

Killingback & Co. . . . . 1,940 5 8

J. JACKSON, Plaistow (*accepted*) . . . . . 1,878 12 11

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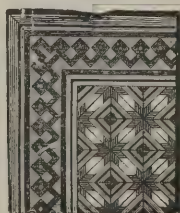


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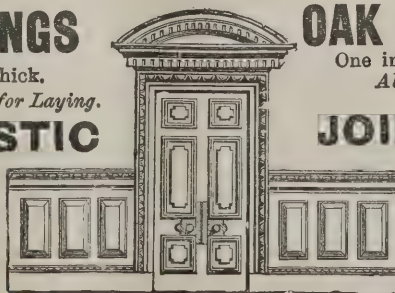


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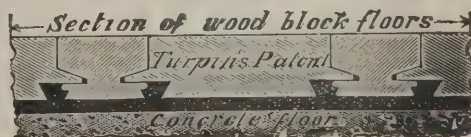
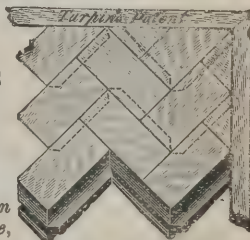
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## SOUTH SHIELDS.

For erection of new wards and making extensions to the Ingham Infirmary, Westoe, South Shields. Mr. HENRY GRIEVES, architect, Albany Chambers, South Shields. Quantities by Mr. J. SAVAGE, Newcastle.  
GOODWIN & SON, South Shields (*accepted*) . £5,928 0 0

## STAFFORD.

For alterations to the pumping machinery at Milford. Mr. W. BLACKSHAW, borough engineer.

THORNEWALL & WARHAM (*accepted*) . £1,980 0 0

For construction of a 9-inch sewer along the Oval, Lichfield Road, also for a 3-inch cast-iron water-main under the road. Mr. W. BLACKSHAW, borough engineer.

*Accepted tenders.*

C. J. Nevitt, Stafford, sewer £81 7s. 6d.; water-main £42 7s.

For additions to pumping station at Milford. Mr. W. BLACKSHAW, borough engineer.

*Accepted tenders.*

G. Newton, bricks.

H. Venables, timber.

W. Ward, stone.

All per schedule of prices.

## STOCKPORT.

For painting of iron railings, &c., at Hollywood Park. Mr. JOHN ATKINSON, borough engineer.

Longson & McFagin . £70 0 0

E. Fantom . 48 0 0

W. Fantom . 46 0 0

For erection of two-horse stable and cart-shed in Vernon Park.

Mr. JOHN ATKINSON, borough surveyor.

W. C. Broadhurst & Co. . £160 0 0

T. Hoe . 159 8 0

J. & J. LEE, Wellington Road South (*accepted*) . 140 0 0

## SWINDON.

For sewerage, metalling, channelling and finishing the back road between Temple Street and Morley Street. Mr. H. J. HAMP, surveyor.

Free & Sons . £72 12 9

J. WILLIAMS, Bath Road, Swindon (*accepted*) . 54 9 0

## STONEHAVEN.

For additions to episcopal schools. Mr. J. AUGUSTUS SOUTTAR, architect, 42 Union Street, Aberdeen. Quantities by architect.

*Accepted tenders.*

W. Smith & Co., mason . £263 15 0

R. Mitchell & Son, carpenter . 139 3 0

A. Cormack, plasterer . 32 6 11

E. Pithie, plumber . 27 10 0

C. Maitland, slater . 26 17 8

Barron & Son, painter and glazier . 14 18 0

## STRETTFORD.

For erection of steam laundry buildings; Chester Road. Messrs. JOHNSTONE BROS., architects, 30 Lowther Street, Carlisle.

T. & W. Meadows . £5,792 19 1

Bentley, Son & Partington . 5,525 0 0

C. Braddock . 4,815 17 6

Burgess & Galt . 4,438 0 0

J. & J. Lee . 4,420 0 0

J. Byron . 4,341 0 0

BLANCHARD BROS., Southport (*accepted*) . 3,980 0 0

## THRAPSTON.

For laying on of a water supply to market. Mr. JNO. M. SIDDONS, surveyor, Oundle.

Freeman & Son . £192 0 0

C. PETTIT, Thrapston (*accepted*) . 185 0 0

## WALSALL.

For re-erection of boundary wall in Vicarage Place. Messrs. BAILEY & McCONNAL, architects, Bridge Street, Walsall.

J. Mallin . £195 0 0

A. T. Broster . 192 9 0

A. Lynex . 180 0 0

W. Wistance . 175 0 0

## WINSFORD.

For alterations and structural fittings, repairs and other works connected with High Street Schools.

J. Fowles & Sons . £312 0 0

Dickenson, Cooper & Johnson . 267 12 6

J. WILSON, Ways' Green (*accepted*) . 257 0 0

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LONDON FEVER HOSPITAL (Nurses' Home),  
BANSTEAD ASYLUM (L.C.C.),  
ROYAL ASCOT GOLF CLUB,  
PIONEER CLUB,

TUNBRIDGE WELLS GOLF CLUB,  
DULWICH COLLEGE,  
HOXTON HOUSE ASYLUM,  
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## ILLUSTRATIONS.

SHEFFIELD MUNICIPAL BUILDINGS.—TOWER AND MAIN ENTRANCE FROM GROUND LEVEL.—WEST FRONT AND MAIN ENTRANCE.—DOORWAY AND COLUMNS IN DINING HALL.

CATHEDRAL SERIES.—NORWICH: EXTERIOR, SHOWING APSIDAL CHAPEL.—EXTERIOR, SHOWING BUTTRESSES ETC.

## TRADE NOTES.

A REREDOS of Caen stone and alabaster has just been erected in Finstall Church, near Bromsgrove, to the memory of the late Rev. J. H. Bainbrigg. It consists of three arcades with gable tops supported by pillars of green marble; the centre panel has a large figure of Our Saviour as the "Good Shepherd," and the two side ones the Alpha and Omega, with floriated decoration. The work has been successfully carried out by Messrs. Jones & Willis, 79 Edmund Street, Birmingham.

MESSRS. PARKERS', LIMITED, of Conybere Street and Corporation Street, Birmingham, have secured a large contract for furniture for wards and nurses' home for the new General Hospital. Messrs. Parkers' machinery and plant are eminently suited to work of this character, especially as the time allowed for completion of the contract is only six weeks.

MESSRS. HOLLIS BROS. & Co., Leicester and Hull, are well known among architects and contractors between Newcastle and London for their high-class mouldings, and the quality and durability of their wood-block flooring. In the latter branch men of long experience are employed in the work of laying, and great satisfaction has been given in important work. The firm have now commenced on a new mill in Hull, which will be in every way up to date. One special feature will be the provision made for drying timber. They are adopting the latest American system of kiln—a most important matter in connection with all high-class woodwork. Shrinkage is practically obviated by this method. With the additional mill accommodation they hope to keep pace with their increasing business. They are now supplying what they describe as their "sesame" doors. Mouldings are worked on the solid, grooved and tongued to receive panels and rails, &c. This is a great departure from the usual method of construction, and has been already highly approved by leading architects. The system has been for years largely adopted on the Continent.

The firm have now in the press their new moulding book of special designs, which it is intended shall be in the forefront of such publications.

MESSRS. JOHN HALL & Co., of Stourbridge, inform us that they supplied the bulk of the glazed bricks used in the construction of the Blackwall Tunnel.

THE new union infirmary, Portsmouth, is being warmed and ventilated throughout by means of Shorland's patent Manchester stoves with descending smoke-flues and patent Manchester grates.

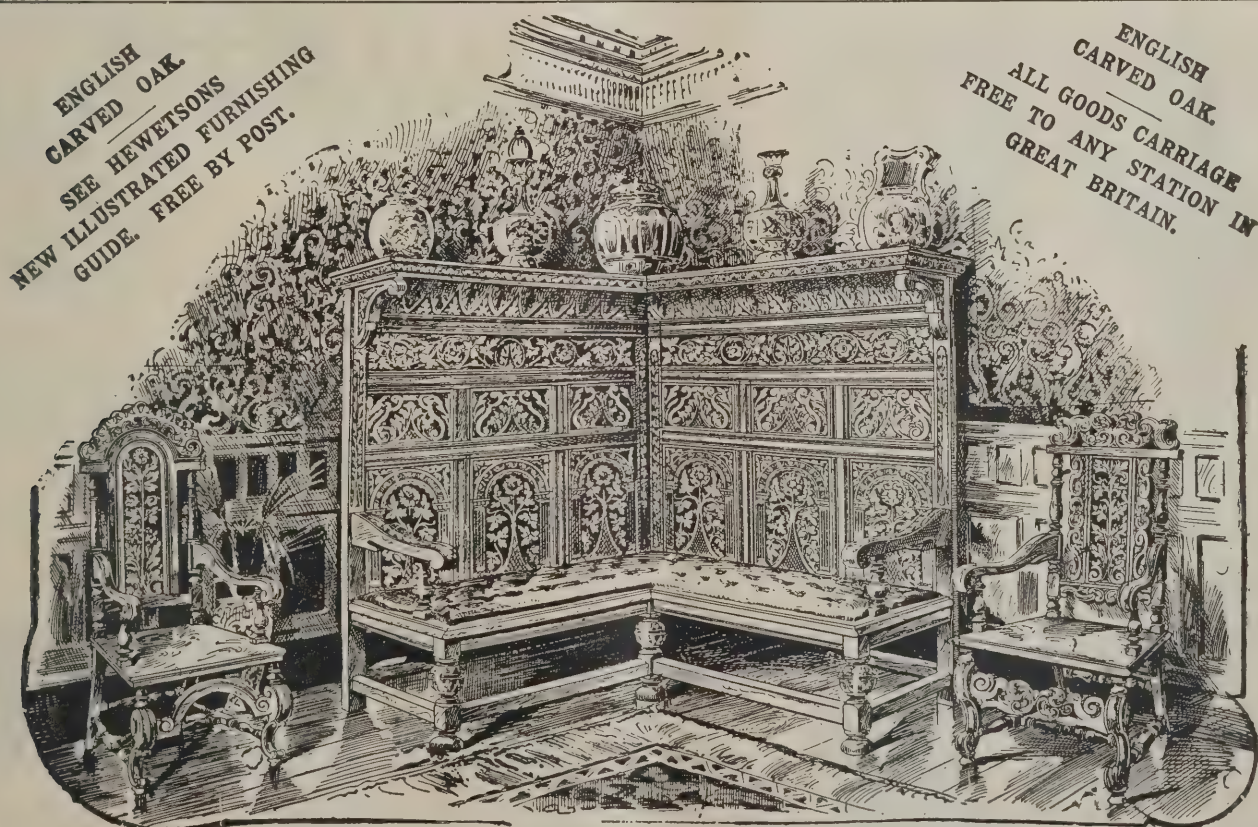
THE Jubilee screen that Messrs. Graham & Banks have now on exhibition at their well-known showrooms, 445 Oxford Street, will form in years to come an excellent record of the long reign of Her Majesty Queen Victoria. The first panel represents the "Coronation" in Westminster Abbey, showing Her Majesty on the throne surrounded by her subjects at the moment when the vast building rang with cheers and cries of "God save the Queen." Not only has the handsome Gothic stonework of the old Abbey been introduced into the background of the picture, but the costumes of the figures are correct in every detail both as to colour as well as to form, having been taken from authentic sketches and notes at the time. The "Marriage," which forms the second panel, represents the interior of St. James's Palace, when again the exact colouring has been kept to. The next panel, being the '51 Exhibition with its glass roof, makes a pleasant contrast to the old time-worn architecture of the Abbey, which repeats again on the end panel when Her Majesty and the Prince of Wales each are portrayed at the ceremony of the Jubilee of 1887. The screen is decorated in gold and colours is made of leather, and has four leaves.

## BUILDING AND BUILDERS.

THE memorial-stones for schools in connection with the church which is shortly to be erected in Ipsley Street, Redditch, took place on May 25.

THE foundation-stone of new premises for the York Dispensary has been laid by the Lord Mayor of the city.

THE foundation-stone of the Westminster Theological College, Cambridge, was laid on May 25. The site of the new building is near the junction of the Queen's and Madingley Roads.



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ESTIMATES and DESIGNS for JUBILEE DECORATIONS submitted free of charge.



THE committee of the Congregational Chapel Building Society for Lancashire and Cheshire have voted a grant of 400*l.* towards the erection of a school-chapel in the Fulwood district of Preston; also a grant of 250*l.* and a loan of 150*l.* for the erection of a new chapel at Poulton-le-Fylde.

THE Princess of Wales has signified her intention of being present to-day (Friday), when the ceremony of laying the foundation-stone of the new hospital in the City Road will be performed by the Prince of Wales.

AT Wednesbury 1,345*l.* 6*s.* has been received towards the establishment of a nurses' institute. The heirs of Parkes have generously agreed to let the committee have an excellent site in Walsall Road, opposite the park, for the sum of 119*l.* (half its actual value), and 1,150*l.* is to be set apart for the building and contingencies.

### ELECTRIC NOTES.

EDISON'S latest idea, on which he is now said to be engaged in making experiments, is the reproduction of theatrical performances without the instrumentality of manager or actor. The great inventor's idea is so to improve the phonograph and the Kinetoscope that they will reproduce with absolute fidelity. In the case of the former the chief difficulty was in overcoming "the metallic character of the tone of the phonograph and the change of its timbre to that of the human voice, so that all the modulations of the singers and actors could be exactly reproduced and the synchronisation of the phonograph with the kinetoscope reproduction."

THE electric lamps erected in three of the principal places of the city of Manchester were brought into use for the first time on the night of May 20. The ceremony of switching on the current was performed by the Lord Mayor, and was preceded by a little dinner party at the Town Hall. In all, the new lamps number twenty, of which twelve are in Albert Square, two in St. Ann's Square and six in Piccadilly, and it is understood that they will displace about seventy-five large gas lamps. The new lamps are arc lamps of the usual description, fixed on lofty standards, designed, it is understood, to insure that they shall be in keeping with their surroundings. Each lamp is said to have an illuminating power equal to that of 3,000 candles. If the use of the lamps should give satisfaction, as it seems likely to do, and the cost is not too great, the

electric light will probably be brought into use ere long in some of the other central places of the city; but as to this nothing has yet been decided.

### NEW ISSUE.

THE prospectus appears this week (and will be found in our advertisement columns) of Messrs. Fisher, Son & Hartland, of Paradise Street, West Bromwich, with which is incorporated the Garter Foundry Company, also of West Bromwich. The company, which will henceforth be known as Fisher, Son & Hartland, Limited, has a registered capital of 25,000*l.* The business of W. Fisher & Son was established upwards of forty years ago for the manufacture of furniture and interior fittings of elementary and technical schools, churches and Government and public buildings, and general office furniture of all kinds; while the Garter Foundry Company has been established upwards of a quarter of a century for the manufacture of castings of every description, and it is anticipated that the combination of the two businesses will be productive of great economy in working, and will be eventually advantageous to both concerns. The board of directors, which is a strong one, consists of Alderman John Horton Blades, J.P., Councillor Heywood Hartland, J.P., Mr. Walter Waring and Mr. Fred. H. Fisher, the latter of whom has entered into an agreement to act as managing director for a period of five years. As the old firms have more orders on hand than they are able to cope with, more machinery, extended premises and extra working capital are required, and it is with this object that the present issue is being made.

### VARIETIES.

THE opening of a new English Presbyterian chapel at Portmadoc took place on May 22. The edifice was erected at a cost of about 2,400*l.*, the architect being Mr. Taliesin Rees, Birkenhead, and the contractor Mr. Evan Jones, Groeslon.

A CHURCH which has been erected by the Swedenborgian communion of Blackburn upon the site of an old edifice in Anvil Street is now open. The church, which is of free Gothic design, will accommodate about 250 worshippers, and has cost 2,250*l.*



# EWART'S COPPER "CROWN" VENTILATOR

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A TABLET has just been erected in Canterbury Cathedral bearing the names of all the archbishops of the Southern Province from Augustin in 597 to Frederick Temple in 1896.

DURING a thunderstorm which visited France last week, a church at Feysin (Isère) was struck by lightning. The building immediately caught fire, and was completely destroyed.

THE corner-stone of the new tower and spire which are to be added to St. Augustine's Church, Kilburn, were laid on the 13th inst. When completed the tower and spire will be among the loftiest in London.

A NEW city hospital is to be erected at Colington Mains, Edinburgh, and the first sod was cut on the 14th inst. The new hospital, which is to be on the pavilion system, will accommodate 600 beds—320 of them for fever patients—and the cost will be 240,000*l.*, or 400*l.* per bed, exclusive of site and approaches.

THE works in connection with the new Roman Catholic Cathedral at Westminster are making progress and will, it is hoped, be completed within two years. The foundations have been finished—at a cost of 15,000*l.*—and the granite façade is gradually mounting.

NEW schools were opened in Benacre Street, Birmingham, on May 24, in connection with Bristol Road Wesleyan chapel. The schools are part of a general extension scheme which includes the modernising of Bristol Road chapel, the liquidation of a debt of 1,000*l.* on Harborne chapel and school, and the purchase of a site and the building of a church at King's Norton. The cost of the whole scheme is estimated at 7,750*l.*

BY command of the Queen a window of elaborate design has just been placed in the parish church of Crathie, in memory of the late Prince Henry of Battenberg. The work represents an angelic figure rising from the sea. At the base are displayed the arms of the late Prince, and an inscription as follows:—"To the dear memory of Henry Maurice, Prince of Battenberg," and a text, "The Lord gave, and the Lord hath taken away. Blessed be the name of the Lord."

AT Bootle a fire broke out in one of a block of seven cotton warehouses, the property of the Liverpool Warehousing Company, Bootle, containing 4,000 bales of cotton. The flames were not extinguished until midnight, and the damage is estimated at 16,000*l.*

HENGRAVE HALL, near Bury St. Edmunds, with its 4,600 acres of splendid sporting land, has been sold by the executors

of the late Mr. John Lysaght to Mr. J. Wood, of Whitfield, Derbyshire, and of Ivington, Herefordshire. Hengrave Hall is famous amongst archaeologists as the finest example of Tudor architecture in the country. The building is of stone, and possesses some very fine ornamental carving. Messrs. Hampton & Sons, of 1 Cockspur Street, were the agents who effected the sale.

MESSRS. C. & E. LAYTON announce that they will in June publish a book by that well-known authority on theatres, Mr. Edwin O. Sachs, F.S.S., author of "Modern Opera Houses and Theatres," &c., entitled "Fires and Public Entertainments: a Study of some 1,100 Notable Fires at Theatres, Music Halls, Circus Buildings and Temporary Structures during the last 100 Years."

ST. CLEMENT'S CHURCH, Leigh, Essex, was struck by lightning on Tuesday last. The turret and belfry were entirely wrecked, and the church was filled with smoke. The clock was demolished, and the *débris* blocks the steeple stairs. Three large stained-glass windows were smashed. The damage is estimated at 1,000*l.*

BATT'S HOTEL, Dover Street, has been recently undergoing extensive alteration and renovation. In place of a stable and other outbuildings in the rear, a dining-room, kitchen and service-rooms have been built, making an important addition to the accommodation of the hotel. Messrs. Hilder & Edge, of Great Pulteney Street, have carried out this work, including the redecoration of the whole of the building. The following specialists have also been employed:—Messrs. Smith & Stevens have supplied passenger and dinner lifts; Messrs. Dent & Hellyer have fitted up entirely new sanitary fittings throughout, and have laid a new system of drainage; electric lighting has been installed by Messrs. Laing, Wharton & Down; electric bells and telephones by Mr. C. E. Zimdars, and hot water, cooking and heating apparatus by Messrs. Charles Heap & Co.

THE memorial-stone erected by Sir Walter Scott over the grave of Helen Walker, the prototype of Jeanie Deans, in the churchyard of Irongray, near Dumfries, has been seriously injured by visitors, who have chipped off numerous pieces to carry away as relics. The edges of the stone itself—which is of the flat "table" pattern—have been much disfigured in this way, and part of the mouldings on the short supporting columns have also been broken off. It is suggested that an enclosing railing should be erected by heritors of the parish or others interested in the preservation of the monument.

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WHILE some labourers were laying out a lawn at New Villa, Balcombe, they unearthed a metal vessel containing twelve gold and 242 silver coins of the reign of King Edward III. The vessel containing the coins was in shape like a wine-flagon, and had a spout. Of the three legs it originally had, two were intact, while the third and missing one was found close by. The vessel, with its contents, weighed about 7 lb.

### ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

THE annual meeting of the Incorporated Association of Municipal and County Engineers was held in the Rochdale Town Hall on May 22. About 100 members were present from Lancashire, Cheshire and other counties. The mayor of Rochdale (Mr. John Turner) received the visitors, and gave them a cordial welcome to Rochdale. A large number of the engineers first visited the sanitary works, and inspected the new destructors, &c. Mr. May, borough surveyor of Brighton, presided.

### THE EMPIRE, WOLVERHAMPTON.

THE Empire Music Hall and Vaults, which are situated in Cheapside and Queen Square, being old and inconvenient, it has been decided to take them down and erect a first-class place of entertainment replete with every modern convenience. The new building will be designed by an architect of well-known ability, and the scheme will include the shop adjoining the Empire Vaults, together with some old shopping at the rear and a shop in Cheapside. The front of the hall will be in Queen Square, where a restaurant will take the place of the vaults. The front will be of red brick with terra-cotta facings, the ground floor of granite, and the woodwork of mahogany, and it is estimated that the entire cost will amount to between 40,000*l.* and 50,000*l.*

### NEW CATALOGUES.

MESSRS. MERRYWEATHER have chosen an appropriate time for the issue of their new catalogue of garden watering apparatus, garden hose and fittings, fountains, sprinklers, &c., with abridged list of pumps and water-supply plant for mansions, estates, nurseries, plantations, &c. It contains

illustrations of every description of plain and armoured hose, hose fittings, spreaders and lawn fountains, syringes, hose reels, &c. The illustrations are for the most part from photographs, and depict the actual working of the various appliances, of which the prices are explicitly given. Descriptions are also given of the firm's improved cottage and farm pumps, gas and oil power pumps, "Farm Homestead" pump, windmills and pumps, and "Garden Valiant" engine.

### CORRESPONDENCE.

#### Exits from Buildings.

SIR,—The letter under the above heading which you publish from Mr. Henry Cunliffe calls attention to a matter which I have been trying to get remedied for a long time past; but I am not prepared to go so far as Mr. Cunliffe, and to say that the danger in all places of amusement and of worship is so great that we must give up visiting such buildings. As regards churches your correspondent is undoubtedly correct. One or two narrow doorways are usually all the exits provided for a large congregation, and should a fire break out it is practically certain that there would be a crush at the doors, and many people would probably lose their lives in the panic. The organ loft is a dangerous place in most churches, and the heating apparatus is in the winter at any time liable to set fire to the adjoining woodwork. Every church should be fitted with some form of fire-extinguishing apparatus, and the exits should also be improved.

As regards theatres, the County Council has done a great deal in regard to exits, but I must say that, in London at any rate, the gallery and pit entrances and exits of a number of our older theatres are very unsafe. Winding, narrow staircases are the rule rather than the exception, and though proper exit doors lead into the street, yet in case of fire the crush is likely to occur on the staircases with disastrous results. It would be a simple matter to arrange that in each town the fire brigade officers, or a competent fire inspector, should examine the places of worship and also the theatres and other public buildings, and report to the authorities as to their safety in case of fire, and until this is done I do not think that any governing body will find anyone among their own officials capable of properly advising them in the matter.—I am, sir, yours faithfully,

Greenwich: May 26, 1897.

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PRICE LIST AND ESTIMATES ON APPLICATION



**BERKELEY HOTEL, PICCADILLY.**

ON the 12th inst. this hotel and restaurant was reopened to the public, having been closed since the beginning of December last. During this interval extensive structural alterations have been made in the old portion of the building, and a new portion, seven storeys in height and covering the site of 73 and 74 Piccadilly, has been added. In the old portion the improvements include the enlargement of the restaurant by removing main walls on the ground floor, a rearrangement of the basement offices, the introduction of an electric passenger lift and complete redecoration. In the new portion an entrance hall to the restaurant, a spacious lounge and cloak-rooms have been provided on the ground floor, and suites of rooms, including reception, bed and dressing-rooms, with bath-room, &c., on each upper floor. The whole of the basement of the new portion is occupied by kitchens, larders and service-rooms.

The architectural treatment of the exterior was limited to a reproduction of the details of the old building, a stone portico to the restaurant entrance in Piccadilly being the only new feature.

The constructional steelwork and some intricate shoring were designed by Messrs. Reade & Reilly. The preliminary works and foundations were carried out by Mr. T. Stevens, of South Molton Street. The general contractors were Messrs. Kirk & Randall, of Woolwich, who, commencing at the beginning of the year, have carried out and completed the whole of the work in the remarkably short period of five months.

The whole of the heating and the cooking apparatus and hot-water supplies are worked from two 6 horse-power nominal vertical boilers. These boilers are very compactly arranged, as owing to the great difficulties in providing a proper boiler-house the space occupied by the boilers was a great consideration. By the arrangement of the valves either boiler can be used separately or both together, so that if at any time one of the boilers requires cleaning out, the working of the apparatus is not interfered with. The safety-valves on the boilers are adjusted to blow off at 60 lbs. pressure, but as this pressure is not required for the heating and cooking apparatus, special valves are provided on the mains supplying this apparatus to reduce the working pressure to 10 lbs. For the hot-water supply, steam from the boilers passes into a patent calorifier with an automatic attachment which regulates the supply of steam, so that the hot water in the storage cylinder is always a little under boiling-point. This calorifier is capable of furnish-

ing a supply of over 1,000 gallons of hot water per hour. The various heating arrangements, consisting of radiators and coils throughout the new and old building on staircases and landings, are also supplied by steam from the same boilers. The kitchen has been entirely reconstructed, and is fitted up with the following apparatus:—Central range and fire grill, by Cabain, of Paris; large roasting range; small roasting range, with spit driven by electric motor; large steam hot plate, 12 feet long; steam hot table, bain marie, vegetable steamer, beef boiler, steam hot closets, gas salamanders, &c.

The whole arrangement of the kitchen was set out by Messrs. Strode & Co. and fitted up by them, as well as the various tables, shelves, cupboards, ice safe, sinks, &c. The tables are constructed of 2-inch sycamore tops, with 5-inch birch turned legs, and the whole of this work is fitted up in a most substantial style. Provision against any accident by fire is amply provided for. On each floor are fitted two fire hydrants of bright polished gun-metal, with long lengths of hose, mounted on handsome polished mahogany boards, ready for immediate use in any emergency. Mains, 4 inches in diameter inside, are fitted up each side of the building for the water-supply to these hydrants. The cold-water supply has been entirely rearranged. For the main storage of water two 1,000-gallon tanks are fixed in the roof; these are also connected to other tanks in different parts of the building, so that scarcity of water is not likely to be known. The electric lighting, which is one of the most important features in a large establishment like the Berkeley Hotel, is effectively carried out by Messrs. Strode & Co. Throughout the building they have installed nearly 1,000 lamps, and have designed and manufactured the whole of the very elegant fittings. Those in the restaurant and entrance-hall are Jacobean in style, made in polished iron. The reception-room is fitted with very handsome Louis XIV. gilt candle sconces. The lighting of the sitting-rooms is most tastefully arranged, with handsome shade lights fitted in the centre of the rooms and polished brass brackets and standards for side lights. The adjustable fittings in the bedrooms, and the other fittings in the various other rooms, are all in keeping with the style of the building. The kitchen and basement are fitted in the patent interior conduit system, the same as fitted by Messrs. Strode & Co. at various hotels. By this system the cables and wires are perfectly protected against all kinds of mechanical injury, dampness, &c. The Hotel Company is not going to be less loyal than its neighbours, and have entrusted Messrs. Strode &

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# BELGIAN EXHIBITION, 1897.

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Co. to carry out the illuminations for Commemoration Day, which will consist of one of their patent devices representing a royal crown about 10 feet high, with an imposing arrangement forming festoons of coloured balloons, all illuminated by means of electricity.

The fireproof floors were executed by Messrs. Dennett & Ingle; the decoration of the restaurant and entrance by Messrs. Waring; the passenger and service lifts by the Otis Elevator Company; the electric bells and telephones by Messrs. Jackson & Coleby; the plumbing, drainage and sanitary fittings by Messrs. Dent & Hellyer; and the new furniture by Messrs. Marris, King & Norton, of Birmingham.

Mr. May, who represented Messrs. Kirk & Randall, and Mr. T. S. Inglis, the clerk of works, have by their constant and indefatigable attention assisted greatly in the satisfactory completion of the work within the time named.

### OPEN SPACES.

A PAPER was read by Sir Robert Hunter at the meeting of the Royal Statistical Society on the 25th inst. on "The Movements for the Enclosure and Preservation of Open Lands." Sir R. Hunter remarked that the hedges which were now typical of an English landscape were in the main of modern creation. The early agricultural settlement of the country was based on a system of common farming, which precluded permanent enclosure. The first step in the movement for the enclosure of common lands was the passing of the Statutes of Merton and Westminster the Second, in the reigns of Henry III. and Edward I., but it seemed unlikely that there was any general change in the agricultural system of the country until the War of the Roses ended. The desire to grow wool for home and foreign manufacture produced the agrarian revolution of the sixteenth century. Landowners endeavoured to convert the arable fields of the village into grass land, and the means employed were harsh and oppressive. During the seventeenth century a few enclosures were made by the aid of the Court of Chancery and by the sale of Crown rights, but the eighteenth century saw the first serious attack upon commons and common fields. The first private enclosure Act was passed in 1709. During the next forty years more than 1,600 private Acts were passed, and during the whole century nearly 3,000,000 acres was enclosed. In 1845 the Enclosure Com-

mission was constituted, and between that year and 1869 a further area of 618,000 acres was enclosed. There was difficulty in estimating the extent of common land remaining, two Parliamentary returns differing by 800,000 acres. The average amount of common fields still left was insignificant. The counter-movement for the preservation of open spaces originated in 1864 in a desire to preserve suburban (mainly metropolitan) commons. The Commons Preservation Society was founded in 1865, and a long course of litigation, conducted under the guidance of the Society, defeated the claims of lords of manors to enclose under the statute of Merton. In 1869 Mr. Fawcett stopped the enclosure of rural commons, and in 1876 the Commissioners were directed by the Commons Act of that year to favour regulation of commons as opposed to enclosure. After referring to Miss Octavia Hill's assistance in the preservation of open spaces, Sir R. Hunter stated that by these means, and by the regulation of commons, an area of 3,686 acres of open space had been secured within the county of London during the last thirty years, while in the metropolitan police district outside the county a similar area of 10,293 acres had been placed at the public disposal. If the Royal parks were added, London was in possession of 4,935 acres within the county and nearly 14,000 outside the county, but within the metropolitan police district. In the provinces, so far as could be ascertained from a return obtained from a number of towns of more than 6,000 inhabitants, nearly 12,000 acres of common land, park and garden had been secured to the public during the present reign, and probably during the last thirty years.

**WHITSUNTIDE ON THE CONTINENT.**—For the convenience of visitors to Brussels Exhibition, cheap tickets available for a week will be issued *viâ* Harwich and Antwerp. The Great Eastern Railway Company's Brussels service has been accelerated, and passengers leaving London in the evening and the North and Midlands in the afternoon reach Brussels next morning after a comfortable night's rest on board the steamer. For visiting the Hague, Amsterdam and other parts of Holland, the Rhine, North and South Germany and Bâle for Switzerland special facilities are offered *viâ* the Company's Harwich-Hook of Holland route, through corridor carriages being run to Amsterdam, Berlin, Cologne and Bâle from the Hook of Holland. The General Steam Navigation Company's fast passenger steamers *Peregrine* and *Seamew* will leave Harwich on June 2 and 5 for Hamburg, returning June 6 and 9.



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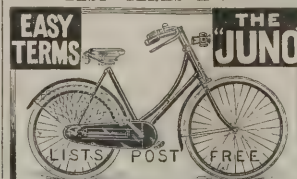
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## THE COUNTY COUNCIL WORKS DEPARTMENT.

IN addition to the half-yearly return of works completed by the Works Department of the London County Council up to September last, which exhibits a loss of 7,557*l.*, a further return has just been presented by the works committee, in which they submit the cost of several completed works for which the accounts have not been presented to the Council.

The return has been prepared in accordance with a resolution the Council passed on April 13 at the instance of Lord Onslow, instructing the committee to bring up an account at the earliest moment of works completed within the last half-year.

The first table in the return deals with fourteen estimated works, seven of which have been completed and certified, whilst the remaining seven have been completed and the accounts sent to the supervising officers, but have not yet been certified. On the seven works certified no very large deficiencies are disclosed, whilst in five cases the work has been completed below the revised estimate. Among the works which have been completed, but not as yet certified, two or three show very large and serious deficiencies. The most important of these is the work on the foundations at the new County Asylum at Bexley. The revised estimate for this work as undertaken by the department was 31,833*l.*, whilst the actual cost has been 37,578*l.*, showing an excess of cost over estimate of 5,745*l.* Mr. Adams, the manager of the Works Department, reporting upon the causes of this large excess, points out that in the actual cost 550*l.* has been included which is the amount paid to the local authorities for repairs to roads and which has yet to be added to the revised estimate. He says that this is another case of work having been accepted under a schedule of prices far too low. The preliminaries were not priced as they should have been, but a lump sum of 300*l.* was put down for the clerk of works' office and men's conveniences, whereas the actual value, as he estimated it, was some 1,000*l.* more. The preliminaries omitted were such as planking and strutting, which cost some hundreds of pounds, water for works, formation of road costing 984*l.*, and temporary buildings. As to prices, they were many of them very inadequate. The digging generally summed up to about 2,000*l.* below what would be a fair average price. Brickwork was the cause of 1,300*l.* excess. The way in which the works were hurried also tended to increase the expenditure considerably.

The work on the Vauxhall temporary bridge piers, the revised estimate for which amounted to 10,832*l.*, has actually cost approximately 12,590*l.*, or an excess of 1,758*l.* There is an excess of cost over estimate of 97*l.* on some paving works at the central dépôt, Belvedere Road, estimated to cost 1,583*l.* Another large excess is shown on the Wandle branch sewer, the work in connection with which was estimated to cost 9,670*l.*, whilst the actual cost was 11,873*l.*, showing an excess cost of 2,203*l.* The manager of the department, in his report upon this case, states that all the persons connected with the work who could afford any explanation of the excess in cost had left the service of the Council, and he was only able to judge of the reasons for the excess from an examination of the documents available. The cause appeared to be due in a great measure to the extremely low prices accepted by the department. For instance, excavation in tunnel, including carting away soil, timbering, and all risks, was allowed at the rate of 7*s.* 6*d.* per cubic yard. The average price for the Hackney and Holloway Fleet storm relief and Lewisham sewers was 18*s.* per cubic yard, and the average price for excavation in tunnel for sewer works, for which contractors tendered about the beginning of this year was 17*s.* 4*d.* per cubic yard. The lowness of the price at which this class of work was accepted accounted for a large proportion of the excess. The revised estimate for the whole of the fourteen works shown in this table amounted to 61,701*l.*, whilst the actual cost was 70,782*l.*, or an excess of cost over estimate of 9,081*l.* The amount of actual cost here given includes charges for plant and 6 per cent. for establishment charges.

In a further table at the end of the return the committee submit a list of nine estimated works which are completed or nearly finished, and accounts for which are in the course of preparation. Here again some large and important deficiencies are disclosed. The Camberwell Coroner's Court, for which the approximate amount of revised estimate was 2,430*l.*, has cost 2,872*l.* For work on new offices and fittings at the central dépôt the department accepted an estimate of 12,400*l.* under a schedule of prices, but the work has cost 14,579*l.* One of the superstructures in the Boundary Street area, estimated at 28,168*l.*, has cost 29,140*l.* A wall connected with the Boundary Street work was estimated at 527*l.*, but has cost 797*l.* The largest deficiency is shown in the Fulham sewer work, which was estimated to cost 21,560*l.*, but actually cost 29,151*l.*, or an excess over estimate of 7,591*l.* On the Whitefriars Fire Station, which was estimated to cost 20,725*l.*, there is an excess of 890*l.* The cost of these last two works is only approximate, as they are not yet entirely completed. On the other side of the account there has been a saving of about 500*l.* on the work on the central laundry at

Boundary Street, and of between 700*l.* and 800*l.* on some temporary road work at Boundary Street, the latter work not yet being completed. For these nine works the balance of excess over estimate amounts to 10,811*l.*, which, added to the excess given on the works in the other table of 9,081*l.*, shows the total excess of cost over estimate on these twenty-three works to have been 19,892*l.* If to this be added the excess of 7,557*l.* disclosed in the previous return, it will be seen that the total loss or excess of cost over estimate during the past year has been 27,449*l.*

On the other hand, a return of the jobbing works completed by the Department during the year ended March 31, 1897, shows that the schedule value of the work was 26,658*l.*, and the actual cost 24,284*l.*, a saving of 2,374*l.*

At the ordinary meeting of the County Council this week the reports were considered. Sir A. Arnold admitted that the position of the contractors in London in regard to the Council was not at present the most advantageous to the service of the public, and one of the main foundations of the report was a desire that there should be a rectification in that respect. He was not in favour of a large undertaking of architectural works by the department, but he was there that day especially to warn the Council not to deprive itself at this juncture, and whilst its relations with contractors remained as at present, of the means of carrying out any work at all.

Lord Onslow, in moving that no further work should be entrusted to the Works Department, said it was agreed on all hands that a body consisting for the most part of amateurs, who had many other avocations to pursue, could not give the time necessary for the conduct of a vast contractor's work. The reason of the failure of the department was its anxiety and greed to grab every sort of work so that it should not fall into the hands of contractors. They had been told that in order to make the department a success it was necessary to have a large turnover—he thought 240,000*l.*—in order to keep down establishment charges. A large turnover was an excellent thing when they were making a profit, but it was a disastrous thing when they were making none. They had spent upwards of 100,000*l.* on their works at Belvedere Road in order to have carpenters and joiners, and their expert told them that he had never seen such infamous joinery as that done by the Council. The department had been exceptionally favoured; it had been allowed to pick its jobs, it had made no bad debts, it had large discounts for cash, it required no capital to pay its workmen, it had unlimited power to borrow, and the result had been nothing but indifferent work, falsification of accounts and a ruinous cost to the ratepayers. If there had been any saving made by the department it would have justified its existence, but, on the contrary, it had been a lamentable failure.

After some discussion it was decided that the debate should be resumed at a special meeting to be held on Friday (to-day).

## HUDDERSFIELD SEWAGE WORKS.

QUITE recently a Belgian deputation inspected the Huddersfield Sewage Works, says the *Telegraph*, and on their departure registered in the visitors' book their impression of what they had seen in the terms, "A perfect installation, deserving of commendation." Making full allowance for continental politeness, such a declaration cannot well be shorn of its full significance, especially when it is remembered that the deputation were accompanied by an Englishman of high reputation in Belgium and parts of France as an authority on works of this description. Since the amount of capital expended on this installation reaches no less than 102,000*l.* odd—apart from interest, maintenance charges and cost of working, making an annual call of from 10,000*l.* to 12,000*l.* on revenue account—the ratepayers might naturally be pardoned the expected possession of a valuable asset in the form of appliances fairly competent to achieve the objects sought. On that point they may take it for granted that there exists little need for dissatisfaction. At any rate this much may be stated, that if the works are not equal in respect of extent, and consequently of absolute adequacy, to the ideal set up by the West Riding Conservancy Board in relation to the prevention of rivers pollution, they are nevertheless capable, in the measure of their dimensions, of attaining the purposes for which they have been constructed and equipped. When storm waters, domestic and manufacturing sewage are so manipulated as to eventually result in an effluent which may be without apprehension taken for human consumption, and a water actually brighter in colour than that supplied to the inhabitants for drinking purposes, merely retaining to the palate the flavour of the precipitating medium with which it has been treated, it may be fairly claimed that the main objects sought have been secured to a demonstration. This dictum is one which could not fail to be adopted by any impartial visitor, just as it is one which has often been uttered by experts, who have not only been delighted with the scientific equipment of



the works, but also with the attractive environment by which the various processes have been surrounded.

A glimpse of the works, which were designed by Mr. R. S. Dugdale, C.E., the borough surveyor, from any suitable point—say, from the Deighton branch of the London and North-Western Railway—is one which elicits no little surprise, because of the striking natural features of the situation, as well as the charming *ensemble* presented to view. Pretty as the picture now undoubtedly is, having in mind the purely utilitarian character of the undertaking, it must not be overlooked that existing arrangements only followed upon technical preliminaries of an exacting kind, in the form of appropriate design, laying out of the land, the building of nearly a mile of retaining wall to river and canal, extensive culverting, the construction of filter-beds and tanks, and other work of a costly description, all of which should not be overlooked in any attempt to estimate the undoubtedly high position which the works, in the opinion of sanitary engineers, now occupies. Accompanied by Mr. Greenwood, the manager, a tolerably accurate idea of the capabilities of the undertaking may be readily obtained. The works are entered close to Woodhouse Mills, Deighton, where the industrial enterprise carried on by the present mayor (Alderman J. Lee Walker) and the profit-sharing scheme, successfully inaugurated and worked by Mr. George Thompson, J.P., are both in operation. Access to the gates is obtained either from Ashgrove Road or Woodlands Road, running off at different angles from Leeds Road, both of which are boulevarded after the manner very properly adopted in Huddersfield of late in the case of many outlying roadways. Along Ashgrove Road run tram-lines, by which domestic refuse may be conveyed to the works for cremation by the destructors so soon as these agents of sanitation have been brought into effective operation in this part of the borough—a consummation shortly anticipated by the authorities.

Passing the entrance gates, on the left is found the weighing-office and on the right the valve chamber, fitted with sluices by which the entrance of sewage and of storm water may be controlled. The volume now impossible of treatment is turned back into the river. While from  $7\frac{1}{2}$  to 8 million gallons of sewage are daily presented from the town sewers, only about half that quantity can be dealt with. The authorities are adopting measures to limit the quantity of liquid matter offered them, and with this object they are endeavouring to arrange that clean water streams shall not enter the sewers at all, and that manufacturers shall provide at their respective mills tanks where matter in suspension may be deposited before the liquid is finally carried away by means of the town sewers. Even then extension of the sewage works will be called for, and it was in this view of the contingency that the Whitehouse Farm, lying at the foot of Dalton Bank, was recently acquired at a cost of 5,000*l.*

From the valve chamber where the town's sewage enters the works the distance between that point and what may be described as the administrative buildings is occupied on the right by ornamental gardens which give a very neat appearance to the enclosure, and on the left by buildings containing what is technically known as the roughing tank or detritus where the solid matter is dredged from the sewage; and still further on the same side the refuse destructors, boilers, and a fine octagon chimney in brick rearing its shaft 90 yards above the surface and constituting the highest in the district save the one at Fieldhouse belonging to the Leeds Fire Clay Company. The set of structures on the left have trees trained up their walls, suggesting rather buildings associated with a fruit-growing establishment than a place of necessity of a slightly more unsavoury description. The buildings generally are of blue brick relieved by courses in stone, and the administrative section coming across at right angles is further relieved by a clock tower containing a useful timepiece which strikes the hours. A couple of boilers are now at work for driving 13 arc electric lamps of 1,000 and 1,500 candle-power, numerous incandescent lamps and the sludge presses, which deal with about 1,000 tons of matter per month. It is hoped that when got into effective operation the destructors will generate enough steam to keep the electric-lighting plant at work without any demand upon the boilers. From the valve chamber the sewage is culverted to the detritus tank, 125 feet in length, where a dredger made by Messrs. Thomas Broadbent & Sons, engineers, Huddersfield, lifts from the tank 50 tons per week of the more solid matter. This for the moment is being removed by neighbouring farmers for tillage purposes. Arrived at the end of the roughing tank, the floating matter, consisting largely of oil and refuse wool, is removed. Manufacturers would do well to themselves to utilise both for their own gain, and so secure the removal of articles which are no little source of dirt and trouble at the sewage works. The wool refuse, now amounting to about 6 cwt. per day, at one time totalled four times that quantity, and was reduced through the efforts of a sub-committee, who made such representations to millowners as to bring about the change now recorded. As it is, the works manager is able to boast of an excellent suit of clothes made

from such refuse wool, and other portions are being worked up for some such similar purpose.

The sewage now ready for treatment passes through a measuring wheel, whose capacity is 3,000 gallons per revolution, and is then treated with a precipitant known as ferozone, supplied by the International Water and Sewage Purification Company, London, who also are the makers of the polarite used in the filter-beds. The sewage, coming largely from mills, varies in colour and density almost hourly, and as certain coloured sewage requires the application of double the quantity of the precipitant to other kinds, the apparatus supplying it cannot be worked automatically, but has to be operated by hand to suit the exigencies of the moment. The action of the precipitant is easily observable when the process is conducted on a small scale in a testing glass. The sewage, first seen as dark, even-coloured liquid, having received its due quantity of ferozone, soon begins to break up. The dense matter coagulates, and quickly presents the aspect of a black snow-storm, whose flakes ere long fall to the bottom of the glass. It is whilst these dense particles are in suspension that the sewage passes under the administrative buildings in culverts, and divides right and left in order to reach the twenty-four settling tanks, a dozen on each side of the system, there laid out to view. From the tanks where the sludge is deposited it passes inwards to the filter-beds, and after filtration is carried along the length of the system in open troughs or aerating channels, to be delivered again close to the administrative buildings into a stream with a pebbly concreted bed and banks of brickwork, relieved by flowering shrubs and ferns, whence it leaves the works and enters, five furlongs further down, the river near the weir at Colne Bridge. So pretty is the aspect of the stream that the onlooker would be little more the subject of surprise if gold-fish or speckled trout were detected disporting themselves in the bright, clear water.

In one of the settling-tanks an experiment has been tried for the automatic removal of sludge, and so successful has it been that it must ere long be fitted to the remaining tanks. In the case of the twenty-three other tanks, sludge has at present to be removed by hand; the men, supplied for the purpose with fishermen's brogues and thick woollen jackets, having to descend to the sludge, and pass it out with the aid of suitable implements. The automatic arrangement is the monopoly of the International Company already referred to. The sludge afterwards reaches the press-room by gravitation, and here are four large presses operated by compressed air. By means of the presses about sixty per cent. of the moisture is removed, and the sludge-cake left is afterwards lifted by a hydraulic hoist to a convenient level, and then conveyed to a tip on the estate. The cake is worthless for manurial purposes, and is, when the destructors shall have been perfected, to be domestic refuse, and duly consumed. However, of the 55 acres of land comprising the estate, one even is not yet fully covered by the refuse tipped there. Present experience leaves the sludge-cake still an unknown quantity, and actual innocuousness to be obtained by crematorial agencies, it is considered, should be positively secured. The filtering medium consists of a number of layers of different character, composed respectively of rough stones and land tiles in the bottom, then smaller stones the size of peas, next rough sand, afterwards a 12-inch thickness of polarite and sand mixed in the proportions of six of polarite to four of sand, and on the uppermost strata a 4-inch bed of washed river sand obtained from the Tadcaster district. The works in general may be considered to have been pretty accurately detailed, when it is added that the buildings also include a mess-room for the employés, a fitter's shop, the manager's office, a handsome room for the meetings of the Corporation committee and the reception of deputations from other places, besides an engine-room containing a pair of horizontal engines, a couple of electric dynamos by Cromptons, of Chelmsford, and a brace of engines for compressing air for forcing the sludge through the presses. A round of the works constitutes a trial of no severe character to the most sensitive nasal organ, and it is stated that of the thirty-eight men employed there none has ever been a sufferer from any zymotic disorder.

### JOHN RAMSBOTTOM, C.E.

THE late Mr. John Ramsbottom, a distinguished engineer, who was for many years connected with the locomotive department of the London and North-Western Railway, died on the 20th inst. at his residence, Fernhill, Alderley Edge, Cheshire, in his eighty-third year. He became locomotive superintendent of the Manchester and Birmingham Railway in 1842, and when the London and North-Western absorbed that line in 1846 he remained as district superintendent of the north-eastern division. In 1857 he succeeded Mr. F. Trevithick at Crewe Works, and when in 1862 engines ceased to be built at Wolverton, he became locomotive superintendent of the whole line. From Crewe he turned out a large number of successful engines, both goods and passenger. The first of the well-known "Lady



of the Lake" class he produced in 1859, and how excellent was the general design of those engines may be judged from the fact that in the race to Scotland between the east and west coast routes in 1888, when a comparatively light load had to be drawn at high speed, some of them were employed to take the trains from London to Crewe, although they were then nearly thirty years old. The system of laying water-troughs between the rails, from which engines can pick up water when travelling at a high speed, was introduced by him on the North-Western, to which it was for long practically confined. Recently, however, it has been adopted by several other railways, and, indeed, the long runs without a stop which have come into vogue of late years would be all but impossible without these troughs. Mr. Ramsbottom was a member of the Institution of Civil Engineers and served as president of the Mechanical Engineers in 1870-71. He was also a director of the Lancashire and Yorkshire Railway.

### THE TORONTO MEETING OF THE BRITISH ASSOCIATION.

SINCE the previous announcement of the preparations for the Toronto meeting of the British Association the local executive committee have issued a large number of invitations to foreign scientific men, many of whom have accepted the invitation, and it is believed that in this respect the meeting will not fall behind any meeting held in the British Isles. American scientific men will be present in large numbers, and the interest felt in the United States is further indicated by the attendance of the presidents and members of the staffs of Clark and Johns Hopkins Universities and of the universities of Pennsylvania and Chicago. The Botanical Society of America, the American Association of Teaching Engineers, the American Mathematical Society, and probably also the Geological Society of America, will meet in Toronto on August 16 and 17 in order to enable their members subsequently to join the British Association and take part in its meeting.

The interest felt in Canada may be understood from the fact that nearly every Canadian public man will be present. It is fully realised there how important the coming occasion will be to the Colony, and especially at a time when efforts are being made to strengthen the ties with the Motherland. The Governor-General has taken a deep interest in the meeting, and will be present. His Excellency and Lady Aberdeen will

give a reception to the members of the Association in the new Legislative buildings. Another reception will be given by the Hon. G. A. Kirkpatrick, the Lieutenant-Governor of the Province, and Mrs. Kirkpatrick. It is arranged also to give a public banquet in honour of Lord Lister, Lord Kelvin, and the president-elect of the Association, Sir John Evans.

The arrangements with regard to all the excursions have been made more definite. The Canadian Pacific Railway Company, it is now ascertained, will give first-class return tickets from Toronto to the Pacific Coast for a rate varying between 61.80 dols. and 70.30 dols., according to the route selected, and the journey may be made at any time between July 1 and October 1. This rate is less than the single fare, and is that which is usually charged for a single ticket to Calgary, at the eastern edge of the Rockies. Local committees are now being organised to take charge of this and other excursion parties which will visit the various towns and localities in Canada.

The Muskoka district is one of the most beautiful localities in Canada. It contains a number of lakes of moderate size, all connected with each other and studded with innumerable islands of rocky formation, but for the most part covered with forest trees. On these islands are hotels, summer residences and camping-grounds for the large number who resort annually to this locality to enjoy cool weather and delightful scenery. It has been arranged that the excursion to this district shall take place on a Saturday, and the members will stay in groups on the Saturday night at various points in the district, while on the Sunday they will sail through the lakes and gather again at a central point for the return journey to Toronto on the Monday morning. The members who take part in this excursion will be the guests of the Muskoka Lakes Association and of the Muskoka Navigation Company. The fare for the railway journey from and back to Toronto will be a nominal one. The Cataract Construction Company (New York) of Niagara Falls has, through its President, extended a cordial invitation to the Association to visit its plant at Niagara Falls. The interest of the excursions to the Don Valley, which is within a few miles of Toronto, consists in the most remarkable drift deposits, in places more than 200 feet thick, the lowest bed, formed of boulder clay, resting directly on Silurian rocks. Interglacial series of sands and clays, holding many fossils of plants and animals belonging to a warmer climate than the present, are in evidence, while above are found two thick beds of glacial deposit. At the higher points, 170 feet above the present

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lake level, the old shore line of the ancient "Iroquois Lake" is splendidly shown. The glacial and interglacial deposits of the Scarboro Heights, also within a few miles of Toronto, which are at one point as much as 350 feet thick, yield a very large number of extinct forms, especially beetles. The two localities may be seen in one day, and a party will inspect both under the guidance of Professor Coleman, who has made a special study of these glacial deposits.

It is arranged that the excursion party visiting the Niagara cañon along its course shall be under the direction of Mr. G. K. Gilbert, of the United States Geological Survey, and Dr. Spencer, who have given special attention to the geology of the Niagara district.

A handbook of Canada is in course of preparation which it is anticipated will be welcome to members who desire to inform themselves as to the Dominion before visiting it. To make this possible, it is intended that a sufficient number of copies shall be ready at the London office in July for distribution to all who intend to be present at the Toronto meeting. The book will contain chapters on the geography, geology, natural history and resources of the Dominion, as well as sketches of its history, administration and economics, and as these are being contributed by the chief Canadian authorities, the handbook will have more than a temporary value.

The Canadian Pacific and Grand Trunk Railway Companies have prepared for this season special tourists' guide-books for Canada, which will be sent from their English offices to all who apply for them.

### COMPLETION OF THE SOUTH KENSINGTON MUSEUM.

WE understand, says the *Times*, that Sir John Gorst's committee on the museums of the Science and Art Department have agreed upon an interim report drawing the attention of Parliament to the peril to which the priceless collection at South Kensington is exposed of destruction by fire. It is pointed out that the old buildings are constructed of wood and lath and plaster, covered in many instances with tarred felt, and that in the immediate proximity are temporary buildings constructed of fir covered with iron and lined with varnished matchboarding; yet, notwithstanding the obvious danger to the contents of the museum from such a state of things, to which attention has been called both in and out of Parliament, nothing has been

done to remedy it. The committee further state that the galleries containing important art collections are open to fire damage, and that the art schools are especially liable to the risk of fire, while the galleries themselves would easily fall a prey to fire. That these buildings have so long enjoyed immunity from fire is, in the opinion of the committee, due to the care and vigilance of the police, the skill and care of the various assistants and mechanics employed about the premises, and the unremitting watchfulness of the officials. The committee recommend the immediate completion of the buildings, and suggest that in the meantime the valuable collections should be withdrawn from exhibition rather than be longer exposed to risk of destruction.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

11715. William John Earl Henty, Henry Thomas Adams, and George Henry Soder, for "Improvements in apparatus for use in erecting buildings and other structures of concrete."

11558. James Frederick Bennett and Robert Henry Marples, for "Improvements in electrical gas-lighting apparatus."

11577. George Walter Westgath, for "A window-fastener."

11933. Peter Jenson, for "Improvements in fire grates."

11925. Herbert Coward, for "An improvement in the construction of fireproof floors."

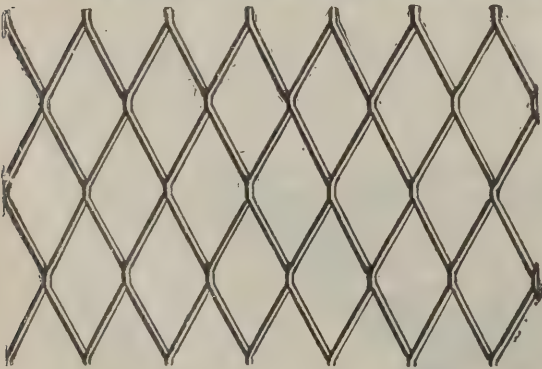
11633. John Lawrence, for "A gully-trap and such invention to be applicable to all traps of any kind."

11990. Edward Louis Schacht, for "Improvements in door checks or door holders."

12025. Alfred Henry Hardaker, for an "An improved set square."

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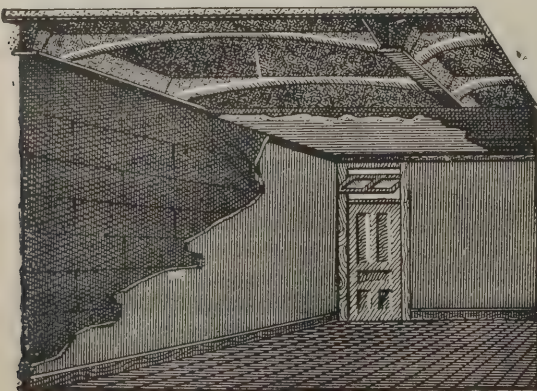
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*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

**TENDERS, ETC.**

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xv.*

**COMPETITIONS OPEN.**

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000l. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

MORECAMBE.—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000l., at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

**CONTRACTS OPEN.**

ABERDEEN.—June 8.—For additions to offices at Flushing, Cairnbulg. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ABERGAVENNY.—June 11.—For erection of two additional classrooms at Park Street Schools. Mr. E. A. Johnson, architect, Abergavenny.

ASHREIGNEY.—June 15.—For taking-down and reconstructing in timber the defective part of Kersham Bridge, over the river Taw. Mr. H. Masterton, county surveyor, Boutport Street, Barnstaple.

ASKAM-IN-FURNESS.—June 15.—For building a new classroom at the Ireleth School. Rev. J. A. Roberts, Ireleth Vicarage, Askam-in-Furness.

AYLESBURY.—June 9.—For repairs at the union house. Mr. Frederick B. Parrott, clerk, 16 Bourton Street, Aylesbury.

BALHAM.—June 8.—For erection of a branch library in Ramsden Road. Mr. Sydney R. J. Smith, architect, 14 and 15 York Buildings, Adelphi, W.C.

BARKING.—June 17.—For erection of retort-house, boiler-house, exhaustor-house and mess-room. Mr. W. North, Gasworks, Stourbridge.

BARROW.—June 12.—For erection of Barrow Beaconsfield Conservative Club, Abbey Road. Mr. John M'Intosh, architect, 6 Cornwallis Street, Barrow.

BEESTON.—For erection of four houses. Mr. W. H. Higginbottom, architect, King John's Chambers, Nottingham.

BELFAST.—June 10.—For erection of buildings at Donegall Square West and Wellington Place. Messrs. Stokes & Ferguson, 35 Royal Avenue.

BLAENAVON.—For alterations and additions to Wain Tavern. Mr. E. A. Johnson, architect, Abergavenny.

BRADFORD.—June 14.—For erection of a large block of shops and dwelling-houses and entrance archway in Manningham Lane. Messrs. Mawson & Hudson, architects, 2 Exchange Buildings, Bradford.

BRADFORD.—For erection of four through houses in Newark Street, off Wakefield Road. Mr. F. Moore, architect, 40 Sunbridge Road, Bradford.

BRADFORD.—For erection of four houses in West Bowling. Mr. W. H. Sharp, architect, 239 Rooley Lane, Bradford.

BRIGHTON.—June 15.—For alterations at Warren Farm Schools, Rottingdean. Mr. T. G. Gibbins, architect, Molesworth House, Palace Yard, Brighton.

BRISTOL.—June 9.—For completion of Kingswood Reformatory. Mr. H. C. M. Hirst, architect, 30 Broad Street, Bristol.

BRISTOL.—June 7.—For small job at Long Ashton Police Station. Mr. W. Rolfe, 14 George Street, Bath.

BUNNEY.—June 12.—For new roof to the north aisle of Bunney Church. Mr. Carver, churchwarden.

CANTERBURY.—For erection of chimney shaft foundations, setting and fixing of a new Cornish boiler, alterations to boiler-house, subway from boiler-house to new blocks, alterations to laundry and steward's stores, and additional works of sewage disposal, at Chartham Asylum, Chartham Downs. Mr. W. J. Jennings, architect, 4 St. Margaret Street, Canterbury.

CARLISLE.—For erection of Hayton Hall and reading-room. Mr. T. Taylor Scott, architect, 43 Lowther Street, Carlisle.

CORSHAM.—June 28.—For additions and alterations at Mansion House. Mr. Thomas Holloway, Chippenham, Wilts.

CORNWALL.—For erection of five-roomed dwelling-house at College Row, Camborne. Mr. E. Rogers, Trelowarren Street, Camborne.

DARLINGTON.—June 9.—For alterations and additions to Black Swan Hotel, Parkgate. Mr. W. Duncan, architect, 3 Zetland Road, Middlesbrough.

DEAL.—June 12.—For erection of a ladies cloakroom at end of South Parade, and for a shelter seat on the Marina. Mr. Thos. C. Golder, borough surveyor.

DEWSBURY.—June 17.—For erection of two cottage homes in Heald's Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DUBLIN.—June 9.—For erecting nine labourers' dwellings. Mr. D. Morris, clerk of works, 24 Cabra Parade.

DURHAM.—June 8.—For pointing the boundary walls at Benfieldside Board Schools. Mr. G. T. Wilson, architect, 121 Durham Road, Blackhill.

EDENBRIDGE.—June 14.—For pulling-down old houses and erecting new houses and ironmonger's shop. Mr. Beale, surveyor, Madeira Park, Tunbridge Wells.



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EGHAM.—June 12.—For pulling-down and rebuilding part of the Catherine Wheel Hotel. Mr. William Menzies, Englefield Green, Surrey.

FEATHERSTALL.—For painting, &c., inside three houses. Mr. N. Shore, 2 James Street, Deanley, Littleborough.

FENTON.—June 15.—For construction of a brick culvert, about 125 yards in length, with manholes, &c. Mr. S. A. Goodall, surveyor, Town Hall, Fenton.

FOLKESTONE.—June 9.—For supply of desks and other apparatus to the new Board schools, Sidney Street. Mr. Ernest S. Wilks, architect, 2 Cheriton Place, Folkestone.

FOXFORD.—June 12.—For erection of a glebe house and offices, &c., at Foxford, co. Mayo. Mr. J. Gervais Skipton, architect, Northgate Street, Athlone.

GATESHEAD.—For erection of factory premises at the Teams. Mr. J. W. Roundthwaite, 13 Mosley Street, Newcastle-on-Tyne.

GLOUCESTER.—June 8.—For new works at the Gloucester Municipal Technical Schools, Brunswick Road. Messrs. Waller & Son, architects, 17 College Green, Gloucester.

GRIMSBY.—June 14.—For erection of Diamond Jubilee provident homes. Mr. Herbert C. Scaping, architect, Grimsby.

GUILDFORD.—June 11.—For erection of buildings to contain the carburetted water-gas apparatus, for the Guildford Gaslight and Coke Company. Mr. William Titley, secretary, Gas Offices, Guildford.

HALIFAX.—June 9.—For erection of three pairs of semi-detached villa residences at Savile Park. Mr. Medley Hall, architect, &c., 29 Northgate, Halifax.

HALIFAX.—June 17.—For erection of three pairs of semi-detached villa residences at Savile Park. Mr. Medley Hall, architect, &c., 29 Northgate, Halifax.

HAMPTON.—June 14.—For erection of shop and additions to bakery at Station Road. Mr. Geo. F. Duke, secretary, Station Road, Hampton.

HAMPTON.—June 25.—For construction of engine-house and other buildings on the site of sewage outfall works at Hampton-on-Thames. Mr. Isaac Shone, 47 Victoria Street, Westminster, S.W.

HIPPERHOLME.—June 10.—For erection of stabling for ten horses and cartshed. Messrs. Jackson & Fox, architects, 22 George Street, Halifax.

HORNCastle.—June 14.—For repair of five bridges, viz. three in the parish of Wispington, one in the parish of Thimbleby and one in the parish of Edlington. Mr. T. E. Chatterton, clerk, Horncastle.

ILKESTON.—For enlargement of the Primitive Methodist Chapel, Nottingham Road. Mr. Samuel Richards, architect, 3 Market Place, Ilkeston.

IRELAND.—June 8.—For erection of thirteen cottages for agricultural labourers. Mr. J. E. Sharkie, executive sanitary officer, Poor-Law Office, Strabane.

KENDAL.—June 10.—For erection of a dwelling-house, with detached business premises in the rear, on a plot of land in Sandes Avenue. Mr. Stephen Shaw, architect, Kendal.

LEEDS.—June 8.—For erection of new water-closets and additional lavatory accommodation at the Workhouse. Mr. Thomas Winn, architect, 90 Albion Street, Leeds.

LEEDS.—For erection of a house at Gipton, near Leeds. Mr. F. W. Rhodes, architect and surveyor, Upper Wortley.

LEEDS.—June 8.—For excavating storage cellars, &c. (about 3,500 yards cube), in York Street. Mr. W. S. Braithwaite, architect, 6 South Parade, Leeds.

LEEDS.—June 10.—For alteration of the exhaustor-house at the Meadow Lane Gasworks. Mr. R. H. Townsley, general superintendent, Municipal Buildings, Leeds.

LIVERPOOL.—June 24.—For erection of proposed new offices, North John Street, Liverpool, for the Royal Insurance Company. Mr. J. Francis Doyle, architect, 4 Harrington Street, Liverpool.

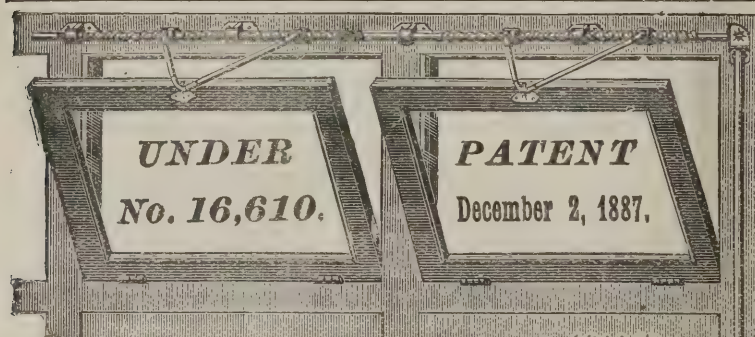
LONDON.—June 14.—For erection of a greenhouse at Irish Corner, Muswell Hill, 60 feet by 12 feet. Mr. E. J. Lovegrove, C.E., engineer to the Hornsey Urban District Council, 99 Southwood Lane, Highgate, N.

LONDON.—June 21.—For supply of internal fittings, fixtures and furniture required at the new Dulwich Library in Lordship Lane. Mr. C. William Tagg, vestry clerk, Vestry Hall, Camberwell, S.E.

MANCHESTER.—For rebuilding Jolly Butcher Inn, Bowlee. Mr. C. H. Openshaw, architect, Fleet Street, Bury.

MARYPORT.—June 12.—For erection of washhouses, &c., and back yards at Steer Cottages. Mr. C. F. Watson, Greysouthen, Cockermouth.

MELKSHAM.—June 9.—For erection of a Masonic Hall. Mr. John A. Randell, M.S.A., Exchange Place, Devizes.



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**MORECAMBE.**—June 7.—For erection of a brick chimney 129 feet in height, engine and boiler-houses, and other offices for generating station of the electric-light works. Mr. John Bond, surveyor, Council Offices, Morecambe.

**MORLEY.**—June 17.—For erection of Primitive Methodist chapel, Bridge Street. Mr. T. A. Buttery, architect, Queen Street, Morley.

**MUSWELL HILL.**—June 14.—For erection of a greenhouse at Irish Corner, 60 feet by 12 feet. Mr. E. J. Lovegrove, 99 Southwood Lane, Highgate.

**MUSWELL HILL.**—June 14.—For additional stabling, ambulance shed and cottage at the isolation hospital. Mr. E. J. Lovegrove, 99 Southwood Lane, Highgate.

**NEW BROMPTON.**—June 8.—For erection of a new store at the rear of the premises, 136 High Street. Mr. E. J. Hammond, architect, 111 High Street, New Brompton.

**NEWSHAM.**—For re-erection of farm buildings at Early Lodge, near Newsham, Yorkshire. Mr. J. A. York, solicitor, Barnard Castle.

**NORMANTON.**—June 14.—For erection of chapel at Hope-town. Mr. Arthur Hartley, architect, Carlton Chambers, Castleford.

**OLDHAM.**—June 17.—For erection of a shed, time office, storeroom and other buildings, at Rasping Mills, Delph. Messrs. John Kirk & Sons, architects, Huddersfield.

**OSWESTRY.**—June 19.—For alterations and additions to the Conservative Club. Messrs. Shayler & Madoc-Jones, architects, 19 Church Street, Oswestry.

**PONTEFRAC.**—June 9.—For erection of two houses in Banks Avenue. Messrs. Garside & Keyworth, architects, Roper Gate, Pontefract.

**PRESTON.**—June 9.—For erection of stable buildings, &c., at the rear of the Central Stores. Mr. Wm. Mumford, architect, 33 Guildhall Street, Preston.

**SALFORD.**—June 24.—For erection of a block of sixty-six artisans' dwellings between King Street and Queen Street. Mr. Saml. Brown, town clerk, Town Hall, Salford.

**SCOTLAND.**—June 19.—For erection of thirty-six dwelling-houses at Denny. Mr. Robert McLellan, architect, Motherwell Road, Bellshill.

**SCOTLAND.**—June 7.—For erection of two cottages and bothy on the farm of Mundole, Forres. Mr. R. Walker, Altye, Forres.

**SCOTLAND.**—June 23.—For erection of the proposed hotel Messrs. Swanston & Legge, architects, 196 High Street, Kirkcaldy.

**SCOTLAND.**—June 12.—For erection of public swimming-baths at South Queensferry. Mr. J. MacIntyre Henry, architect, 7 South Charlotte Street, Edinburgh.

**SILLOTH.**—June 8.—For erection of a concrete wall and apron, about 200 yards in length, near East Cote. Mr. Robert Stubbs, surveyor, Abbey Town, Carlisle.

**SOUTHAMPTON.**—June 8.—For constructing a public convenience in the High Street, near the Town Quay. Mr. George B. Nalder town clerk, Municipal Offices, Southampton.

**SOUTHMINSTER.**—June 12.—For erection of a house. Mr. Benjamin Totham, Southminster.

**SPILSBY.**—June 12.—For building of a 2-feet 6-inch culvert at Bonthorpe, on the road leading to Mumby from Willoughby Station. Mr. Fred. J. Dixon, district surveyor, Spilsby.

**STAFFORD.**—June 10.—For alterations to lying-in wards at the Workhouse. Mr. N. Joyce, architect, Stafford.

**SWANSEA.**—June 15.—For erecting about 3,000 feet run of boarded fencing and open shedding, horse-boxes, stands and other fittings for the holding of the Glamorganshire General Agricultural Society's Meeting on August 2 and 3. Mr. W. V. Huntley, secretary, Welsh St. Donatts, Cowbridge.

**TYRONE.**—June 25.—For executing repairs and improvements at a house in Augher. Mr. Thos. Elliott, architect.

**WALES.**—June 10.—For erecting house and shop at Llan-gennech. Messrs. J. Davies & Son, architects, Cowell House, Llanelli.

**WALES.**—June 14.—For erection of a school at Pontrhondra. Mr. J. Rees, Hillside Cottage, Pentre.

**WALES.**—June 11.—For erection of a Welsh Congregational Chapel at Senghenith. Mr. Bruton, Queen Street, Cardiff.

**WEST HAM.**—June 15.—For the cleansing, repair and painting of five schools, to be executed during the summer vacation, from July 23 to August 23, for the West Ham School Board. Mr. W. Jacques, architect, 2 Fen Court, E.C.

**WHITEHAVEN.**—June 9.—For erection of new post-office, Whitehaven. Mr. J. G. Dees, Somerset House, Whitehaven.

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WIGAN.—For building a classroom at Broad o'-th'-Lane School, for the Shevington School Board. Messrs. Heaton, Ralph & Heaton, Wigan.

WINDERMERE.—June 12.—For erection of the St. John's Vicarage. Mr. John F. Curwen, architect, 51 Highgate, Kendal.

## TENDERS.

### BARWICK-IN-ELMET.

For restoration of church of All Saints. Mr. T. BUTLER WILSON, architect, 12 East Parade, Leeds, and London. J. HEATON, Aberford (*accepted*).

### BEDFORD.

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Offices.	
Warton . . . . .	£260 0 0
Coleman . . . . .	250 0 0
Foster . . . . .	245 0 0
FATHERS ( <i>accepted</i> ) . . . . .	244 0 0

Gates.	
Coleman . . . . .	30 0 0
Foster . . . . .	27 0 0
Warton . . . . .	22 0 0
FATHERS ( <i>accepted</i> ) . . . . .	22 0 0

For additions to premises, Patheshall Street.

G. E. FATHERS (*accepted*) . . . . . £229 0 0

### BRADFORD.

For erection of seven houses at Undercliffe. Mr. G. C. GAMBLE, architect, Parkinson Chambers, Bradford.

#### Accepted tenders.

Baker & Overend, Eccleshill, joiner.  
A. Taylor, Eccleshill, plasterer.

### BRISTOL.

For alterations to Messrs. Jolly & Sons' premises, College Green, Bristol. Messrs. R. MILVERTON DRAKE & JOHN M. PIZEY, architects.

A. J. Beaven . . . . . £2,430 0 0  
T. H. Brown\* . . . . . 2,370 0 0

\* Accepted subject to slight deviation.

### BURSLEM.

For erection of offices in Moorland Road. Mr. EDWIN PENN, architect, Stoke-on-Trent.

C. Cope . . . . .	£1,423 0 0
Ball & Robinson . . . . .	1,198 0 0
G. A. Foster . . . . .	1,190 0 0
W. Cooke . . . . .	1,183 0 0
J. Bagnall . . . . .	1,157 0 0
Walley & Wooliscroft . . . . .	1,149 0 0
Broadhurst . . . . .	1,105 0 0
W. Simpson . . . . .	1,104 0 0
N. Bennett . . . . .	1,101 0 0
Grant & Son . . . . .	1,089 0 0
J. J. LONGDEN, Burslem ( <i>accepted</i> ) . . . . .	1,054 0 0

### CASTLEFORD.

For erection of proposed public hall and offices in Jessop Street. Mr. R. M. McDOWALL, architect, Castleford.

#### Accepted tenders.

A. S. North, excavator, &c., bricklayer and mason . . . . .	£1,650 0 0
W. Wilson & Son, carpenter, joiner, plumber and glazier . . . . .	1,360 0 0
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W. Allison, slater . . . . .	102 10 0
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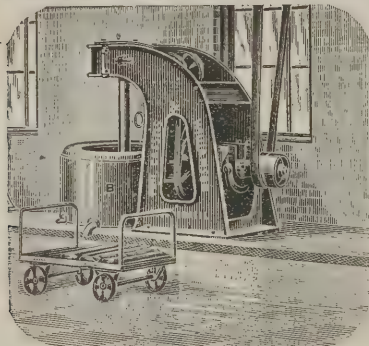
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### CROXDALE.

For erection of Board school new play sheds. Mr. H. T. GRADON, architect, Durham.

Wm. Forster . . . . .	£110 10 0
F. Caldcleugh . . . . .	110 0 0
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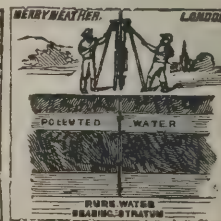
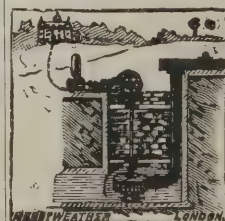
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**CROYDON.**

For alterations and additions, including new classroom (girls' department) at the Board schools, Birchange Road, South Norwood. Mr. ROBERT RIDGE, architect, 12 Katharine Street, Croydon.

E. P. Bulled & Co.	£459	0	0
J. & C. Bowyer	449	0	0
W. Akers & Co.	419	0	0
J. Smith & Sons*	405	0	0

\* Accepted subject to approval of Education Department.

**DUBLIN.**

For erecting eight labourers' cottages on the plot of ground in the townland of Puckstown.

J. WHELAN, Dublin (accepted)	£1,275	0	0
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**DUFFTOWN.**

For works of manager's and excise officers' houses to be erected at Glendullan Distillery, Dufftown. Mr. CHARLES DOIG, architect, Elgin.

*Accepted tenders.*

G. Milton, Bands, Cullen, builder	£380	0	0
A. Garrow, carpenter	275	0	0
Scott & Sellar, plasterer	109	14	6
J. Wilson, slater	71	14	6
Ross Bros., plumber	63	12	6
Garden & Ward, painter	18	3	0

**DURHAM.**

For alterations and additions to Durham Diocesan Girls' Home and Refuge. Mr. H. T. GRADON, architect, Durham.

J. Shepherd	£995	0	0
G. Gradon & Son	972	0	0

*Including New Oratory.*

J. Shepherd	1,090	0	0
G. GRADON & SON, Durham (accepted)	1,078	9	0

For erection of new house, Field House Lane. Mr. H. T. GRADON, architect, Durham.

WM. WARDROPPER, Durham (accepted)	£855	0	0
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For erection of five cottages, Framwellgate, Waterside. Mr. H. T. GRADON, architect, Durham.

F. Caldcleugh	£683	0	0
J. G. Bradley	665	0	0
G. T. Manners	645	0	0
William Walton	593	17	6
E. W. GIBSON, Durham (accepted)	593	0	0

**DURHAM—continued.**

For erection of a police station at Crook.

G. H. BELL, Bishop Auckland (accepted)	£1,835	0	0
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**DOVERIDGE.**

For alterations and additions to East Lodge, for the Right Hon. Lord Waterpark. Mr. EDWARD FORSHAW, architect, Burton-on-Trent and Uttoxeter. Quantities by architect.

Chamberlain Bros.	£2,100	0	0
Walker & Slater	2,050	0	0
T. R. Yoxall	1,995	0	0
J. T. Varlow	1,934	0	0
G. HODGES, Burton-on-Trent (accepted)	1,825	0	0
T. Goodwin, Hanley	1,761	11	0

**HANLEY.**

For rebuilding and alterations to the Mount Pleasant Inn. Mr. EDWARD FORSHAW, architect, Burton-on-Trent. Quantities by the architect.

T. GODWIN, Hanley (accepted)	£433	0	0
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**HEREFORD.**

For erection of a new wing to the City Arms Hotel, Hereford. Mr. W. W. ROBINSON, architect, 10 King Street, Hereford.

Lewis & Co.	£4,393	0	0
Bowers & Co.	4,380	0	0
W. Powell	4,312	0	0
Beavan & Hodges	4,243	0	0
J. DAVIES (accepted)	4,150	0	0

**HULL.**

For 12-inch and 9-inch sanitary pipe drainage, with manholes, inspection chambers, &c., at Hessle. Mr. WILLIAM H. WELLSTED, engineer, Prince's Dock Chambers, Hull.

B. Robinson	£695	0	0
E. Frost	690	0	0
A. H. ATKINSON, Hull (accepted)	648	16	0

For erection of smoke-houses, stables and foreman's residence in Flinton Street, Hessle Road. Messrs. FREEMAN, SON & GASKELL, architects, Hull.

*Accepted tenders.*

A. Higgins, brick, concrete and plaster.
J. F. Sweeting, stonework.
W. Dawber & Son, slating.
J. Caunt & Sons, joiner.
W. G. Padgett, plumbing and glazing.
Christopher & Stephenson, painting.

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For additional buildings and alterations at the workhouse, Celbridge.

W. FENNEL, Celbridge (*accepted*) . . . £658 0 0

## KING'S LYNN.

For alterations and repairs to the Prince of Wales inn, Mr. GEORGE THORPE, architect, Exchange Square, Wisbech.

E. Girling & Co. . . . . £355 0 0

Wells & Son . . . . . 354 0 0

Bardell Bros. . . . . 310 0 0

J. Medwell . . . . . 310 0 0

W. H. BROWN (*accepted*) . . . . . 309 0 0

H. G. Rudrum . . . . . 304 10 0

Read, Wildbur & Co. . . . . 302 10 0

Renaut Bros. . . . . 296 0 0

## LANCASTER.

For forming, kerbing, flagging, paving, &c. in thirty-five streets, courts and yards in various parts of the borough.

J. JOHNSON, Aldcliffe Road (*accepted*).

For alterations at slaughter-houses and cattle auction mart. Mr. J. COOK, borough surveyor.

*Accepted tenders.*

W. Harrison, mason.

J. Greene, joiner.

T. Cross & Son, slater.

Hathersall & Co., plumber.

## LEEDS.

For erection of a villa at Roundhay. Mr. C. FOWLER, architect, &c., 24 Basinghall Street, Leeds.

*Accepted tenders.*

Burn & Hardy, mason and bricklayer.

Abbot, carpenter and joiner.

J. Atkinson & Son, tiling.

W. Briggs, plumber and glazier.

Plasterer and painter's work not let.

## LIVERPOOL.

For supply and erection of two additional furnace cells to the refuse destructor, Smithdown Road.

MANLOVE, ALLIOTT & CO., LIMITED (*accepted*) £995 0 0

## LONDON.

For painting Addison Gardens Bridge. Mr. H. MAIR, C.E., surveyor.

W. BROWN (*accepted*) . . . . . £102 0 0

For whitewashing and cleaning the interior of asylum in Cleveland Street, Fitzroy Square, W.

W. H. Brydges . . . . . £270 8 0

Love & Co. . . . . 205 0 0

A. Scott & Son . . . . . 197 0 0

J. R. Jackson . . . . . 184 0 0

G. McArthur . . . . . 179 17 0

W. C. Eady . . . . . 151 0 0

G. Houghton . . . . . 150 0 0

J. Parsons . . . . . 150 0 0

C. Trelaine . . . . . 137 0 0

Dorrell & Co. . . . . 130 0 0

W. HORNETT, Strand (*accepted*) . . . . . 118 0 0

For alterations and dilapidations at the Park Tavern public-house, Portway, West Ham, E., for Mr. S. Knight. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.

C. North . . . . . £346 0 0

Hearle & Farrow . . . . . 313 0 0

A. E. Symes . . . . . 293 0 0

C. Simmons . . . . . 275 0 0

G. & H. COCKS (*accepted*) . . . . . 275 0 0

For additions, alterations and fittings at the White Hart Hotel, Gipsy Lane, Upton Park, E., for Mrs. M. A. Fry. Mr. FRED. A. ASHTON, architect, 177 Romford Road, Stratford, E.

A. E. Symes . . . . . £2,675 0 0

J. & H. COCKS . . . . . 2,502 0 0

W. Shurmur . . . . . 2,470 0 0

W. Watson . . . . . 2,420 0 0

Hearle & Farrow . . . . . 2,300 0 0

W. I. Maddison . . . . . 2,255 0 0

C. Simmons . . . . . 2,260 0 0

## MACCLESFIELD.

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S. & W. WHITTAKER (*accepted*) . . . . . £48 0 0

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For piling at Maidstone. Mr. HUBERT BENSTED, architect,  
Week Street, Maidstone.

J. Nolan, Ethelbert Villa . . . . .	£216	14	0
G. Batchelor, jun. . . . .	110	0	0
W. HOCKING, jun., Rochester (accepted) . . . . .	79	0	0

For concrete foundation. Mr. HUBERT BENSTED, architect,  
Week Street, Maidstone.

G. Batchelor, jun. . . . .	£456	0	0
J. Nolan, Ethelbert Villa . . . . .	303	10	0
W. HOCKING, jun. (accepted) . . . . .	187	0	0

**MARKET DRAYTON.**

For erecting two shops, &c., in Cheshire Street. Mr. G. A.  
CRAIG, architect, Market Drayton.

Wood & Son . . . . .	£783	5	0
G. Bullock . . . . .	687	0	0
G. MONTFORD, Market Drayton (accepted) . . . . .	650	0	0

**MIDDLESBROUGH.**

For paving Denmark Street from Newport Road to North  
Road.

J. T. Dixon . . . . .	£1,738	16	4
T. D. RIDLEY, Middlesbrough (accepted) . . . . .	1,597	13	8
T. Hunt . . . . .	1,372	0	3

For reconstruction and repair of Richmond Street and the  
back passage between Salisbury and Walker Streets.  
Mr. FRANK BAKER, borough engineer.

*Richmond Street.*

T. Hunt . . . . .	£113	3	9
J. T. DIXON, Preston-on-Tees (accepted) . . . . .	89	1	2

*Back Salisbury and Walker Streets.*

J. Sparkes . . . . .	192	16	6
T. Hunt . . . . .	174	6	10
J. T. Dixon . . . . .	144	1	3
GOODHALL BROS., Middlesbrough (accepted) . . . . .	138	16	5

**NEWPORT.**

For adding a vestry to the parish church.  
BRADNEY & LLOYD, Shifnal (accepted).

**NUNEATON.**

For construction of sewers at Stockingford.  
J. MORETON (accepted).

**NEWCASTLE.**

For erection of a house, corner of King Street and Gower  
Street. Mr. ELIJAH JONES, architect, 10 Albion Street,  
Hanley.

G. A. Foster . . . . .	£1,598	0	0
J. Gallimore . . . . .	1,595	0	0
C. Brayford . . . . .	1,469	0	0
C. Cornes . . . . .	1,465	0	0
York & Goodwin . . . . .	1,460	0	0
Walley & Wooliscroft . . . . .	1,445	0	0
J. Bagnall . . . . .	1,418	0	0
C. Cope . . . . .	1,393	0	0
T. GODWIN, Hanley (accepted) . . . . .	1,359	0	0

**NOTTINGHAM.**

For erection of new technical centre, &c., Leen Side Board  
school. Mr. A. H. GOODALL, architect, Nottingham.

J. Hutchinson . . . . .	£1,780	0	0
Appleby & Lambert . . . . .	1,690	0	0
W. Maule . . . . .	1,660	0	0
T. Cuthbert . . . . .	1,657	0	0
J. Skerritt . . . . .	1,627	15	6
G. A. Pillatt . . . . .	1,597	0	0
H. Vickers . . . . .	1,526	0	0
T. Barlow (accepted) . . . . .	1,516	0	0

**NEW TREDEGAR.**

For erection of seven houses on the Gasfield, Tirphil, and four  
houses on the Greenfield. Mr. GEORGE KENSHOLE,  
architect, 26 Duffryn Terrace, New Tredegar.

*Seven houses, at per house.*

Phillips & Jones . . . . .	£239	15	0
W. Williams & Sons . . . . .	210	0	0
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R. Samuel . . . . .	189	10	0

THOMAS BROS., Danygraig Road, Potyminster  
(accepted) . . . . .

Jones Bros. . . . .	179	10	0
	157	15	0

*Four houses, at per house.*

W. Williams & Sons . . . . .	182	0	0
Phillips & Jones . . . . .	169	10	0
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J. Lloyd . . . . .	163	17	6
R. Samuel . . . . .	159	0	0
Jones Bros. . . . .	156	0	0
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For erection of new Wesleyan Methodist church.	Mr. H. T. GRADON, architect, Durham.
W. Lodge . . . . .	£2,108 10 8
G. T. Manners . . . . .	1,937 0 0
J. Kell . . . . .	1,747 12 0
J. Lovett . . . . .	1,663 12 8
T. HAILTON, Bishop Auckland (accepted)	1,639 0 0

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For adapting the Commons House to the purposes of a technical school.	Mr. ALFRED PRICE, architect, Elworth, Sandbach.
J. Stringer . . . . .	£411 0 0
J. Mellor . . . . .	397 10 0
W. Jones . . . . .	384 0 0
S. BRERETON (accepted)	295 0 0

**SHOREHAM.**

For erection of two dwelling-houses and shops.	Mr. W. H. HARKER, architect, Shoreham.
J. Rooke . . . . .	£1,025 0 0
G. Gillam . . . . .	1,080 0 0
E. A. Knight . . . . .	945 7 0
W. T. Watson . . . . .	850 0 0
C. E. KEMP & SONS, Hove (accepted)	908 0 0

**SHREWSBURY.**

For painting the inside of the general market	Mr W. CHAPLE EDDOWES, borough surveyor.
W. Lee . . . . .	£175 0 0
J. H. Perks . . . . .	160 10 0
RAVENSCROFT & MANSELL, Shrewsbury (accepted)	149 0 0

**SLEAFORD.**

For erecting a residence in North Street.	J. BANKS, Sleaford (accepted)
	£575 0 0

**SLIGO.**

For building walls, &c. round the burial-ground of Carrigeens, near Carney.	M. KENNY, Doonfore, Grange (accepted)
	£57 10 0

**SNARESBROOK.**

For decoration to house.	Mr. HERBERT RICHES, architect, 3 Crooked Lane, King William Street, E.C.
T. Osborn & Sons . . . . .	£245 0 0
W. Mundy . . . . .	199 0 0
F. J. EVANS (accepted)	197 0 0

**SOUTHWARK.**

For erection of new premises, Swan Street, for the Standard Bakery Company.	Mr. R. E. CROSSLAND, architect.
Holloway Bros. . . . .	£8,513 0 0
Jas. Smith & Sons . . . . .	7,547 0 0
John Grover & Son . . . . .	7,525 0 0
J. Carmichael . . . . .	7,396 0 0
Patman & Fotheringham . . . . .	7,151 0 0
HARRIS & WARDROP (accepted)	6,963 0 0

**SOWERBY BRIDGE.**

For pulling-down the old stone tannery, Gratrix Lane, Sowerby Bridge, and rebuilding the same three storeys high.	Mr. S. WILKINSON, architect, Sowerby Bridge.
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*Accepted tenders.*

W. Sutcliffe, mason and bricklayer.
Whiteley Bros., joiner and carpenter.
T. Dyson, slater.
W. Fox & Son, plumber and glazier.

**STOCKPORT.**

For excavating, sewerage, forming, paving, kerbing and flagging new street from London Place to Middle Hillgate (in lieu of the Old Covent Garden and Lead Yard), and also Banbury Street, off the same, with all works connected therewith, viz. building retaining walls, constructing steps, landing, and other mason's work, &c.	Mr. JOHN ATKINSON, borough surveyor.
W. C. Broadhurst & Co. . . . .	£1,206 13 8
A. Taylor . . . . .	1,172 10 6
P. D. & S. W. HAYES, Stockport (accepted)	1,135 6 10

**STOCKTON-ON-TEES.**

For alterations and additions to houses and shops, 1, 2, and 3 Bishop Street.	Mr. JNO. SANDERSON, architect, 134 High Street, Stockton.
J. DAVISON, Springholme Building Works (accepted)	£362 17 9

**SWANSEA.**

For erection of an additional cottage or block at the union cottage homes, Cockett, near Swansea.	W. WILLIAMS, Swansea (accepted)
	£1,022 0 0

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**ST. LEONARDS-ON-SEA.**

For erection of infant school for the United District School Board, Hastings. Messrs. ELWORTHY & SON, architects, St. Leonards-on-Sea. Quantities by architects.

H. E. Cruttenden . . . . .	£3,855	0	0
J. Geary . . . . .	3,790	0	0
F. Cruttenden . . . . .	3,697	0	0
E. Gutsell . . . . .	3,222	0	0
Barton & Gasson . . . . .	3,210	0	0
C. Hughes . . . . .	3,199	0	0
ELDRIDGE & CRUTTENDEN, St. Leonards (accepted) . . . . .	3,172	0	0

**SWINDON.**

For erection of the New Queen's Theatre. Messrs. R. MILVERTON DRAKE & JOHN M. PIZEY, architects, Bank Chambers, Baldwin Street, Bristol. Quantities by Mr. WM. VEALE, Brighton Chambers, Bristol.

Flewelling & Huckson . . . . .	£9,950	0	0
C. WILLIAMS (accepted) . . . . .	9,936	0	0

**TICEHURST.**

For erection of Wesleyan chapel to seat about 200, with school-room, vestries, &c.

L. EDWARDS, Hawkhurst (accepted) . . . . .	£945	0	0
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**TIPTON.**

For raising, restoring, metalling, kerbing and channelling a portion of main road at Toll End. Mr. W. H. JUKES, surveyor.

J. Gittings . . . . .	£900	0	0
J. Bott . . . . .	875	10	0
J. FORD, Coalville (accepted) . . . . .	851	0	0

**TROWBRIDGE.**

For alterations, &c., at Market Street. Mr. WALTER W. SNAILUM, architect, Trowbridge.

E. Linzen . . . . .	£115	0	0
J. Price . . . . .	87	10	0
W. R. MOODY, Polebarn Road (accepted) . . . . .	80	0	0

**UTTOXETER.**

For alterations and new stabling at the White Horse inn. Mr. EDWARD FORSHAW, architect, Burton-on-Trent and Uttoxeter.

I. WARD & SONS (accepted) . . . . .	£600	0	0
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**WARRINGTON.**

For painting iron rails and gates at the cemetery. Mr. THOMAS LONGDIN, borough surveyor.

JEFFERSON BROS. (accepted).

For supply of 100 manhole covers, 100 gullies, and 200 manhole stepirons. Mr. THOS. LONGDIN, borough surveyor.

J. S. Garland, Bridge Street (accepted) . . . . .	£136	4	6
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**WARWICK.**

For erection of tramp wards, &c., at the workhouse. Mr. F. P. TREPESS, architect, 8 Jury Street, Warwick. Quantities supplied by architect.

J. W. Randall . . . . .	£2,751	7	1
R. Bowen . . . . .	2,699	0	0
Smith & Sons . . . . .	2,428	0	0
T. Bailey . . . . .	2,338	6	0
J. H. & T. Castimore . . . . .	2,324	0	0
E. TALLIP, Warwick (accepted) . . . . .	2,212	0	0
Architect's estimate . . . . .	2,535	0	0

**WEST BRIDGFORD.**

For laying sewers and surface-water drains, manholes, &c., and for forming, levelling, kerbing, channelling and metalling about two miles of roads on the Mutual Freehold Land Association's Estate at West Bridgford. Mr. W. H. RADFORD, engineer, Angel Row, Nottingham.

W. Moss . . . . .	£14,500	0	0
Cope & Raynor . . . . .	14,493	14	6
T. Smart . . . . .	14,296	0	0
H. H. Barry . . . . .	13,351	3	0
J. H. Vickers, Limited . . . . .	13,306	14	10
M. Hall . . . . .	12,738	2	10
J. Holmes . . . . .	12,543	18	8
Siddons & Freeman . . . . .	11,200	0	0
BOWER BROS., Halifax (accepted) . . . . .	10,981	0	0

**WHITTLESEY.**

For repair of three bridges near Whittlesey.

Accepted tenders.

C. Ashley, Field's End Bridge . . . . .	£391	10	0
R. Swann, Angle Bridge . . . . .	284	0	0
R. Swann, Ponder's Bridge . . . . .	153	0	0

**WINCHESTER.**

For erection of a sanatorium. Mr. THOMAS STOPHER, architect, 57 High Street, Winchester.

FIELDER & SON, Westgate (accepted) . . . . .	£1,290	0	0
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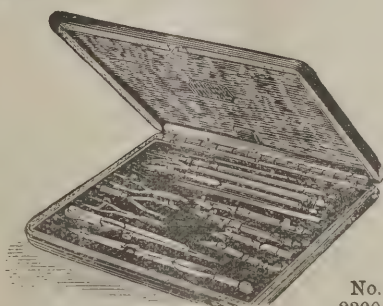


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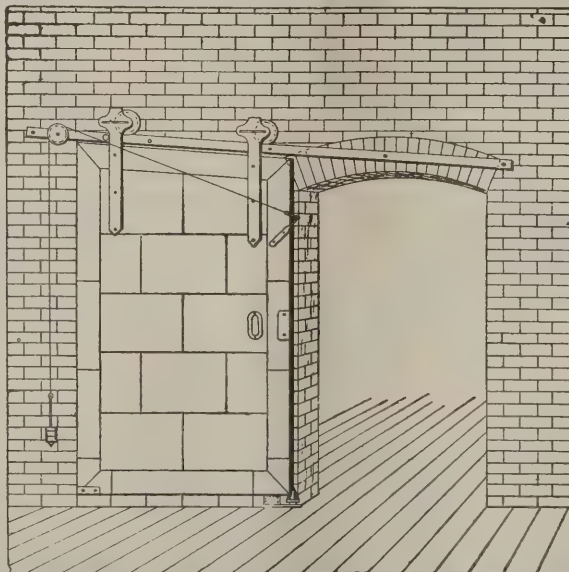
evident. The photograph which we reproduce will give some idea, although an inadequate one, of their extent; in fact, they resemble art galleries rather than mere showrooms, while the goods displayed therein are seen to great advantage and emphatically demonstrate that the old firm, although established upwards of 130 years, instead of crystallising or resting contentedly on its reputation, is as elaborately up-to-date as the newest.



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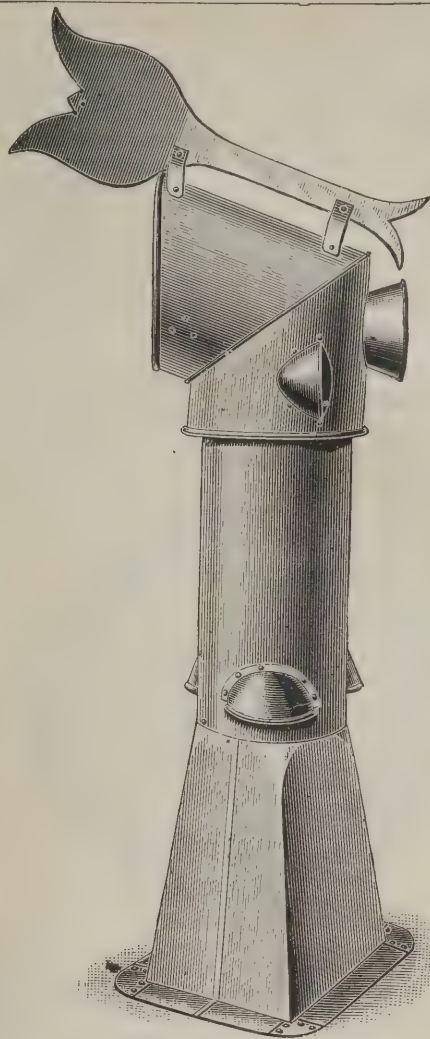
CATHEDRAL SERIES.—NORWICH: THE CLOISTERS.—VIEW FROM CLOISTER COURT.

ROOM DECORATION.

SHEFFIELD MUNICIPAL BUILDINGS.—MAYOR'S SEAT IN COUNCIL CHAMBER, FROM GROUND LEVEL.

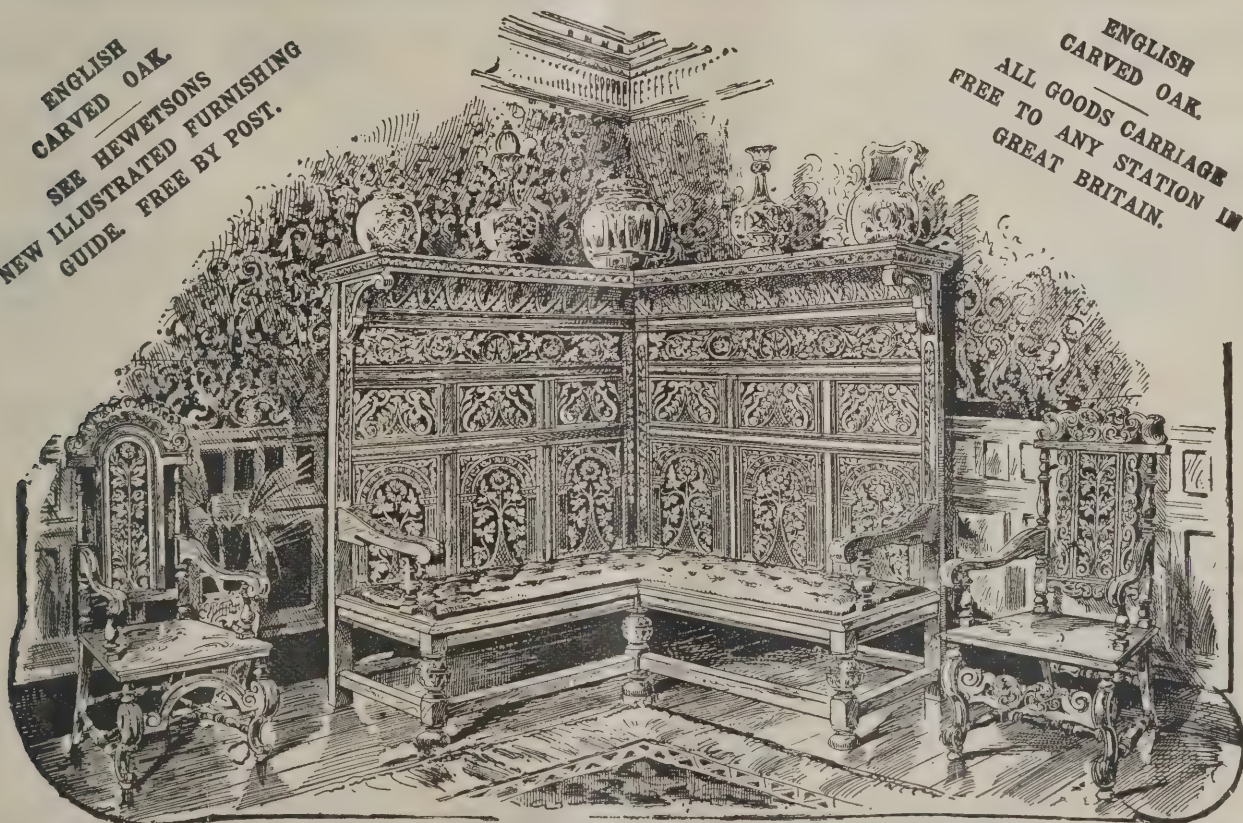
## TRADE NOTES.

THE "Soho" cowl and ventilator, which is being put on the market by Mr. L. Nicklin, Despatch Works, High Park Road, Smethwick, can be confidently recommended as an efficient apparatus. It is the joint invention of Messrs. Nicklin & Milward, and possesses the advantages of simple construction, the absence of parts requiring oiling and the substitution of rivetting for soldering in the putting together, this last-named feature being regarded as a safeguard should the chimney catch fire. Another point is the introduction of a current of air at the back of the cowl, which, passing over the back of the fan-shaped shield, increases the suction in the head of the cowl and clears the main pipe of smoke, increasing the up-draught to a considerable extent, while offering resistance to down-draught. To further increase the up-draught, currents of air are introduced on each side of the cowl head acting under the fan-shaped shield, and add very materially to the suctional power of the cowl. The double vanes on the top of the cowl keep the head subservient to the action of the wind, adding very much to the efficiency of the cowl. By their action the wind currents have a direct pressure on both wings, keeping the head of the cowl in such a position that the wind rushing through the inlets greatly increases the draught. The main pipe being quite clear, the sweep's brush can pass without obstruction to the middle of the head of the cowl and thus clear the pipe of any soot that may have accumulated. The semicircular base for the pivot prevents the brush from displacing the head of the cowl and adds strength to the pivot by reducing its length—a matter of great consideration in stormy weather, as many cowls are rendered useless at such times by the pivot becoming bent and preventing the free revolution of the cowl. The pivot is fitted with an adjustable nut placed inside a lateral stay or bracket so fixed as to prevent the head of the cowl being blown off in the severest gale. The fan-shaped shield is claimed to be a great preventative of down



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and back-draught, it being placed in the head of the cowl at an angle that directs the back-draught through the inlet at the rear and also through the side inlets, they being placed in a direct line with the mouth of the cowl. To entirely obviate the possibility of any smoke or down-draught entering the chimney itself, three outlets are placed in the lower part of the main shaft, as shown in illustration.

THE Cargo Schools, Carlisle, are being warmed and ventilated by means of Shorland's patent Manchester grates, patent exhaust roof ventilators and special vertical inlet tubes, by Messrs. E. H. Shorland & Brother, of Manchester.

MESSRS. WIDNELL & TROLLOPE, surveyors, have removed from 13 Parliament Street to Broad Sanctuary Chambers, Tothill Street, Westminster, S.W.

### LINCRUSTA-WALTON DECORATIONS.

MESSRS. FREDERICK WALTON & CO., of 2 Newman Street, W., send us some sketches of commemorative and other designs which they have recently got out for their well-known Lincrusta-



Walton decoration. Among the more strictly commemorative of these is the admirable portrait medallion of Her Majesty, of which we give an illustration. The size of this is 13 inches diameter, and it can be had decorated in various styles and

colourings at prices varying from 1s. to 3s. Other designs comprise the royal arms, the royal standard, the Prince of Wales's feathers, the badges of England and Scotland, &c., &c.

### BUILDING AND BUILDERS.

A MAUSOLEUM, to cost about 50,000*l.*, is being erected in Fairmount Cemetery, Newark, N.J., for Gottfried Krueger, a millionaire brewer of that city, which when completed will have few equals in point of architectural beauty in the United States.

A MEMORIAL-STONE of the new church of St. Stephen, Prenton, was laid on the 27th ult. Only the nave of the new church will be completed at present, and will cost about 4,000*l.*, seats being provided for 300 worshippers. The entire scheme will cost about 8,000*l.*

THE old building known as the Empire Music Hall and Vaults at Wolverhampton is to be rebuilt at a cost of about 42,000*l.* There will be nine entrances and exits, and the building will be lighted throughout by electricity. The license has been unanimously granted on the application of the architects, Messrs. Owen & Ward, of Birmingham, and the plans passed.

THE carpenters employed in the erection of the jubilee stand in the churchyard at St. Clement Danes, Strand, struck work for an advance in wages of 2*d.* per hour, from 10*d.* to 1*s.*, on Monday last. The men, numbering over 100, were employed by the firm of Messrs. Kirk & Randall, contractors, Woolwich, and, without the slightest warning, threw down their tools and refused to resume work until their demand had been conceded. Delegates were appointed to meet the employers, and it was pointed out on behalf of the men that the carpenters employed in the erection of stands at St. Paul's, Charing Cross, St. Martin's-in-the-Fields and other places had been conceded the 1*s.* per hour. Later in the afternoon the firm decided to grant the demand for an advance of 2*d.* per hour.

MESSRS. WARING & SONS, of 181 Oxford Street, have on exhibition a fine collection of the English productions of the Della Robbia Pottery from Birkenhead, and a very notable selection of embroideries from Spain and Italy. The exhibition was visited by Princess Christian, who evinced great interest in and an artist's appreciation of the various objects shown.

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## VARIETIES.

THE small town of Namsos, in the province of Nordre Trondhjem, has been entirely burned. The flames spread with such rapidity, owing to the high wind, that the inhabitants, who number about 1,800, were unable to save even their furniture.

A FIRE broke out on Sunday last in the roof of Coatbridge East Free Church, Airdrie, while a large congregation was engaged in worship. A timely warning was given by the officiating clergyman, and the people quietly dispersed without the least confusion. The fire soon spread, and did damage to the estimated amount of 1,500*l*.

A HOUSE was struck by lightning at Blackburn on the 28th ult. Every pane of glass was shattered, and doors were torn off, furniture smashed and walls split. Two women and a child were injured.

THE public health committee of Aberdeen Town Council have reported the arrangements that had been made for the Congress of Sanitary Inspectors, to be held in the city on June 17.

A NEW school at Lostock, Grantham, near Northwich, to accommodate 300 infants, was opened on Monday last. It is a pretty half-timbered building, and has been built at a cost, exclusive of the site, of 1,200*l*.

THE Llandudno branch of the Metropolitan Bank of England and Wales has been reopened after extensive alterations, which have practically converted the old premises into a new building, with every modern improvement. The work has been done from designs by Mr. G. A. Humphreys, architect, the contractor being Mr. Thomas Jones.

IT is announced that the firm of Aldam Heaton, lately constituted as a limited company, is to extend the business, so long carried on in Bloomsbury Street, by opening new premises as showrooms for exhibition of designs and decorative furnishing work. This branch establishment will be opened on or about June 10 next, at 89 Mount Street, Grosvenor Square.

A CONFERENCE of delegates of trades favourable to the formation of a Scottish National Trades' Federation was held on the 29th ult. in the Trades Hall, Glasgow. Draft rules were submitted and approved. It is provided in the constitution of the Federation that "when any trade movement is likely to involve a society in a dispute with their employers, the society

shall give immediate notice to the secretary of the Federation, and should a strike or lock-out occur, no member or members of the Federation shall do any of the work of the men in dispute, or work on any job where 'blacklegs' are brought in to do the work of the men on strike or locked out."

THE next ordinary meeting of the Society of Engineers will be held at the Royal United Service Institution, Whitehall, on Monday, June 14, when a paper will be read on "The Compression of Air by the direct action of Water," by Professor Herbert W. Umney, Assoc.M.Inst.C.E., and a visit will be made to the London section of the Manchester, Sheffield and Lincolnshire Railway (extension to London) works in progress on Thursday, June 17.

THE new Gordon Hotel, which is being erected on the Lees at Folkestone, where it stands in its own grounds of about four acres, is rapidly approaching completion, and will be ready for opening in the course of a week or two. It contains accommodation for 350 visitors, and comprises excellent dining-halls and drawing-rooms, a library and many fine suites of private apartments. The grounds contain a number of tennis-courts, well sheltered, and it is intended to hold concerts in the large hall, whilst a private orchestra will perform during lunch and dinner in the public rooms.

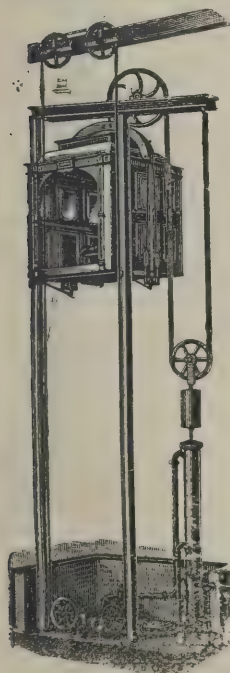
THE promoters of the Whitechapel and Bow Railway scheme have concluded settlements with all the opponents who threatened opposition to this railway before the select committee of the House of Commons to which it was referred. The Bill, which will now pass as an unopposed measure through the first House, provides for the incorporation of a new company for the purpose of constructing a railway from junctions with the Metropolitan and Metropolitan District Railways at Whitechapel to a junction with the London, Tilbury and Southend Railway in the parish of St. Leonard, Bromley. The estimated cost of constructing this railway is 672,500*l*.

THE new Wesleyan school chapel, which adjoins the old sanctuary in the Dudley Port Road, Dudley Port, was formally opened on May 31. The building, which is of Gothic style, is capable of accommodating 400 persons, and is designed to harmonise with a larger chapel it is intended to erect on the remainder of the site when sufficient funds can be raised. Until the erection of the larger building the old chapel will be utilised as a school, and the structure, to which is attached an infant schoolroom, will be devoted to chapel purposes. The cost of building and furnishing is about 1,300*l*. The work has been carried

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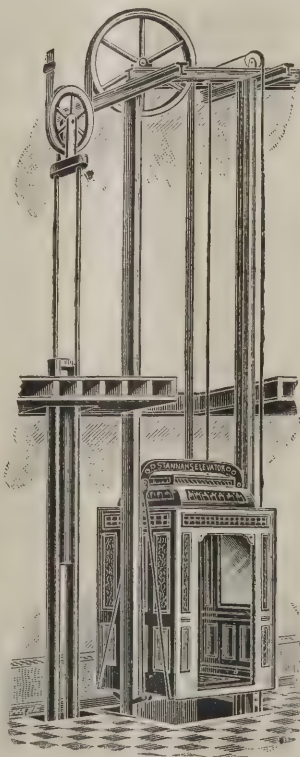


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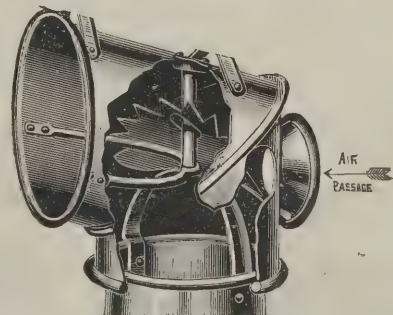
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"Your cowl has proved a complete success, no matter which way the wind blows. Please forward me another one at once."

The Smethwick Ventilating Co.,  
DESPATCH WORKS, SMETHWICK,  
Near BIRMINGHAM.



out by Mr. E. Cooper (Blackheath), under the direction of the architect, Mr. Alfred Long (West Bromwich).

THE Queen's rooms at the Windsor terminus of the Great Western Railway will be completed before Her Majesty's return from Scotland. They are contained within a building of handsome elevation, its Bath-stone walls being ornamented near the yard and platform entrances with Robin Hood stone tablets sculptured with an Imperial Crown and the motto "Dieu et mon droit," surrounded by acorns, oak sprays and laurel leaves. The interior of the royal station is divided into three chambers, the principal being the salon where the Queen will alight when arriving at or leaving Windsor. This is an elegant apartment, with niched walls and oak panelled wainscoting, the Italian Renaissance ceiling being domed by a cupola of tastefully leaded windows. An ante-room and lavatory adjoin it. The royal waiting-rooms and their approach are covered by an arched iron and glass roof springing from massive columns. This spans the broad road in front of the Queen's apartments, and affords a sheltered space for the assembling of cavalry escorts and guards of honour at State receptions. An ornamental verandah overhangs the platform side of the building and screens it from the weather. The electric cable, which is to convey the current for lighting the royal rooms, has been laid into the station.

A NEW United Presbyterian church in Langside, N.B., was opened on May 21. The new church stands on the site of the old one, at the corner of Langside Road and Stevenson Drive, the principal front being to Langside Road. It is in late Decorated Gothic style, and is built of yellow stone with red freestone dressings and corners. The main entrance is by a projected porch at the base of a tower which is placed at the north-east corner. The entrance has a richly moulded archway with a tympanum filled with cusped panelling, under which are double doors admitting to the vestibule. In the lower part of the main gable fronting Langside Road are two triplet windows lighting the area under the gallery, and above there is a large five-light window with moulded jambs and rich traceried head. On the side elevation the lower stage has a series of square-headed windows, and the upper stage has in each bay a three-light window with elliptic head. The pulpit-platform and organ-chamber form a projection of chancel form to the southern end. Above this is a four-light traceried window. The church internally is divided into nave and side aisles, with galleries at sides and end. The side galleries and main roof are supported on moulded-iron columns which rise the full height from the floor.

The roof is entirely in timber, with dressed main couples, partly filled in with moulded tracery. The session-house and vestry buildings form an attached group at the end of the Stevenson Drive front, and the hall buildings are at the south-west corner of the site. The church has been seated to accommodate 780 worshippers, the hall 300, and two classrooms forty each. The buildings have been designed by Mr. John B. Wilson, Glasgow.

AMONG the improvements which Lord Tweedmouth contemplates making at Hutton Castle are two new approaches, the one from the west by way of Berwick or Chirnside, across the Whitadder at the Blue Stone Ford, and the other from the east of the castle by way of Berwick, or through the Whitadder by Edington Mill Ford. A handsome lodge has been constructed at the west drive. Additional bedroom accommodation and buildings for servants, &c., are to be provided, so as to make a residence during certain seasons of the year in Berwickshire. Further stabling accommodation will also be erected. The old tower is to be made habitable, the centre part being raised one storey with four pepper-box turrets at the corners. The new portions will have asphalt roofs with embrasures and parapets. There will also be internal alterations. The architect is Mr. George Duns, of Duns.

THE new railway station at Boscombe, Bournemouth, was opened for traffic on the 1st inst. This station is the fifth built by the South-Western Company in the town within a radius of three miles from the pier, and for a population of 50,000.

CROYDON Corporation is about to apply to the Local Government Board for sanction to borrow 32,000*l.* for the construction of new waterworks at Waddon, where boring operations have been carried on with great success. The average daily consumption of water in Croydon is nearly 3,000,000 gallons.

#### ASBESTOS FIREPROOF DECORATIONS.

AN interesting exhibition of the products of the United Asbestos Company, Limited, as applied to the purposes of internal house decoration, was opened by Colonel Robert W. Edis at St. James's Hall on Monday last. The show, which is effectively arranged in the rooms of the Society of Architects, comprises specimens of all the company's specialties in "Salamander decorations," which are made wholly from asbestos, and are consequently entirely fireproof. Among the most

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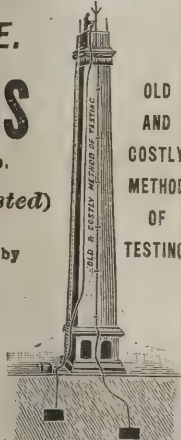
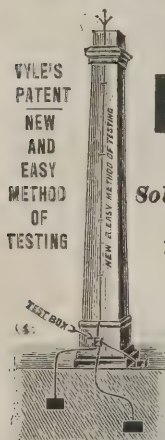
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interesting of the exhibits may be mentioned specimens of crude asbestos, as taken from the mines in Italy; serpentine rock, showing the asbestos formation; asbestos in a state of partial manufacture (corded fibre), asbestos thread, yarn, cloth, &c.; asbestos-metallic cloth, as made specially for theatre curtains; working model of fire-resisting drop-curtain for theatres (Booth & Fisher's patent); illustration of Queen's Theatre, Manchester, after the fire in 1890. (The stage and effects were saved by the asbestos curtain); a piece of the asbestos curtain removed after the fire; asbestos curtains, plain and in colours; "besolite," fire and weather-proof, in lieu of wood, &c., for partitions, match-lining, roofs, bungalows, and portable buildings; rough model of portable building made with "besolite;" asbestos ropes and ladders for fire-escapes; asbestos jackets, gloves, &c.; asbestos blankets for isolating fires; asbestos fire and water proof cloth, suitable for awning, tents, &c., obviating danger from naked lights or sparks; asbestos paints, &c.; ordinary muslin treated with "anti-flame," which prevents ignition and does not destroy colours, and other specialties.

### NEW CATALOGUES.

MESSRS. GREEN & CO., of Bradford Street, Birmingham, who have acquired all Green & Comforth's patents, and those of John Green & Co. (both of which firms were of Wolverhampton), send a catalogue containing illustrations of their English hand-made locks and latches and rose attachment to knobs, combined patent double-hand mortise and V bolt locks and latches, patent combined two-bolt mortise and rim locks and latches, patent wedge catch and tell unpickable locks for safes and all purposes, patent tell-tale office door indicator locks, patent asylum and prison door locks, patent three-keyed treble secure locks suitable for hall and other outside doors where extra security is required, &c.

MESSRS. ADAMS & CO., of York and Leeds, are issuing a very elaborately got up catalogue consisting of upwards of one hundred folio pages of well-printed and profusely illustrated descriptions of their well-known sanitary specialties. To mention these categorically would require much more space than we have at our disposal. We cannot, however, pass over without special comment their patent "Epic" slab closet, which is unsurpassed for elegance of design by any which we have seen. Their "Cresset" urinal is also worthy of note, and architects and municipal authorities should obtain the book.

MESSRS. A. R. DEAN, LIMITED, of Corporation Street, Birmingham, have sent us their book of original designs for chimneypieces, grates, &c. Among the illustrations are some excellent reproductions of photographs of a hall, dining, drawing, billiard and bedrooms, completely furnished and showing in *ensemble* the fittings which are elsewhere given in detail. As the latter are also from photographs, and are plainly priced, the book will be found most useful to those in search of such goods.

### MANCHESTER COUNCIL FOR THE REGISTRATION OF PLUMBERS.

THE last lecture of the series for 1896-97, arranged by the Manchester Council for the Registration of Plumbers, was delivered on Monday last at the Municipal Technical School by Mr. H. Gilbert Whyatt, deputy borough engineer, Salford, who took for his subject "The Requirements of Municipal Authorities with respect to Plumbing." Mr. J. H. Edmiston, vice-president of the Council, presided.

Mr. Whyatt traced the progress of sanitary legislation down to the Public Health Act, 1875, and the Public Health Acts Amendment Act, 1890, in which plumbers had special concern. He then took the plumbers' work in a house *seriatim*, and explained the requirements of Acts of Parliament and local by-laws, particularly those of Manchester and Salford, with regard to eaves, gutters, down-spouts, water-closets, cisterns, traps, soil-pipes, vent-pipes, waste-pipes, water-fittings, hot-water supply, gasfittings, &c., and incidentally he discussed such matters as the allowance of water made for flushing purposes, the quality of material fittings, &c. In conclusion, the lecturer said that, seeing municipal authorities had such stringent regulations and powers, they should be very careful with regard to those whom they placed on their "authorised lists" of plumbers. He agreed in the contention of the Association that nobody should be certified by a municipal authority as a qualified plumber (for that was how the public regarded it) without passing an examination such as was required from candidates for registration. Every plumber and journeyman in the district should be registered, as a guarantee to the public of his fitness to carry out the very responsible work entrusted to him, and the authorities might with advantage require anyone applying to be placed on the authorised

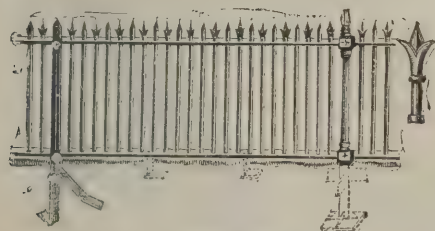
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list of plumbers that he should present the Association's certificate of qualification. On the other hand, he would require the Corporation inspectors to pass a searching examination in plumbing, for it was palpably unfair that a craftsman who had spent years in learning a trade should be at the mercy of an inspector who might have no knowledge of the trade at all.

### WATER DIVINING.

At the annual audit of the accounts of the Urban District Council of Ampthill, Bedfordshire, which was completed on Friday last by Mr. W. A. Casson, the Local Government auditor for the county, several ratepayers raised objections to an expenditure incurred in the employment of Mr. Leicester Gataker, a water diviner. They produced geological plans and sections to show that, if the diviner's recommendations were acted on, the Council would be boring into a stratum of Oxford clay, the depth of which had not been fathomed as yet, although a boring had been made to 700 feet and no water obtained. The district council had applied to the Local Government Board for a loan to carry out boring experiments to test Mr. Gataker's recommendations. The Board ordered a water supply to be procured within a limited time, leaving the council a free hand how they went to work, and they unanimously resolved to employ Mr. Gataker. In reply to the auditor, the chairman said that Mr. Gataker did undoubtedly hold out that he had a mysterious power of discovering water. His method was to start with his arms spread out and walk slowly over the ground. Suddenly he would stop as though he felt a shock, and it was there that he "located" a spring. He would then step backwards and forwards to ascertain the depth of the spring and the volume of water. In his report he named a number of springs in one field, and the total of the water there was more than ample for the town. The auditor, in announcing his decision, stated that in seeking for water the district council had disregarded the reports of experts and had gone for guidance to a man who had a reputation for discovering water by some unusual and peculiar method not possible to ordinary persons, and the question he had to settle was whether this was legal or not. He noted that Mr. Gataker took the trouble to do what ordinary professional men would not think of doing, namely, to state, "I guarantee my business to be genuine," whilst no guarantee whatever in the legal sense was given that water would be found where it was located. Money

might properly be spent on experimental borings under proper advice, but it had not been proved that this man had any greater power than anyone else. The district council were in the position of trustees of public moneys and must not spend them in a speculative manner. In the only case that had come before the courts which bore upon this matter the judges had held that "the pretence of power, whether moral, physical, or supernatural, with intent to obtain money was sufficient to constitute an offence within the meaning of the law," and he (the auditor) thought that, as Mr. Gataker claimed to exercise some such power, his employment was clearly illegal, and the amount of his fee would therefore be disallowed, and the gentlemen who authorised the payment surcharged with it. They could appeal either to the Queen's Bench Division or to the Local Government Board against the surcharge.

### COUNTY COUNCIL FINANCE.

THE report of the district auditor, Mr. Lloyd Roberts, on the accounts for the year ended March 31, 1896, has been presented. The gross indebtedness of the Council on that date, with respect to loans on mortgage and Metropolitan Consolidated stock amounted to 34,937,730 $\frac{1}{2}$ l., but, taking into consideration the Council's assets, consisting principally of outstanding loans to local authorities and the value of the surplus lands held by the Council, the net debt on the date mentioned was 19,215,400 $\frac{1}{2}$ l. In the course of a few observations on the accounts of the Works Department, the auditor points out that the department was not entrusted with the expenditure of cash, except in small amounts for petty disbursements, and the accounts kept by the officers of the department related simply to the apportionment of the cost of labour and materials to the various works which they executed. It was to be remarked that the irregularities were detected without delay by the comptroller under the system of check provided. The system of accounts adopted was one which, in his opinion, if properly carried out, enabled the Works Department to show the cost of the various works executed by them, as far as it was possible to arrive at the same. But he observed from the comptroller's report to the special committee dated December 11, 1896, that "documents were in some cases fabricated and in others tampered with, that there was collusion between various officials of the department, and it was only by questioning and testing original vouched documents that the improper entries were dis-

**TOTAL ASSETS, £9,708,495.**

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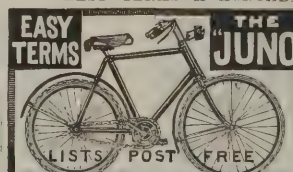
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covered." When those conditions existed, his experience led him to the conclusion that it was only from information or knowledge outside of the documents that irregularities of this kind could be detected.

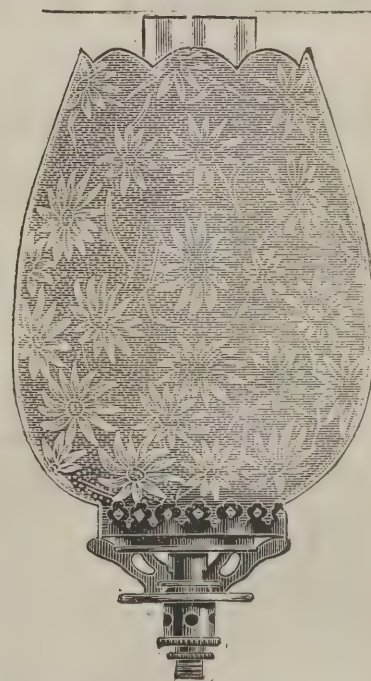
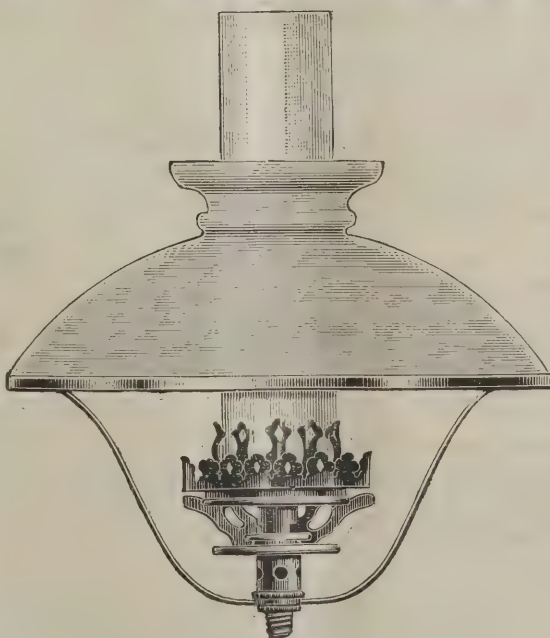
### THE BLACKWALL TUNNEL.

ON Saturday, May 22, the Blackwall Tunnel, "the first great achievement of the London County Council," was opened by the Prince and Princess of Wales on behalf of the Queen. The necessity of additional means of communication between the north and south banks of the Thames below London Bridge has been felt for many years. It was a pressing need even in the beginning of the century, and it has become accentuated as the manufacturing districts have extended eastward along the river. Up to the present time, however, the population of the East End, numbering 1,700,000, or a larger number than the combined populations of Liverpool, Manchester, Salford and Birmingham, have not possessed a free river crossing between the Tower Bridge and the Woolwich Free Ferry, a distance of nearly nine miles. During the past ninety years many proposals have been made for crossing the Thames below London Bridge. The first work of the kind, attempted but not completed, was Vases's Tunnel at Limehouse in 1805. Then came Brunel's Tunnel in 1825 to 1841, between Wapping and Rotherhithe, which, originally intended for road traffic, is now used by the East London Railway. The Tower Subway, constructed by Messrs. Barlow & Greathead for foot-passengers, followed in 1869-70; and, finally, the Metropolitan Board of Works obtained an Act in 1887 to make a tunnel at Blackwall, six miles from London Bridge. The design, as proposed by Sir Joseph Bazalgette, consisted of three tunnels, two for vehicular traffic and one for foot-passengers, and it was determined to construct that for foot passengers in the first instance. Messrs. S. Pearson & Son obtained the contract for the work, but the Metropolitan Board of Works being superseded by the London County Council, and the latter body considering that a larger tunnel ought to be made at once, the contract was never carried out. It was then three years before the final decision was arrived at by the County Council, and at the end of 1891 the contract for the present tunnel, designed by Mr. Alex. R. Binnie, M.Inst.S.C.E., chief engineer to the Council, was obtained by Messrs. Pearson & Son, the amount of their tender

being 871,000*l*. The tunnel crosses the river  $1\frac{1}{2}$  mile below Greenwich and 3 miles above Woolwich, and will bring these growing and populous places into direct communication with Poplar and the East and West India Docks on the north side of the Thames. At this point the river is 1,200 feet in width and 46 feet in depth at high water. Some engineering authorities regarded the success of the undertaking as doubtful, for, while large tunnels had been driven under rivers through rock, it was pointed out that there would be very considerable difficulty in getting through the large, deep bed of coarse gravel with but little sand that would be encountered under the Thames. Mr. Binnie, however, held to his view, and the complete success of the tunnel has justified him.

The total length of the work is 6,200 feet, or nearly  $1\frac{1}{4}$  mile, being about the same distance as from Charing Cross to St. Paul's. On the south of the river on the Kent side, the incline is on a gradient of 1 in 36, and has a run of 2,408*ft* 6; the portion under the river for a distance of 1,212 feet is level; and the north, or Middlesex, incline has a gradient of 1 in 34 for a length of 2,579*ft* 6. In other words, the inclined approaches will not be so steep as parts of St. James's Street and Regent Street, and very much less so than the slope on the east side of Trafalgar Square; they will, however, be about equal in gradient to the Haymarket. The work is divided into three portions—open approaches with side walls; "cut-and-cover" arched over with brickwork; and the tunnel proper composed of cast-iron rings lined with concrete and faced with white glazed tiles, all the other parts of the work being faced with white glazed bricks. To facilitate the work so as to permit of altering its direction, which it would be difficult to do by means of a long curve in a tunnel of this description lined with cast-iron, and to secure ventilation there are four shafts varying in depth from 75 feet to 98 feet and having an internal diameter of 48 feet. The tunnel proper is circular in cross-section, 27 feet outside diameter (or 6 feet larger than that of St. Clair, the largest hitherto constructed), built up of fourteen cast-iron segments and a key-piece, each complete ring of segments being 2 feet 6 inches in width. The thickness of the cast-iron is 2 inches, the flanges are 12 inches in depth, and each segment weighs about one ton. The effective diameter of the tunnel is 24 feet 3 inches. Within this the road of 16 feet, with two footpaths each 3 feet  $1\frac{1}{2}$  inch in width, is formed, resting on an arched subway 12 feet in width and 5 feet 6 inches in height for the reception of water-pipes. This road will be of the same width as parts of Little Queen Street,

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Holborn, and King Street, Westminster, and of a greater width than parts of Drury Lane, Fetter Lane, London Wall and Lombard Street, and as there will be no occasion for stopping at shops, houses and street corners, it should be ample for two lines of the largest vehicles. Should the traffic, however, increase beyond the capacity of the tunnel, land has been secured for the construction of another and parallel line of tunnel. The road is paved with asphalt in the level portion under the river and with granite laid in tar and pitch on the inclined approaches.

Although the most difficult portion of the work was that under the river itself, still almost as many difficulties were encountered inland on either side, as the ground was saturated with water in direct communication with the river. For some distance in mid-river the tunnel was driven within 5 feet of the river bed, and the intervening ground consisted of coarse gravel. The mode of driving the tunnel was by means of a shield which was worked under compressed air. This shield was a structure of steel, weighing about 250 tons, cylindrical in shape, 19 feet 6 inches in length and 27 feet 8 inches outside diameter. It was stiffened by two circular portions 3 feet apart, and its forward or working face, which pressed against the material to be excavated, was divided into twelve pockets or cells by three horizontal and three vertical portions. It was within these spaces, which were 6 feet in height, that the men worked. Between the two circular stiffening partitions were formed air-locks and shoots for passing out the excavated material. Arranged round the inner circumference of the shield and attached to it and the circular partitions were disposed twenty-eight hydraulic rams for the purpose of pushing the shield forward. The enormous water pressure of  $2\frac{3}{4}$  tons to the square inch was used in thrusting the shield forward, and sometimes the total pressure was as much as 5,000 tons. In the rear of the shield, or that portion of it which faced the completed tunnel, was a space which was merely enclosed within the outer skin of the shield. This, which is called the "tail" of the shield, always overlapped by 2 feet 6 inches, or one cast-iron ring, the last completed portion of the tunnel, and within it were built up the various rings of iron with which the tunnel is lined. The face of the shield was kept open when working in clay, but when in gravel it was almost completely closed by iron shutters. These shutters were opened by a very small amount at one time, and for several weeks near the centre of the river all the excavation was done through small holes 7 inches by 3 inches.

In all tunnels where water is encountered in large quantities compressed air is now generally adopted. The air is compressed by engines on the surface to the pressure of the water met with in the workings, and is then taken by pipes to the tunnel. The air drives the water out and keeps the ground to be excavated comparatively dry. To prevent the air from escaping along the already completed portion of the tunnel a brick bulkhead is built across the tunnel at some distance behind the working face, forming what is practically a horizontal diving bell, the space between the bulkhead and the working face being filled with compressed air. Entrance to and exit from this space is obtained by means of locks in the bulkhead. At the Blackwall Tunnel an air-pressure of about 27 lbs. to the square inch beyond the ordinary atmospheric pressure was necessary, and engines of about 1,200 horse-power were required to compress the amount of air used. To insure the safety of the men and to prevent the compressed air from blowing up the ground above the shield, a layer of clay about 10 feet thick and 150 feet wide was deposited from barges over the line of the tunnel. Absolute safety was not, however, attained by this method, as twice holes were blown in the bed of the river and the water poured into the tunnel, but on each occasion the men happily escaped without accident. A large portion of the clay placed on the river bed was afterwards excavated in the tunnel. As working in compressed air is very dangerous for some persons, great care was exercised in selecting the men, and every man was medically examined before he was allowed to start work. The County Council furthermore obtained powers to compensate workmen injured while working under compressed air, and in cases of death to make allowances to widows and orphans. Owing to the precautions taken, however, compensation for injury has only been necessary in half a dozen cases, and there have been no deaths directly due to the effect of compressed air.

In the design of the houses at each entrance, the Council's architect, Mr. T. Blashill, was associated with the engineer. The houses have an ornamental appearance, and will form residences for the superintendent of the tunnel and the caretaker, besides which the archway under each house will serve the purpose of measuring the height of loaded waggons before entering the tunnel. Much attention has been devoted to the lighting of the tunnel. As already stated, the interior is lined with a white glazed face, and an electric installation has been arranged to supply current for lighting. The test fixed was that the light should be "sufficient to read the *Times* newspaper in

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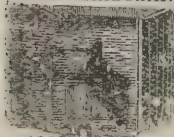
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any part of the tunnel." This work has been carried out by Messrs. Laing, Wharton & Down, Limited, according to plans and specifications prepared by Mr. T. P. Gunyon, the chief electrical engineer of the County Council. The lighting is by means of about 700 lamps of 32-candle power, mostly suspended in water-tight fittings from the roof of the tunnel, both over the road and over the pathways. The open approaches and stairways are lighted by lamps in handsome lanterns, and the entrance-gates, the shafts and the wharf and engine-house by arc lamps of the long-burning type. No gas is admitted to any portion of the tunnel.

The following figures, in addition to those already given, will be found interesting:—The number of men employed at one time on the works was 800. In the construction of the tunnel there were used 17,000 tons of cast-iron, 7,000,000 bricks, 1,000,000 white glazed tiles, 20,000 tons of cement, 110,000 tons of concrete, five acres of asphalt and twelve miles of electric-light cables. The quantity of earth excavated is set down at 500,000 tons. The total time occupied in the construction of the tunnel has been a little over five years, the contractors having begun operations in 1892; but at least a year of the time was occupied in preparatory work, such as the diversion of sewers. The portion of the tunnel under the Thames was constructed in almost exactly twelve months, which is at an average rate of 100 feet per month.

The cost of such a work as this is, of course, of great interest, but the risks incident to tunnelling in gravel within a few feet of the bed of a navigable river must generally render the contract cost of such undertakings of uncertain value. As already stated, the cost of the completed work as contracted for by Messrs. S. Pearson & Son was 871,000*l.* The County Council are entitled to take some credit for the fact that the actual cost has been below this amount, and that it is "well within the estimate of their engineer," a matter which the rate-payers, who have not recently had much cause to admire certain classes of work done by the Council, will regard with gratification. It is satisfactory to know that the accidents, which are inseparable from every large engineering work, have been few and far between at Blackwall. Undoubtedly the success of this great undertaking is due in the first place to the Council's engineer-in-chief, Mr. Binnie, who designed it and who has carried it out so satisfactorily. Mr. Binnie has won the admiration of all eminent engineers, and speaking last month upon the subject Sir Benjamin Baker referred to the boldness of conception and the

perseverance and ability with which the work has been carried out. All intermediate works, he said, were really insignificant in comparison. He had visited all the subaqueous tunnels of importance except the Thames Tunnel; the Hudson tunnel and others he had been intimately associated with as consulting engineer, and he had also visited Sarnia; and his opinion, expressed without reservation, was that there was nothing in the world that could be compared with the work that had been accomplished at Blackwall. Credit was due, he added, to the engineers and contractors for having undertaken an absolutely original work without guidance from anybody. Mr. Binnie himself fully acknowledges the skill and untiring energy of Mr. David Hay, M.Inst.C.E., and Mr. Maurice Fitzmaurice, M.Inst.C.E., the two resident engineers, and Mr. E. W. Moir, M.Inst.C.E., the contractors' engineer, to whom in a great measure the success achieved is due. In contemplating the result of the labours of these engineers, it is interesting to note the progress that has been made in this class of work during the past fifty years. Brunel's tunnel was about the same length as the portion under the river at Blackwall, and it took about nine years, with many long pauses, to complete; the portion of the Blackwall tunnel under the river between shafts 2 and 3 was tunnelled in about thirteen months. The cost of Brunel's tunnel was at the rate of about 1,300*l.* per yard, while that of the Blackwall averages 550*l.* per yard. At the same time, it must not be forgotten that engineers of the present day are largely indebted for the means which have enabled them to make progress to such men as Brunel, Bramah and Dundonald.

### NEW SANITARY OFFICES FOR GLASGOW.

AN important addition to Glasgow's public buildings has been erected to serve the purpose of Sanitary Chambers in place of the old and totally inadequate premises which were acquired some twenty-five years ago. The site of the new building is at the junction of Cochrane Street and Montrose Street, within 200 yards of the Municipal Buildings. Externally the block is handsome and imposing. Built of Overwood stone, the new building is three storeys in height, with a square tower 70 feet high at the corner where the two streets join. The front elevations have been freely and ornately treated in the style of the later Renaissance. The first storey, which is bold in archi-

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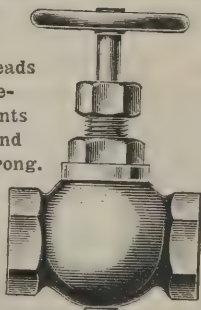
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ecture, with rusticated courses and round-headed windows, forms a substantial base for the lighter and broader treatment of the second and third flats. Above the main entrance in Montrose Street is a statue of Hygeia, and over the main cornice the skyline is broken by a rich balustrade, interrupted at intervals by pediments and finials. The whole design has the stability and stateliness becoming a public building. In addition to the three storeys there is a basement floor, which is devoted to storage purposes and accommodation for drain-testing and lime-washing apparatus and operators. Practically the whole of the ground floor is occupied by Mr. Peter Fyfe, F.R.S.E., the sanitary inspector, his assistants, inspectors, draughtsmen, &c., who number in all about 180. The only exceptions are the south-west corner, which is devoted to the vaccination department, and comprises rooms for the officer (Dr. Carmichael) and waiting and operating-rooms, and the north-east corner, where there is a room where suspected patients may be isolated until examined. On the first floor Dr. Russell, the medical officer of health, and Dr. Chalmers, the junior officer, have their rooms, and accommodation is also provided for the veterinary surgeon and the other medical assistants. The rest of the storey, and also the greater part of the second floor, is occupied by the inspecting sanitary officers. Those for each district of the city have a room set apart for their use. A caretaker's house is also provided, and the large square tower which surmounts the building is used as a chemical laboratory. The principal novelty in connection with the chambers is the proposed bacteriological department, the institution of which is believed to be a unique departure in municipal enterprise in this country. Also on the second floor is an exhibition-room, where it is proposed to show and test all forms of sanitary appliances which may be submitted to the sanitary inspector for his opinion. The chambers are fitted and furnished in the most comfortable and convenient style. Special attention has been paid to lighting, heating and ventilation. The artificial illuminant is electricity from the Corporation mains. The buildings are heated by steam at a pressure of 25 lbs. per square inch, utilised in pipes, coils and radiators. The vitiated air, extracted by three Blackman's fans, finds exit by means of ducts in the ceilings of the corridors to outlets on the roof. In the construction of the patients' rooms the corners have been rounded and projecting surfaces reduced to a minimum, in order to afford as little harbourage as possible for dust and germs. The lavatory accommodation includes baths—not a luxury, but a necessity, in view of the disagreeable character of

much of the sanitary inspector's work. In the court at the rear of the main building is an examination and refrigeratory house for investigations in connection with diseased meat.

The plans of the new chambers were prepared in the City Engineer's office under the supervision of Mr. A. B. M'Donald. The principal contractors were:—Masons, Messrs. Alexander Thomson & Son, Glasgow; joiners, Messrs. William M'Call & Son, Glasgow; plumber, Mr. Matthew Sproul; and plasterers, Messrs. D. & J. Mackenzie. The site for the chambers cost 11,000*l.*, and the buildings about 19,000*l.* Although the chambers have not yet been formally opened the sanitary staff is already in occupation.

### PATENTS.

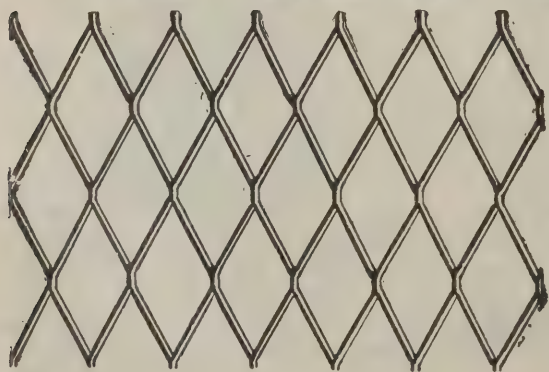
[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

- 12155. George B. Phillips, for "Reliable window-fastener."
- 12197. Edward Evan Bennett, for "Improvements in adjustable tables."
- 12221. Samuel Walker and John Poole, for "An improved expandible pulley."
- 12341. Edwin Waddington, for "A new method of brick-making."
- 12255. John Day Pastle, for "An apparatus for controlling the movements of doors."
- 12272. Henry Donald Hope, for "Improvements in fastenings for window casements."
- 12282. Edmund Fisher Hartshorn, for "Improvements in window shade and blind fixtures."
- 12303. Heinrich Spatz, for "Process and apparatus for the manufacture of metallic pipe-joints."
- 12307. Daniel L. M. Evans and James Jones, for "Improvements in window sash-fasteners."

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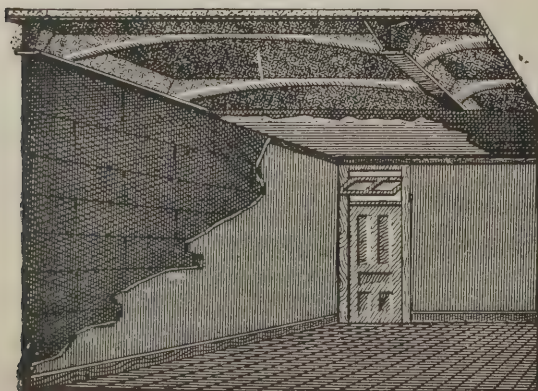
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## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xiii.*

## COMPETITIONS OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l.* Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

MORECAMBE.—Competitive designs are invited for the erection of a new hotel, to be called the Hôtel Métropole, at a cost of 30,000*l.*, at this picturesquely situated and rapidly increasing fashionable seaside resort. Designs must be sent in under motto on or before June 16, 1897.

## CONTRACTS OPEN.

ABERDEEN.—June 16.—For additions and alterations to the farm offices at Mains of Shiels. Mr. William Nicol, forester, Cluny.

ABERDEEN.—June 17.—For erection of eight houses. Mr. John Rust, city architect, 224 Union Street.

ASHREIGNEY.—June 15.—For taking-down and reconstructing in timber the defective part of Kersham Bridge, over the river Taw. Mr. H. Masterton, county surveyor, Boutport Street, Barnstaple.

ASHTON-UNDER-LYNE.—For erection of a pair of detached houses. Mr. Thomas D. Lindley, architect and surveyor, 150A Stamford Street, Ashton-under-Lyne.

ASKAM-IN-FURNESS.—June 15.—For building a new classroom at the Ireleth School. Rev. J. A. Roberts, Ireleth Vicarage, Askam-in-Furness.

AYLESBURY.—June 18.—For erection of schools and offices at Quainton. Mr. W. F. Taylor, architect, Aylesbury.

BALA.—June 26.—For erection of classrooms, laboratories and other works for the Bala County School for Boys. Mr. R. Lloyd Jones, architect, Mount Place, Bala.

BARKING.—June 17.—For erection of retort-house, boiler-house, exhaustor-house and mess-room. Mr. W. North, Gasworks, Stourbridge.

BARNSTAPLE.—June 16.—For alterations and additions at 87 High Street. Mr. W. C. Oliver, Bridge End, Barnstaple.

BARNSTAPLE.—For cleaning and colouring the inside walls of the parish church. Mr. W. Boyle, verger.

BELFAST.—June 15.—For papering, graining, &c., of board, committee and waiting rooms of the workhouse. Mr. James C. Neeson, clerk, Workhouse.

BIDEFORD.—June 29.—For repairs to 16 Bridgeland Street. Mr. R. T. Hookway, Bideford.

BRADFORD.—June 14.—For erection of a large block of shops and dwelling-houses and entrance archway in Manningham Lane. Messrs. Mawson & Hudson, architects, 2 Exchange Buildings, Bradford.

BRIDLINGTON.—June 26.—For construction of a brick gas-holder tank, 102 feet in diameter and 25 feet deep. Messrs. Thomas Newbigging & Son, engineers, 5 Norfolk Street, Manchester.

BRIGHTON.—June 15.—For alterations at Warren Farm Schools, Rottingdean. Mr. T. G. Gibbins, architect, Molesworth House, Palace Yard, Brighton.

BRIGHTON.—June 14.—For erection of a cookery school, and a school for afflicted children. Messrs. Thomas Simpson & Son, 16 Ship Street, Brighton.

CANTERBURY.—June 24.—For repair or renewal of the wood-paled fence enclosing the old moat in Rhodas Town. City Surveyor, 28 St. Margaret Street, Canterbury.

CARLISLE.—For erection of a villa residence in Dalston Road. Messrs. Johnstone Bros., architects, 39 Lowther Street, Carlisle.

CARLISLE.—June 21.—For erection of laboratories and lecture-rooms at the Grammar School. Mr. Geo. Dale Oliver, architect, 5 Lowther Street, Carlisle.

CANTERBURY.—June 18.—For erection of a chimney shaft, foundations, setting and fixing of a Cornish boiler, alterations to boiler-house, subway from boiler-house to new blocks, alterations to laundry and steward's stores and additional works of sewage disposal at Chartham Asylum, Chartham Downs. Mr. W. J. Jennings, architect, 4 St. Margaret's Street, Canterbury.

CHESHIRE.—June 16.—For erection of offices, board-room and committee-rooms on land adjoining the workhouse at Knutsford. Mr. Robert J. McBeath, architect, Birnam House, Sale, near Manchester.

CHOPWELL AND HIGH SPEN.—June 19.—For erection of three six-roomed houses at Chopwell and thirteen two-roomed cottages at High Spen (all brick buildings). The Secretary, Consett Iron Company, Limited, Blackhill, co. Durham.

COLNE.—June 23.—For construction of a chimney 70 yards high and flue, in connection with the refuse destructor at the proposed health dépôt. Mr. T. H. Hartley, borough surveyor, Town Hall, Colne.

CORNWALL.—June 18.—For erection of a first-class hotel at Mullion Cove. Mr. Sampson Hill, Redruth.

CORNWALL.—June 16.—For construction of orchestra, vestries, at the Wesleyan Chapel, St. Day. Mr. Sampson Hill, architect, Green Lane, Redruth.

CORNWALL.—June 19.—For erection of a dwelling-house for Trebarwith Farm, in the parish of Tintagel. Mr. Seth Lobb, of Messrs. Wise & Wise, architects, Launceston.

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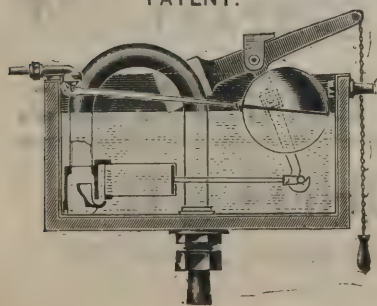
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# THE VALVELESS SYPHON CO., KIRKSTALL, LEEDS.



CORNWALL.—June 18.—For repairing and renovating the St. Stythians Board Schools. Mr. Horace W. Collins, architect, Penryn Street, Redruth.

CORSHAM.—June 28.—For additions and alterations at Mansion House. Mr. Thomas Holloway, Chippenham, Wilts.

CROYDON.—June 21.—For excavating about 355 cubic yards of earth and erecting about 1½ rods of brickwork in Croyham Road. Mr. E. Mawdesley, town clerk, Town Hall, Croydon.

CUMBERLAND.—June 14.—For erection of public offices and free library at Wilson Terrace, Frizington. Messrs. Moffatt & Bentley, architects, Whitehaven.

DENABY MAIN.—For erection of St. Alban's Church and Presbytery. Messrs. Empsall & Clarkson, architects, 7 Exchange, Bradford.

DERBY.—June 21.—For additions and alterations to the Orchard Street Board School. Mr. A. Macpherson, architect, Tenant Street, Derby.

DEVON.—June 15.—For building a farmhouse at Broadley, in the parish of Tamerton Foliot. Mr. Dennis, Farmhouse, Broadley.

DEWSBURY.—June 17.—For erection of two cottage homes in Heald's Road. Messrs. Holtom & Fox, architects, Westgate, Dewsbury.

DOVER.—June 29.—For erection of a carshed at Buckland. Mr. Henry E. Stilgoe, Town Hall, Dover.

DURHAM.—For repointing and repairing the mason and brick-work and painting and papering at the county police station. The County Surveyor, Shire Hall, Durham.

DURHAM.—June 12.—For the conversion of miners' hall, Leadgate, into council chambers, surveyor's office, clerk's office, &c. Mr. Geo. Thos. Wilson, architect, 121 Durham Road, Blackhill.

DURHAM.—June 12.—For erection of three houses, &c., in Aynsley Terrace, Consett. Mr. Geo. Thos. Wilson, architect, 121 Durham Road, Blackhill.

DURHAM.—For erection of four cottages at Blackfine. Mr. Phil. Stokoe, 71 Durham Road, Blackfine.

EDENBRIDGE.—June 14.—For pulling-down old houses and erecting new houses and ironmonger's shop. Mr. Beale, surveyor, Madeira Park, Tunbridge Wells.

EDINBURGH.—June 11.—For erection of a urinal (in stone and brick) at the east end of Promenade. The Burgh Engineer, 1 Parliament Square, Edinburgh.

EDINBURGH.—June 12.—For painter and joiner's work at internal fittings for various schools. Mr. Wilson, 3 Queen Street, Edinburgh.

ELGIN.—June 12.—For additions and alterations to property in Maida Place. Mr. James Jamieson, architect, 2 Commercial Street, Elgin.

ELGIN.—June 17.—For additions and alterations to dwelling-house at Woodlands, Bishopmill; additions and alterations to farm steading at Burnbank, Birnie. Seafield Estates Office, Rothies.

FENTON.—June 15.—For construction of a brick culvert, about 125 yards in length, with manholes, &c. Mr. S. A. Goodall, surveyor, Town Hall, Fenton.

FIFE-KEITH.—June 12.—For erecting farm offices at Ramsburn, Claymires, Shielparks, Poolside and Ternemny, all in Rothiemay; at Followsters and Upper Forgie, both in Keith parish; and at Limehillock, Grange. The Factor, Fife-Keith.

FINEDON.—June 11.—For erection of residence and shoe factory on Wellingborough and Kenmuir roads. Messrs. Mosley & Anderson, architects and surveyors, Northampton and Finedon.

GLASGOW.—June 26.—For construction of a masonry dam at the outlet of Lock Katrine, by which the level of the loch is to be raised 5 feet. Mr. James M. Gale, engineer of the Water Department, City Chambers, 45 John Street.

GREAT YARMOUTH.—June 19.—For erection of a boys' school in Peter's Road, and additions and alterations to George's girls' school. Messrs. Bottle and Olley, Queen Street, Great Yarmouth.

GRIMSBY.—June 14.—For erection of Diamond Jubilee provident homes. Mr. Herbert C. Scaping, architect, Grimsby.

GUISBOROUGH.—June 11.—For taking down and rebuilding part of the boundary wall and palisade, and for erecting a new wall at the cemetery. Superintendent of the Cemetery, Guisborough.

HALIFAX.—June 15.—For erection of a wash kitchen at the lodge at Ogden reservoir. Mr. James A. Paskin, waterworks engineer, Town Hall, Halifax.

HALIFAX.—June 17.—For erection of three pairs of semi-detached villa residences at Savile Park. Mr. Medley Hall, architect, &c., 29 Northgate, Halifax.

HAMPTON.—June 14.—For erection of shop and additions to bakery at Station Road. Mr. Geo. F. Duke, secretary, Station Road, Hampton.

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HAMPTON.—June 25.—For construction of engine-house and other buildings on the site of sewage outfall works at Hampton-on-Thames. Mr. Isaac Shone, 47 Victoria Street, Westminster, S.W.

HARROGATE.—June 14.—For erection of a detached house and shop at Oatlands. Messrs. H. E. & A. Bown, architects, Harrogate.

HASTINGS.—June 15.—For building schoolroom for infants at the Pett National School. The Rector, Pett Rectory, Hastings.

HEYWOOD.—June 11.—For the restoration and repair of buildings at the cemetery. Mr. J. H. Baldwick, town clerk, Heywood.

HORNCASTLE.—June 14.—For repair of five bridges, viz. three in the parish of Wispington, one in the parish of Thimbleby and one in the parish of Edlington. Mr. T. E. Chatterton, clerk, Horncastle.

IPSWICH.—June 15.—For conversion of the privies into w.c.'s, &c., at the Springfield school. Mr. E. F. Bishopp, architect, Museum Street, Ipswich.

IRELAND.—June 19.—For building a teacher's residence and schoolhouse at Kilmallock. Mr. R. Fogerty, architect, Henry Street, Limerick.

IRELAND.—June 13.—For completion of the entrance to the Roman Catholic Church, Gowran, and erection of steps to front door, stone and iron works to be included in one contract. Ver. Rev. J. Canon O'Hanlon, P.P.

ISLE OF MAN.—For erection of an hotel on the Mooragh Promenade, Ramsey. Messrs. W. Telford, Gunson & Son, C.E., architects, &c., 10 Marsden Street, Manchester.

KINGSWEAR.—June 24.—For additions to The Redoubt of a new room and conservatories. Mr. W. F. Tollit, architect, Gate House, Totnes.

LEEDS.—June 18.—For the removal of the roof over the yard at the rear of General Post Office, Leeds. The roof covers a space of about 193 feet by 38 feet, and comprises seventeen steel principals, 37 feet 6 inches span; rolled steel joists, size 12 inches by 6 inches; fourteen cast-iron columns, eaves, gutters, fall-pipes, roof timbers, boards and slates, &c. The materials are to become the property of the contractor, and the whole must be cleared away within one month of acceptance of tender. Assistant Surveyor, H.M. Office of Works, Infirmary Street, Leeds.

LIVERPOOL.—June 24.—For erection of proposed new offices, North John Street, Liverpool, for the Royal Insurance Company. Mr. J. Francis Doyle, architect, 4 Harrington Street, Liverpool.

LONDON.—June 14.—For erection of a greenhouse at Irish Corner, Muswell Hill, 60 feet by 12 feet. Mr. E. J. Lovegrove, C.E., engineer to the Hornsey Urban District Council, 99 Southwood Lane, Highgate, N.

LONDON.—June 21.—For supply of internal fittings, fixtures and furniture required at the new Dulwich Library in Lordship Lane. Mr. C. William Tagg, vestry clerk, Vestry Hall, Camberwell, S.E.

MICKLEOVER.—June 25.—For erection of two cottages on land adjoining the county asylum. Mr. J. Somes Story, county surveyor, St. Mary's Gate.

MICKLEOVER.—June 25.—For supplying and laying about 98 squares of teak flooring and 36 squares of deal flooring in the wards of the county asylum. Mr. J. Somes Story, county surveyor, St. Mary's Gate.

MORLEY.—June 11.—For erection of three through houses in Fountain Street. Mr. Geo. B. Clegg, architect, 2 Peel Street, Morley.

MORLEY.—June 11.—For erection of six cottages in Fountain Street. Mr. Geo. B. Clegg, architect, 2 Peel Street, Morley.

MORLEY.—June 17.—For erection of Primitive Methodist chapel, Bridge Street. Mr. T. A. Buttery, architect, Queen Street, Morley.

MUSWELL HILL.—June 14.—For erection of a greenhouse at Irish Corner, 60 feet by 12 feet. Mr. E. J. Lovegrove, 99 Southwood Lane, Highgate.

MUSWELL HILL.—June 14.—For additional stabling, ambulance shed and cottage at the isolation hospital. Mr. E. J. Lovegrove, 99 Southwood Lane, Highgate.

NEATH.—June 14.—For extension and alteration of the Coedfranc Board Schools, Skewen. Mr. J. C. Rees, architect, St. Thomas Chambers, Church Place, Neath.

NEWPORT.—June 18.—For erection of a hospital on a site on the Cardiff Road. Mr. Richard J. Lovell, architect, 46 Queen Victoria Street, E.C.

NORMANTON.—June 14.—For erection of chapel at Hope-town. Mr. Arthur Hartley, architect, Carlton Chambers, Castleford.

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**NOTTINGHAM.**—For alterations to the Ruddington Co-operative Society's premises. Mr. A. R. Calvert, architect, 18 Low Pavement, Nottingham.

**OLDHAM.**—June 17.—For erection of a shed, time office, storeroom and other buildings, at Rasping Mills, Delph. Messrs. John Kirk & Sons, architects, Huddersfield.

**OSWESTRY.**—June 19.—For alterations and additions to the Conservative Club. Messrs. Shayler & Madoc-Jones, architects, 19 Church Street, Oswestry.

**OTLEY.**—June 18.—For erection of Congregational church. Messrs. T. H. & F. Healey, 42 Tyrrel Street, Bradford.

**OXFORD.**—June 16.—For erection of a disinfecting-room and other alterations at the tramps' ward, Oxford Workhouse. Mr. W. H. Castle, surveyor, Grove Street, Oxford.

**PAIGNTON.**—June 19.—For brick lining a water-tower at Oldway. Mr. P. E. Singer, Oldway, Paignton.

**PENZANCE.**—June 12.—For the carpentering work of seven houses on Leggo's Estate, Heamoor. Mr. W. H. Green, 7 St. Dominic Street, Penzance.

**ROCHDALE.**—For erection of a branch shop and six dwelling-houses at Meanwood Brow. Mr. George A. Hammond, architect, &c., Rochdale or Heywood.

**ROTHERHAM.**—June 12.—For erection of banking premises and sale shops, &c., at Parkgate. Mr. J. Platts, architect, Old Bank Buildings, High Street, Rotherham.

**SALFORD.**—June 24.—For erection of a block of sixty-six artisans' dwellings between King Street and Queen Street. Mr. Saml. Brown, town clerk, Town Hall, Salford.

**SALOP.**—June 19.—For erection of new chapel at Whittington. Mr. W. Kenrick Minshall, Oswestry.

**SANDGATE.**—June 21.—For erection of a public convenience (brick built), and all drains and fittings in connection with the same. Mr. A. R. Bowles, surveyor's office, Sandgate.

**SCOTLAND.**—June 19.—For erection of a house at Dalmally. Mr. John Macdonald, Fern Bank, Dalmally.

**SCOTLAND.**—For erection of a boot and shoe factory in Huntly. Mr. James Jamieson, architect, 2 Commerce Street, Elgin.

**SCOTLAND.**—June 19.—For erection of thirty-six dwelling-houses at Denny. Mr. Robert McLellan, architect, Motherwell Road, Bellshill.

**SCOTLAND.**—June 23.—For erection of the proposed hotel Messrs. Swanston & Legge, architects, 196 High Street, Kirkcaldy.

**SCOTLAND.**—June 14.—For erection of twenty-four houses, Mr. Dun. Cameron, architect, Academy Buildings, Inverness.

**SHEFFIELD.**—For erection of two houses at Pitsmoor. Mr. J. Dobson Townend, 21 Fargate, Sheffield.

**SHEFFIELD.**—June 17.—For erection of junior and senior institutes, and certain additions and alterations to the John Street Primitive Methodist Chapel. Mr. C. J. Innocent, architect, 17 George Street, Sheffield.

**SOMERSET.**—June 14.—For alterations to the Red Lion Inn. Mr. William F. Bird, architect, Midsomer Norton.

**SOWERBY BRIDGE.**—June 24.—For taking out the present choir gallery, &c., and forming a new choir gallery, with rostrum, communion, &c., at the Bolton Brow Wesleyan Chapel. Mr. Arthur George Dalzell, architect and surveyor, 15 Commercial Street, Halifax.

**SUFFOLK.**—June 14.—For erection of a girls' school and alterations to existing buildings at Walton. Mr. Edward Fernley Bishopp, architect and diocesan surveyor, 32 Museum Street, Ipswich.

**SURREY.**—June 16.—For alterations and additions to the laundry buildings, including the erection of a new boiler-house, plumbing and other work in refitting the men's lavatory, installation of a system of electric call-bells, &c., at workhouse buildings, Hambledon. Mr. Edward L. Lunn, surveyor, 36 High Street, Guildford.

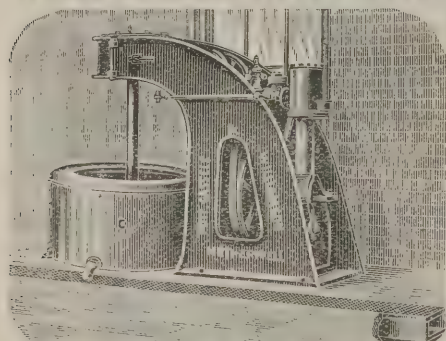
**SWANSEA.**—June 15.—For erecting about 3,000 feet run of boarded fencing and open shedding, horse-boxes, stands and other fittings for the holding of the Glamorganshire General Agricultural Society's Meeting on August 2 and 3. Mr. W. V. Huntley, secretary, Welsh St. Donatts, Cowbridge.

**TOOTING.**—June 24.—For repairs to the chapels, lodges, boundary walls, &c., at the cemetery. Surveyor, Vestry Hall, Kennington Green, S.E.

**TYRONE.**—June 25.—For executing repairs and improvements at a house in Augher. Mr. Thos. Elliott, architect.

**WALES.**—June 14.—For erection of a school at Pontrhondra. Mr. J. Rees, Hillside Cottage, Pentre.

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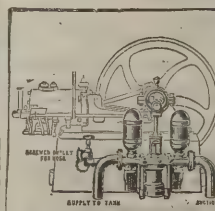
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WHITEHAVEN.—June 19.—For pulling down and rebuilding the Dog and Gun Inn, Ennerdale Bridge. Mr. Edmund Jackson, Tangier Buildings, Whitehaven.

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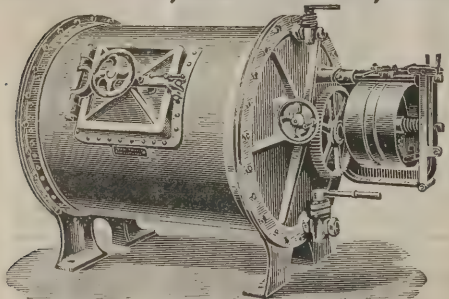
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J. Willmott & Son	5,760	0	0
F. & F. Wood	5,612	0	0
W. Shurmur	5,608	0	0
W. J. Mitchell	5,597	0	0
W. Gregar & Son	5,540	0	0
W. M. Dabbs	5,515	0	0
W. Smith	5,493	0	0
C. Cox	5,465	0	0
Perry & Co.	5,454	0	0
R. A. Yerbury & Son	5,454	0	0
T. L. Green	5,372	0	0
G. S. S. Williams & Son	5,318	0	0
Killby & Gayford	5,298	0	0
Clarke & Bracey	5,298	0	0
J. Grover & Son	5,251	0	0
E. Lawrance & Sons	5,105	0	0
C. Miskin	4,949	0	0
W. Scrivener & Co.*	4,923	0	0

For new school, Leo Street.

F. & H. F. Higgs	£27,269	0	0
B. E. Nightingale	26,115	0	0
J. Grover & Son	25,689	0	0
Stimpson & Co.	25,650	0	0
J. & M. Patrick	25,483	0	0
Lathey Bros.	25,426	0	0
J. Shillitoe & Son	25,240	0	0
E. Lawrance & Sons	25,122	0	0
W. Downs	24,867	0	0
C. Cox*	24,070	0	0

For infirmary and isolation ward, Shaftesbury training-ship.

T. Bruty	£4,576	0	0
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J. Shillitoe & Son	4,238	0	0
H. Everett & Son	4,220	0	0
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S. Parmenter	4,108	0	0
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For enlargement, Eltringham Street School, Wandsworth.

F. & H. F. Higgs	£1,956	0	0
J. Garrett & Son	1,900	0	0
W. Akers & Co.	1,894	0	0
W. Downs	1,890	0	0
J. F. Ford	1,858	0	0
J. Smith & Son	1,839	0	0
Rice & Son	1,835	0	0
Lathey Bros.	1,813	0	0
J. & C. Bowyer	1,798	0	0
E. Triggs	1,792	14	1
J. & M. Patrick	1,779	0	0
E. P. Bulled & Co.*	1,762	0	0

For sanitary and drainage works, Pritchard's Road School, Hackney Road.

J. Garrett & Son	£2,255	0	0
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R. P. Beattie	2,004	17	0
E. Lawrance & Son	1,962	0	0
E. Triggs	1,937	0	0
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R. A. Yerbury & Sons	1,860	0	0
Lathey Bros.	1,822	0	0
W. Akers & Co.*	1,739	0	0

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G. H. Sealey	£150	0	0
T. Nicholson	118	0	0
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R. A. Yerbury & Sons	100	0	0
A. M. Sparks	91	10	0
E. T. Folley	79	0	0
Perkins & Co.*	75	0	0

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G. Barker	£247	15	0
A. E. Symes	232	0	0
W. Shurmur	230	0	0
D. Gibb & Co.	220	0	0
J. Kiddle & Son	187	0	0
J. F. Holliday*	179	0	0

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Wake & Dean	37 0 0
W. H. Lascelles & Co.	31 10 0
ILLINGWORTH, INGHAM & Co. (accepted)	31 9 9
For painting roofs of two iron buildings, Honeywell Road.	
W. Harbrow *	£12 12 0
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T. Cruwys	£54 0 0
A. M. Sparks	47 10 0
E. T. Folley *	46 0 0

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For various articles of furniture and ironmongery.

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W. H. Lascelles & Co.	each £3 15 9
Pearson & Brown	" 3 15 0
E. Spencer & Co.	" 3 3 0
Rice & Son	" 3 3 0
G. M. Hammer & Co.	" 3 0 0
Bennet Furnishing Co.	" 2 17 0
T. Cruwys	" 2 16 0
T. Blezard & Sons, Limited	" 2 15 0
J. Garvie & Sons	" 2 8 6
H. Addison & Co.	" 2 7 6
Wake & Dean	" 2 6 0
Illingworth, Ingham & Co.	" 2 1 6
H. BOUNEAU (accepted)	" 2 0 0

(B) Tables (size, 3 feet 6 inches by 2 feet 6 inches).

W. H. Lascelles & Co.	each £3 14 6
Pearson & Brown	" 3 0 0
Foster, Cooper & Foster	" 2 16 8
Bennet Furnishing Co.	" 2 13 6
J. H. Martin	" 2 13 0
E. Spencer & Co.	" 2 9 0
H. Addison & Co.	" 2 2 0
Rice & Son	" 2 2 0
T. Cruwys	" 1 17 6
Wake & Dean	" 1 15 0
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(C) Tables (size, 6 feet by 3 feet 6 inches).

W. H. Lascelles & Co.	each £5 15 0
T. J. Syer & Co.	" 5 5 0
Pearson & Brown	" 5 5 0
Foster, Cooper & Foster	" 4 8 9
Bennet Furnishing Co.	" 4 5 6
W. Holt & Son	" 4 0 0
T. Cruwys	" 3 19 6
Rice & Son	" 3 19 0
E. Spencer & Co.	" 3 11 0
H. Bouneau	" 3 10 0
H. Addison & Co.	" 3 9 6
J. Garvie & Sons	" 3 7 6
Wake & Dean	" 3 6 0
G. M. Hammer & Co.	" 3 3 0
ILLINGWORTH, INGHAM & Co. (accepted)	" 2 19 0

(D) Sand boxes.

W. Bradford & Co.	each £0 6 0
W. H. Lascelles	" 0 5 10
W. Summerscales & Son, Limited.	" 0 5 9
G. M. Hammer & Co.	" 0 5 9
Bennet Furnishing Co.	" 0 5 0
Illingworth, Ingham & Co.	" 0 4 6
Rice & Son	" 0 3 8
J. GARVIE & SONS (accepted)	" 0 3 6
For the supply of portable coppers.	
Bradford & Co.	each £3 15 0
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O'Brien, Thomas & Co.	" 2 12 0
H. & C. Davis & Co.	" 2 9 6
R. H. & J. Pearson, Limited	" 2 7 6
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H. S. Timpson	" 2 7 6
Rowland Hodges	" 2 5 9
Smallbone & Sutton	" 2 5 0
F. Braby & Co., Limited	" 2 2 0
PRYKE & PALMER (accepted)	" 2 1 6

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For erection of three sheltered seats on the Promenade between Newgate Gapway and Hodge's Flagstaff. Mr. ALBERT LATHAM, borough engineer.	
Jenkins	per seat £105 0 0
Barwick & Ansell	78 0 0
L. SEAGER, Sittingbourne (accepted)	65 0 0

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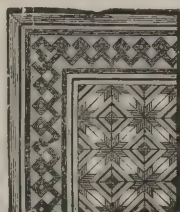


## PARQUET FLOORINGS

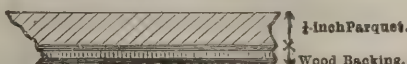
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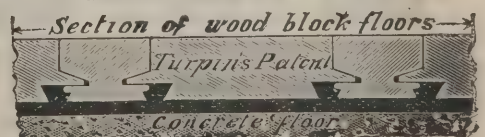
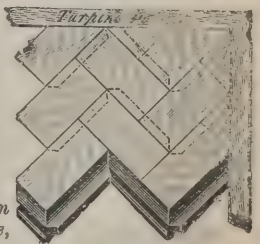
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J. T. Dixon	140	0	2
H. Gale	123	1	1
W. SMITH, Grangetown (accepted)	120	19	6

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W. & H. Pounder	£7,134	0	0
W. THOMPSON & SONS (accepted) *	7,078	15	0
J. Lambert & Sons	5,782	0	0

\* Exclusive of fittings and fixtures.

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For erection of two houses in Sefton Road, Heysham. Mr. J. MARSHALL, architect, Back Crescent, Morecambe.

*Accepted tenders.*

W. Pool, mason and bricklayer	£629	10	0
J. Schofield, joiner and carpenter	378	12	0
Hall & Sons, slater and plasterer	140	0	0
J. McNair, plumber	89	0	0

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For erection of a new boiler and exhaustor house, sheds over purifiers, and oxide floor and other work, for the Cromer Gas and Coke Company, Limited. Mr. PERCY GRIFFITH, engineer, 55 Parliament Street, Westminster, S.W.

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Girling & Smith	890	0	0
W. Neil	842	0	0
J. Tillings	795	0	0
J. WHITE, Cromer (accepted)	790	0	0

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For new technical centre, &c., Leen Side Board school. Mr. A. H. GOODALL, architect, Nottingham.

J. Hutchinson	£1,780	0	0
Appleby & Lambert	1,690	0	0
W. Maule	1,660	0	0
T. Cuthbert	1,657	0	0
J. Skerritt	1,627	15	6
G. A. Pillatt	1,597	0	0
H. Vickers	1,526	0	0
T. BARLOW (accepted)	1,516	0	0

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For making-up Phoenix Road and laying sewer and drains, for Mr. W. R. Queded. Mr. ALBERT E. PRIDMORE, surveyor, 2 Broad Street Buildings, E.C.

D. BREWER, Plumstead (accepted)	£410	15	0
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For construction of a reservoir. Mr. H. T. KEATES, surveyor, Petersfield.

Pedrette & Co.	£1,456	0	0
B. Cooke & Co.	1,258	0	0
T. Wood & Son	938	0	0
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For execution of work at workhouse.

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W. Lodge	£2,108	10	0
C. T. Manners	1,937	0	0
J. Kell	1,747	12	8
J. Lovett	1,663	12	8
T. HILTON, Bishop Auckland (accepted)	1,639	0	0

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E. Duke	1,123	1	5
J. Fisher	1,035	5	8
H. KERSWILL, Plymouth (accepted)	1,014	7	3

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For building four cottages in Ivy Street. Messrs. JOHN HARDING & SON, architects, Salisbury.

E. Day	£1,118	0	0
E. Hale	965	0	0
F. Dibben	900	0	0
W. Roles	860	0	0
G. HARRIS (accepted)	840	0	0

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For enlargement of post office at Scarborough.

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J. W. Allan	2,567	0	0
W. Overton & Son	2,520	0	0

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For painting at the Clarence Park.

L. Sell	£20	0	0
D. ARNOLD, St. Albans (accepted)	20	0	0

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For erection of school buildings, Bopeep. Messrs. ELWORTHY & SON, architects, London Road, St. Leonards-on-Sea. Quantities by architects.

H. E. Cruttenden	£3,855	0	0
J. Geary	3,790	0	0
F. Cruttenden	3,697	0	0
E. Gutsell	3,222	0	0
Bartor & Gasson	3,210	0	0
C. Hughes	3,199	0	0
ELDRIDGE & CRUTTENDEN, St. Leonards-on-Sea (accepted)	3,172	0	0

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For laying about 650 yards of cement-paving and 119 yards of granite crossings at Market Square.

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W. Smith, jun.	159	16	4
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Scott & Sellar	140	12	0
P. Tawse	138	2	2
VALENTINE & MASSON, Barclay Street (accepted)	132	14	0

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For erection of a villa residence. Messrs. MOFFAT & BENTLEY, architects, Whitehaven.

A. DAVIDSON, Parton, Whitehaven (accepted).

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For decorative and sanitary works to Norbury House, Beaufort Road, Surbiton, Surrey, for Miss E. Forster. Mr. WALTER J. EBBETTS, architect, Savoy House, 115 Strand, W.C.

J. M. Macey & Son	£926	0	0
T. Messum	698	0	0
Foord & Sons	670	10	0
Adkins Bros.	665	15	0
R. SCASE & SONS, Surbiton (accepted)	649	0	0

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For erection of a corrugated-iron engine-shed, in the parish of Midhurst. Mr. A. G. GIBBS, surveyor.

C. Leather	£132	0	0
Mallett & Co.	104	15	0
H. Duncan	71	3	0
GAMMON & SON, Midhurst (accepted)	69	17	6
Surveyor's estimate	73	0	0

## SUTTON.

For additions and alterations to Stanley House, Mulgrave Road, Sutton, Surrey, for Mr. Wm. Berrell, C.E. Mr. WALTER J. EBBETTS, architect, Savoy House, 115 Strand, W.C.

G. H. Lewis	£831	0	0
H. Adams	820	0	0
J. B. Potter	805	0	0
F. J. SHOPLAND, Sutton (accepted)	787	0	0

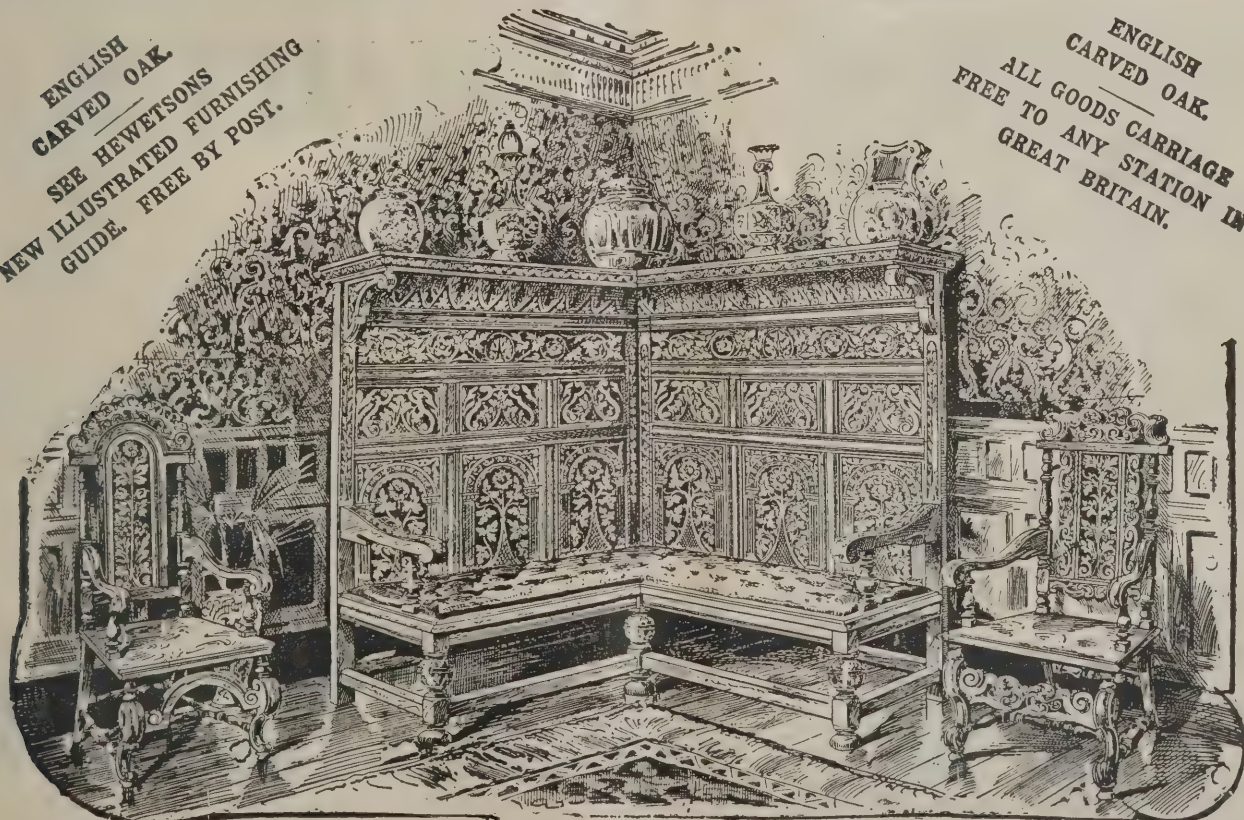
## THORNHILL.

For flagging, kerbing, channelling, improvements, &c., in Dewsbury Road and Ingham Lane. Mr. S. W. PARKER, surveyor.

C. A. Walker	£477	5	10
M. Hall	448	6	11
W. R. Thompson	434	8	10
W. Knowles	399	18	6
E. Wilcock	331	4	6
J. Godley	309	3	9
R. BOOTH, Thornhill (accepted)	278	1	5

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## WALES.

For construction of a bridge and approaches to carry road over the river at Melyn Ciwc, Brynna. Mr. EDWARD JENKINS, surveyor, Nolton Street, Bridgend.

G. Harris . . . . .	£167	0	0
C. H. Cooksley . . . . .	153	1	3
C. Gwatkin . . . . .	120	10	0
J. David . . . . .	110	19	9
R. Jones . . . . .	107	4	0
T. DAVIES, Maesyfelin, Glamorgan ( <i>accepted</i> ) . . . . .	105	1	6

For erection of two shops and dwelling apartments, Dinas Powis.

W. REES, Dinas Powis, near Cardiff (*accepted*) £1,012 0 0

For pulling-down and rebuilding three shops at Pontnewydd.

F. C. Parfitt . . . . .	£396	4	8
W. Arthur . . . . .	359	0	0
H. PARFITT, Pontnewydd ( <i>accepted</i> ) . . . . .	355	0	0

For additions to Welsh Baptist chapel, Rhos. Mr. J. G. OWEN, architect, 7 Preston Grove, Liverpool. Quantities by the architect.

J. Davies . . . . .	£1,582	16	0
I. Davies . . . . .	1,350	0	0
JENKINS & JONES, Johnstown, Ruabon ( <i>accepted</i> ) . . . . .	1,320	0	0
J. T. Jones . . . . .	1,297	0	0

## WEST ARDSLEY.

For erection of stables, coach-house and other buildings, in connection with Boyle Hall. Messrs. C. S. NELSON & R. W. SAVAGE, architects, Sun Buildings, 15 Park Row, Leeds.

W. KITSON & SON, Wakefield (*accepted*) . £1,600 0 0

## ELECTRIC NOTES.

A STATEMENT has just been prepared by Councillor Mackenzie, convener of the electric-light committee, of the income and cost of the electric lighting of Edinburgh from May 15, 1896, to May 15, 1897. The income from private lighting, at 5d. per unit, and from motor power was :—Summer term, 3,080d.; winter term, 8,418d.; spring term, 9,184d.;

together, 20,682d., as against an estimated income of 16,500d. The income from arc lighting was 6,283d., as against an estimated income of 7,250d., the difference being caused by the late delivery of the arc lamps for the city extensions. The total income was therefore 26,965d., as against an estimate of 23,750d., or an excess over estimate of 3,215d. The cost of manufacture, distribution, &c., was 19,200d., which showed a profit of 7,765d. The output was 1,102,700 units sold for private lighting and motor power, and 621,260 for arc lighting—a total of 1,723,960 units. The cost has now been reduced to 4d. per unit, or, with the discount off, practically 3½d. per unit. The cost per arc lamp for public lighting is now 16d. These rates are the lowest charged for electric lighting in the United Kingdom.

A LOCAL GOVERNMENT BOARD inquiry was recently held at Handsworth to consider the question of lighting the public buildings by electricity, and the application of the District Council for permission to borrow 2,200d. for that purpose. There were present Councillors W. A. Ellis (chairman of the Council), D. Rose, J. J. Hughes, H. Loveridge, F. Lempriere, and S. Adkins, and Mr. H. Ward (clerk). Mr. Ward, in reply to the inspector, gave the population of the district as 41,600, and the annual assessable value as 161,233d. The balance of outstanding loans under the Sanitary Acts and the Public Health Acts of 1875 was 84,762d., and the loans which had been sanctioned but had not been taken up, 23,990d., giving a total of 108,752d. He also pointed out that though the amount of loans taken up was only 85,000d., they were entitled to borrow 213,714d., and that the Council owned property to the value of 41,607d. The loan of 2,200d. which was now being applied for was for the purpose of providing electric light for the council house, library, lecture-halls, stabling, fire station and the new technical schools. That light would render the council house much more comfortable to those who attended there, particularly those who frequented the library. At the present time the heat from the gas in winter was almost unbearable, and there was also a considerable loss arising from the injury done to the books by the gas fumes. The new form of light would also be much better for the work of the technical school than gas would. Evidence as to the details of the buildings and plant was then given by Mr. Henman, the architect, and Mr. Vaudrey, M.Inst.C.E. The engineer and inspector then visited the premises proposed to be lighted.

THE report of the gas committee of the Salford Borough Council for the year ended March 25 last, which was approved, stated that there had been an increase in the business of the



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department during the year, the output of gas being nearly  $4\frac{1}{2}$  per cent. more than in the previous year, and the receipts for residuals had been better. The cost of coal had been slightly more, but the illuminating power of the gas had been better. The working expenses had been less and the total result of the year's operations was very satisfactory. The quantity of coal and cannel carbonised during the year was 126,259 tons, and the quantity of gas made was 1,298,201,000 cubic feet. The average illuminating power of the gas at all stations was equal to 18.92 standard sperm candles. The demand for supply current for the electric light had increased considerably during the year, and the committee in December last reduced the charges from 6d. to 4d. per unit for lighting, and from 4d. to 2d. per unit for motive power. As this was an exceedingly low price, it was anticipated that it would induce a larger demand for current. The number of lamps equivalent to eight candle-power now connected with the mains was 11,467. The electric light is to be also installed in the town hall at a cost of 724l.

### VARIETIES.

A NEW bridge connecting Norfolk and Lincolnshire has been erected over the river Nene, at Sutton Bridge, near Spalding, by the Midland and Great Northern joint railways. It is an iron swing-bridge for both road and railway traffic, and with contingent alterations at Sutton Bridge will cost the railway companies a sum approaching 100,000l.

SIR JOHN JONES JENKINS, M.P., president of Swansea Exchange, presided on the 8th inst. at a luncheon to inaugurate the opening of the new buildings erected in Fisher Street, at a cost of 4,000l.

THE Barton House Estate, South Warwickshire, comprising an original Jacobean mansion, built by Inigo Jones in the year 1615 for Sir James Overbury (a brother of the Sir Thomas Overbury who was poisoned in the Tower in the reign of James I.), with its estate of about 750 acres, has been sold by Messrs. John D. Wood & Co., of Mount Street, for 27,200l., including the valuable timber.

AN illustrated programme of the Royal Jubilee Procession, authorised by H.R.H. the Prince of Wales, will be published in aid of His Royal Highness's Hospital Fund for London, to which the entire profits will be devoted. The

programme will contain detailed particulars of the procession, and sixty-four pages of illustrations will run throughout the pamphlet, with descriptive letterpress underneath. It will be published at one shilling, and will be on sale four or five days before the day fixed for the procession, and will form not only an illustrated guide, but an interesting memento of the day.

BALGRIFFEN PARK, the residence of Major Doyne, situate between Raheny and Malahide, in North County Dublin, was totally destroyed by fire on Tuesday night. The house was one of the oldest in the northern part of county Dublin, and the woodwork was of exceptionally heavy construction, the floors being of 3-inch planking and the beams of pitch pine. Balgriffen is the estate conferred by Henry VIII. on Conn Bacach O'Neill, when the king was engaged in an attempt to convert Irish chiefs into noblemen of the pale. Along with the estate O'Neill received the title of Earl of Tyrone. Both the earldom and the estate ultimately fell to the celebrated Hugh O'Neill, Earl of Tyrone.

A NEW vehicular bridge over the river Dee, which has been built at a cost of 13,000l. by the County Councils of Flintshire and Cheshire, the Dee Conservancy Board and other authorities, to take the place of a primitive ferry which for many years has been inadequate to cope with the requirements, was opened on June 2 by Mr. Gladstone. The new structure, which is a handsome one, has three spans, the centre one of which opens by an ingenious telescopic movement to permit of the passage of vessels up and down the river. The bridge forms a convenient and speedy access from North Wales to Cheshire and Lancashire, and will be the means of further opening out the Principality to the markets of the great centres of commerce. It is free to foot passengers, but the Flintshire County Council are permitted to charge tolls for animals and vehicles in consideration of undertaking its maintenance.

### NEW CATALOGUES.

MESSRS. SHANKS & Co. have just produced a catalogue of their patent sanitary appliances for ships, which is an admirably got-up epitome of everything which can be required for the purpose. The illustrations portray a practically unlimited assortment of closets, lavatories, urinals, baths, &c., of which all prices are given.

ANOTHER concise catalogue of sanitary appliances which has reached us is that of Messrs. Thos. Crapper & Co., of

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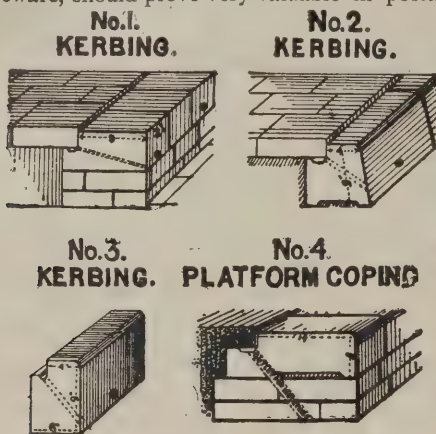


Chelsea, whose list contains sketches, with sectional diagrams, &c., of a variety of glazed stoneware traps, gullies, pipes, inspection chambers, &c., frames and covers for drains and manholes, grease traps, closets, sinks, ventilating valves, tanks, &c.

### TRADE NOTES.

WE learn that Messrs. Witherby & Co., of 325 High Holborn, W.C., are publishing for the Admiralty a Jubilee commemoration number of the Royal Navy List.

MESSRS. TYHURST & SON, of Uckfield, have forwarded us particulars of their patented improvements in kerbs, edging blocks, platform copings, steps, &c., which, made in strong, hard stoneware, should prove very valuable in positions where



they are likely to be subjected to great stress of wear and tear. The illustrations show a transverse section of a plain edging block or kerb of different shapes, which, as will be seen, are made with a roughened surface, which ensures a good foothold.

THERE is probably no monarch in the world who is so closely connected with other rulers as our own beloved Queen. So many and so varied are the relationships of our Royal Family that most people, while convinced of the fact, have only a vague knowledge of the actual details. Recognising this, the proprietor of *Mothers and Daughters* is giving away a

large chart showing the whole of the Queen's descendants, and the various inter-relationships of the Royal Houses of Europe so far as they are connected with our own Sovereign.

THE new hospital, Dagenham, Essex, is being warmed and ventilated by means of Shorland's patent double-fronted Manchester stoves with descending smoke-flues.

### SIGNALLING THROUGH SPACE.

AT the Royal Institution on Friday, the 4th inst., Mr. W. H. Preece delivered a lecture on "Signalling through Space without Wires." He described the method he himself had worked out of sending signals from one place to another without intervening wires. In this system, which made use of electromagnetic waves of low frequency, two parallel circuits were established, one on each side of a channel or bank of a river, each circuit becoming successively the primary or secondary of an induction system according to the direction in which signals were to be sent. Strong alternating currents were transmitted in the first circuit, so as to form signals in the Morse code. The effects of the rise and fall of these currents passed as electro-magnetic waves through the intervening space, and if the secondary circuit was so situated as to be washed by these ethereal waves their energy was transformed into secondary currents, which could be made to affect a telephone. This system was successfully used in 1895 to telegraph across the Sound of Mull when the submarine cable had broken down. With reference to the distance to which it was possible to signal in this way, the lecturer mentioned that the curious law had worked itself out that the length of each of the two parallel circuits must be equal to the distance between them. Last year an attempt was made by this method to establish communication with the North Sandhead Lightship on the Goodwin Sands. A cable was coiled in a ring on the bottom of the sea, embracing the area over which the ship swung, and the ship itself was surrounded with another coil above the water line. Communication, however, was found to be impracticable, because the screening effect of the sea-water and the effect of the iron hull of the ship absorbed all the energy of the currents in the coiled cable. Last July a young Italian brought a new system to England, in which Hertzian waves of very high frequency were utilised. The peculiarity of Mr. Marconi's system was that apart from the ordinary conducting wires of the apparatus, conductors of very moderate length only were needed, and even these could be dispensed

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with if reflectors were employed. The transmitter was Righi's form of Hertz radiator, consisting of two spheres of solid brass, 4 inches in diameter, fixed in an insulated case fitted with oil, in such a way that a hemisphere of each was exposed, the other hemisphere being immersed in the oil. The oil kept the surfaces of the spheres electrically clean, it impressed on the waves excited a uniform and constant form, and it tended to reduce the wave-length. Mr. Marconi generally used waves about 120 centimetres long. This radiator was excited by an induction coil controlled by a Morse key. A 6-inch spark-coil had sufficed for distances up to 4 miles, but for greater distances a larger coil had to be used. The receiver consisted of a small glass tube 4 centimetres long, into which two silver pole pieces tightly fitted, the  $\frac{1}{2}$ -millimetre space between them being filled with a mixture of fine nickel and silver filings mixed with a trace of mercury. The tube, which was exhausted to a vacuum of 4 millimetres, formed part of a circuit containing a local cell and a sensitive telegraph relay. In its normal condition this metallic powder was virtually an insulator; but when electric waves fell on the particles they were marshalled and arranged in such a way that they became a conductor. Hence a current passed which could be used to ring a bell or indicate a signal in other ways. But in order to apply this device to practical work it was necessary to have some means of again rendering the filings non-conductive, and this Marconi managed by making the local current vibrate a small hammer-head against the glass tube, thus shaking the filings back into an insulating condition. This receiver Mr. Preece declared to be about the most delicate electric instrument we possessed. By its aid signals had been transmitted across the Bristol Channel between Penarth and Brean Down, a distance of nearly nine miles. With reference to the employment of this device in the public service, he pointed out that secrecy could be perfectly maintained by its use. If a receiver was to respond to a certain transmitter it must be tuned to accord with it, and unless it were so timed it would be unaffected. It was curious that hills and apparent obstructions failed to obstruct the effects, nor did weather seem to have an influence, while one apparent anomaly which had developed itself in the course of Mr. Marconi's experiments was that his receiver acted even when enclosed in a perfectly closed metallic box. In conclusion, the lecturer declared that, though there were still many practical points that required to be threshed out in this system, enough had been done to prove its value and to show that for shipping and lighthouse purposes it would be a valuable acquisition.

## THE UNIVERSITY OF NEW SOUTH WALES.

A CORRESPONDENT of the *Scotsman* in Sydney writes:— Sydney possesses a University which in some respects may be spoken of as an institution with few equals in the world. It stands in a picturesque position, it has been arranged with admirable care and forethought for the purposes of study, it opens its doors to all comers who have got the necessary qualifications, and it is conducted with an amount of energy and spirit not often to be found in older institutions. The main building of the University stands upon an eminence between the suburbs called Newtown and Forest Lodge. An extensive park surrounds it. Part of that park is really a great pleasure ground; another part is the site upon which the affiliated colleges stand. If you stand at the front of the University you have a really magnificent panorama before you. A great part of the city of Sydney is in full view; you are looking down upon it. You see the harbour glittering in the sunshine; you see the hills to your right and to your left covered with foliage. Immediately at your feet lie the pleasure grounds which by the care of the managers of the University have been made to blossom with flowers. Here again you have the scarlet hibiscus all aflame in the midst of shrubs of various kinds; you have the oleander and the mimosa, and the Japanese lily, and many other plants of a tropical or sub-tropical kind. It is a scene not soon to be forgotten; and it must have something of an elevating effect upon the students of the University.

Behind the main building other erections have been put up. The main building is of stone, the other buildings are mainly of brick, the idea being that, as they will need extension in the not very distant future to meet the requirements of the increasing number of students, it was cheaper to build them at first of brick, and being of brick they are more easily removed than they would be if they were built of stone. Here you have a great museum, you have classrooms and laboratories for the medical, the engineering, and all the scientific departments. The arrangements of these classrooms seem to be excellent. They have taken the place of older and smaller classrooms which were not arranged with anything like the same care for the purposes of teaching.

It is intended before long to erect as an adjunct to the main building a new library and museum which will contain most of what is now held in other and less permanent buildings. When it is completed, with its cloisters and its fine library, the University building will have few equals elsewhere.

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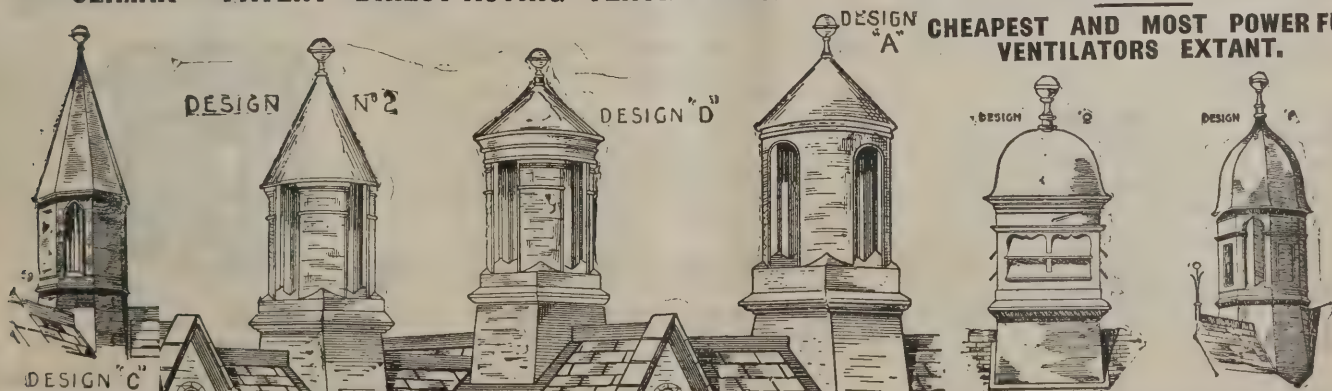
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As far back as 1858 the University was incorporated by an Act of the Colonial Legislature. It was then endowed with an annual income of 5,000*l.* Since 1882 various supplementary grants have been made, the amount in 1895-96 being about 4,000*l.*, besides special grants for special purposes. The charter of the University declares that its object is to supply the means of a liberal education to "all orders and denominations without any distinction whatever." There is no Faculty of Theology in the University, but there are lecturers in modern languages, as well as in all the ordinary branches of University teaching. Obviously, as there is no Faculty of Theology in the University, there might be objections on the part of some of the religious bodies. These objections have been removed by the establishment of colleges in connection with the different religious denominations. This was provided for by an Act of the Legislature in 1854 before the University itself received its charter. Assistance is given to their endowment, and the fundamental principles of the University—the association of students without respect of religious creeds in the cultivation of secular knowledge—is secured consistently with the most perfect independence of the college authorities within their own walls. These colleges, which stand within the grounds of the University itself, are St. Paul's College for members of the Church of England, St. John's College for members of the Roman Catholic Church, St. Andrew's College for members of the Presbyterian Church, and the Women's College. Mention of this last institution recalls the fact that women have for many years past been admitted to the University on an equal footing with the men. They are taught in the same classes by the same professors or lecturers, and are entitled to receive the same degrees if they show competency in their work.

### A LEGITIMATE BRIDGE FAILURE.

MILL BROOK, a small stream in Raritan Township, N.J., has for several years, says the *Engineering Record*, been crossed near Bonhamtown by a brick arch bridge about 25 feet wide and of 14-foot span. It was recently determined to widen the bridge, and a contract was let for the extension of the old structure about 20 feet transversely to the roadway, by building another section of arch and walls "like the original ones." Between 300 dols. and 400 dols. was allowed for the work, and

the original contractor sublet the job to a second party, who constructed the brick side walls, 4 or 5 feet high, and from their tops sprung the new arch. This was a very flat segment with sharp curve at the haunches, and was supported on skewbacks made of broken brick, spawls and mortar. The arch ring was three bricks thick laid in poor cement mortar. Earth was filled in behind the retaining walls and the arch was finished and its centres immediately struck. The removal of the centres was accomplished on the evening of May 1. Considerable rain fell the following night, and surface water flowed down the steep hill at the end of this bridge and over the new fill and work.

On May 2, while two persons were crossing the bridge, the new part fell without warning and killed one of them. The brickwork was found badly disintegrated, the mortar still soft and wet, and where the old and uninjured work had joined the new there was a perfectly smooth finished surface where the new section had merely abutted against the old without any pretence of bonding, toothing or other connection. The fatality attending this bridge failure again calls attention to the criminal carelessness often permitted on work of this character in country communities where an expenditure for intelligent design and honest superintendence is regarded as superfluous. The county will probably now have to pay a money penalty for the short-sighted economy of its officials.

### MINES AND QUARRIES IN 1896.

SUMMARIES of statistics for the year 1896 relating to the mines and quarries of the United Kingdom and the Isle of Man have just been issued as a blue-book. They show the number of persons employed, the quantities of minerals raised, the number of fatal accidents and deaths, the number of non-fatal accidents and persons injured and the death-rates from accidents in each inspection district. During the year 1896 the total number of persons employed in and about all the mines of the United Kingdom was 725,803, of whom 692,684 worked at the 3,385 mines under the Coal Mines Act and 33,119 at the 731 mines under the Metalliferous Mines Act. Compared with 1895 there is a decrease of 7,600 persons at mines under the Coal Mines Act, and a decrease of 254 persons at mines under the Metalliferous Mines Act. Of the 692,684 persons working at mines under the Coal Mines Act 557,026, or about 80 per cent., were



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employed below ground. Of the 135,658 surface workers 4,517, or about 3·3 per cent., were females. At the mines under the Metalliferous Mines Act 19,299 persons, or about 58 per cent., worked below ground, and of the 13,820 surface workers, 597, or nearly 4·3 per cent., were females. At quarries there were 112,829 persons employed, of whom 56,123 worked inside the actual pits or excavations, and 56,706 outside. The persons employed occasionally at quarries are not included. The total output of minerals at mines under the Coal Mines Act was 208,503,868 tons, of which 195,351,951 were coal. Adding 9,309 tons from open quarries, the total output of coal was 195,361,260 tons, which exceeds that of the previous year by 5,708,698 tons. It is the highest output yet recorded. The total output of minerals at mines under the Metalliferous Mines Act was 3,873,697 tons, of which 2,237,327 tons were iron ore. The total quantity of stone and other minerals obtained from quarries was 35,641,411 tons. At the mines under the Coal Mines Act there were 849 separate fatal accidents, causing 1,025 deaths. Compared with 1895 there was a decrease of 19 in the number of accidents and a decrease of 17 in the number of deaths. At the mines under the Metalliferous Mines Act there were 37 fatal accidents, which caused 40 deaths, showing a decrease of 9 in the number of accidents and 14 in the number of deaths. At the quarries there were 117 fatal accidents, which resulted in 124 deaths. Compared with 1895 there was an increase of 15 in the number of accidents and 22 in the number of deaths. The number of non-fatal accidents reported during the year amounted to 5,520 at mines under the Coal Mines Act, 308 at mines under the Metalliferous Mines Act and 896 at quarries under the Quarries Act. The death-rate in the midland district was far lower than that of any other inspectorial division. The death-rate from accidents of the underground workers at the mines under the Coal Mines Act was 1·619 per 1,000 persons employed, and that of the surface workers ·907 per 1,000 employed; the corresponding figures for 1895 were 1·655 and ·877 respectively. At the mines under the Metalliferous Mines Act the death-rate of the underground workers was 1·710 per 1,000 persons employed. There was a considerable improvement compared with that of 1895, which was 2·391 per 1,000; the deaths from accidents to surface workers showed a ratio of ·507 per 1,000. At quarries the death-rate of the workers inside the actual pits or excavations was 1·604 per 1,000, and of the persons at factories and workshops outside the quarries, but connected with them, ·600 per 1,000.

### THE NEW BIRMINGHAM WATERWORKS.

IT is now five years, says the *Birmingham Daily Post*, since the passing of the Act of Parliament authorising the construction by the Corporation of Birmingham of an extensive system of works for impounding the waters of the Elan and Claerwen above the Rhayader, and conducting them to Birmingham for the supply of the necessities of the huge population, of which the greater portion is under the jurisdiction of the City Council. Parliament fixed a period of ten years for the execution of the undertaking, and it was entered upon with the least possible delay, contracts being let for some of the works, while the Corporation arranged for the carrying out of other portions by its own officers. Nearly three years ago, on July 10, 1894, the members of the City Council made a day's excursion to the Elan Valley. They were then shown the site of the reservoirs, the model village for the accommodation of the workpeople, certain railways that had been constructed for facilitating the removal of material and a variety of other preliminary operations. The general outlines of the scheme were explained, and the Council were able to appreciate more fully than had previously been possible the nature of the vast undertaking for which they and their advisers were responsible. Two features that were made additionally evident by the inspection were the admirable character of the gathering ground from which the water is derived, and, in the second place, the adaptability of the Elan and Claerwen Valleys for reservoir purposes by the construction of the proposed series of dams. There was little more to be learnt at that time, but in the period that has since elapsed material progress has been made with the works—practically, they are nearly half through—and the water committee considered it desirable that in the present spring a second visit should be made by the whole body of the City Council. May 27 and 28 were fixed for the inspection, two days being none too much for the ground which had to be covered.

The undertaking naturally divides itself into two sections. First, there is the damming up of the head waters into reservoirs capable of providing for a supply of from twenty-six million to twenty-seven million gallons per day, or ultimately seventy-five million gallons per day; and, secondly, there is the provision of the means for conveying this water through hill and dale to the confines of Birmingham. The first day was accordingly devoted to the inspection of the nature of the conduit works and the progress that has been made in their

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construction. For this purpose the party were taken to the picturesquely-situated town of Knighton, in Radnorshire. Knighton is approximately at a third of the distance from the Elan Valley to Frankley, near Northfield, where the construction of a storage reservoir will shortly be commenced. Nothing has yet been done on the Birmingham side of Knighton, but on the Welsh side the works are making rapid progress. The party numbered fifty-one members of the City Council, representatives of the Press and a number of principal officers of the Water Department. Under the guidance of Mr. Mansergh, they made their way up the somewhat steep road of the Garth Hill to a building standing prominently on the hillside. This was the inlet valve house of the Downton syphon, and here explanation was given of the manner in which the water is carried across the deeper valleys by which the course of the conduit is intersected. Knighton is in the valley of the River Teme, and the hills rise upon either side to a considerable height. The conduit from the reservoirs, which is being constructed with but a slight gradient—a fall of 44 feet in 27 miles—meets the valley of the River Teme at a point where, for the next 9 miles towards Ludlow, a variety of elevations and depressions have to be passed, but all of them lower than the point on the hillside already indicated. For this purpose the water tunnel is replaced by lines of iron pipes, which descend the depressions and ascend the elevations a short distance beneath the soil, the downward pressure on the one side causing the water to find its level upon the other. This arrangement is called a syphon, whether intended to cross a single valley or a long series, and there are several such syphons of greater or less magnitude between the Elan reservoirs and Frankley.

The party having reached the syphon-house descended some temporary ladders into what looked like a sort of cellar with blue brick sides and vaulted roof of concrete. "Now, gentlemen," said Mr. Mansergh, "I just want to describe in a few words where you are and what this arrangement is." The "arrangement" proved to be a very simple and intelligible one. A tunnel, which the visitors were afterwards to traverse for a mile and a quarter before they saw daylight again, was explained to be a section of "cut-and-cover" conduit. That is to say, it is sufficiently near the surface of the ground to be constructed by cutting a trench, building an invert and sides of blue brick and cement, backed by concrete, and then covering it with an arched roof of concrete, upon which the soil is ultimately replaced. Towards the valley of the Teme this tunnel

widens out into a chamber, of which the outer face has six iron doors on the ground level. They are rounded at the top, and, except that they worked in slides, portcullis fashion, and not upon hinges, they resembled the openings of a baker's oven. These gates are intended to regulate the admission of the water to a series of six cast-iron pipes 42 inches in diameter, and which compose the 9 miles of the Downton syphon. The chamber, as already stated, is prepared for six pipes, which would deliver 75,000,000 gallons of water per day, but this quantity will not be needed until some distant day. For immediate needs two pipes only are being provided both at this point and at others where the aqueduct consists of pipes, and these will suffice to deliver from 26,000,000 to 27,000,000 gallons per day. There is an arrangement whereby any excess of water in the chamber passes over a sill at the top into an overflow pipe to the river, and in case of either of the pipes of the syphon bursting under the pressure an ingenious device has been provided whereby the increased rush of water would result in the automatic closing of the gate to the damaged pipe, thus avoiding any flooding or damage in the valley.

Having been duly informed of these details the party started on their walk through the mile of covered conduit, light being afforded by several lamps carried by members of the engineering staff. It was not altogether an unpleasant journey, the passage having a height of 8 feet and a maximum width of slightly over this, the sectional form being somewhat pear shaped. There was very little wet upon the invert, the walls were beautifully clean, and the atmosphere was cool and pleasant. The conduit follows the course of the hillsides, curving first one way and then another, while here and there are short lengths of square sections constructed with the aid of binding girders, and carried upon arches across small valleys or dingles. One such section was exposed to view near the spot where the party emerged into the open air, and it was pleasing to observe that these arched sections were constructed of a reasonably decorative design, and formed no detriment to the native scenery. The next section explained consists of tunneling through the hills. The visitors were shown the commencement of what is called the Knighton tunnel, extending from a mile and a quarter beyond Knighton to the Lugg Valley, a distance of two miles and a half. Mr. Mansergh explained that this tunnel was being driven from each end, 1,700 yards having already been run from the Knighton end and 1,600 yards from the other end, leaving about 1,000 yards still to pierce before the two sets of excavators meet.

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Ascending a steep bank, the visitors made their way to the main road, where a number of open vehicles awaited them, and in which they were taken a drive of about a hour and a half to Dolau Station. The route forms one of the pleasantest drives in the Principality, lying through a constantly changing landscape of rolling hills, many of which are beautifully wooded, while others show smooth heather-topped moorlands of varying tints. At intervals are small picturesque villages, and here and there the farmsteads of prosperous agriculturists. The first stopping-place was the Lugg Valley, where there is another syphon constructed to carry the water past a depression of about a third of a mile in width. Descending to the syphon chamber, a long table, illuminated by candles, was found, just within the covered conduit, and spread with light refreshments, by way of luncheon. From this point there is a further length of two miles of cut-and-cover conduit almost finished, and leading to the Dolau tunnel, a piercing  $4\frac{1}{2}$  miles long, which is to extend very nearly to the reservoirs. On the way opportunity was afforded for inspecting three shafts formed at intervals along the Dolau tunnel for discharging the excavated material. Part of the tunnel is at no great depth below the surface, but the greater length penetrates a hilly ridge, of which the summit is about 600 feet above the level of the tunnel. The day's inspection ended at Dolau, whence train was taken to Llandrindod Wells, where quarters were provided for the night, partly at the Pump House Hotel and partly at neighbouring boarding-houses.

The next morning an early start was made by train for Rhayader in order to inspect the works at the Elan Valley, of the magnitude of which few only of the party had previously any conception. The weather was again fine, and the inspection proved both instructive and enjoyable. From near Rhayader Station a walk was taken over the line of the conduit to the Caethon syphon, near to which Alderman Lawley Parker (chairman of the water committee) met the party, and was warmly welcomed and congratulated on the measure of recovery he has made from his late illness. On the way attention was called to an air-valve at one of the higher points of the pipes intended to allow of the escape from the syphon of any imprisoned air, which would otherwise retard the flow of the water. There is provision of this kind at the summit of all the syphons, while, on the other hand, there are at the important depressions wash-out valves for the removal of any earthy matter carried down by the water. Crossing the Caethon stream, the visitors found awaiting them on the Corporation railway a

train of trucks, in which rough seating had been constructed. In these a journey was made of about 6 miles to the head of the Elan Valley, passing the whole chain of three reservoirs into which the valley is being converted. Stoppages were made at points of interest, and explanations were given of the construction of the dams. The lowest of these, at Caban Coch, was quickly reached. Caban Coch (the red cabin) forms, as it were, a natural gate to the valleys beyond. The Caban dam will be remarkable not so much for its lateral extent as for its height, which from the river bed will be no less than 122 feet, exclusive of the foundation. The thickness of the dam at its base is practically the same as the height, and while a nearly upright face will be presented to the reservoir, the outer side will be a flowing curvilinear slope. The length of the dam from side to side at the top will be about 600 feet. The excavation and the work already done is not so impressive viewed from the railway above, but the immense size of the dam is more apparent upon a descent to the river-bed and into the huge stack of timber that has been built to shut out the river from about half of its course while the first part of the masonry is built. The Lord Mayor, Alderman Lawley Parker and others so descended for the purpose of laying a stone in the face of the outlet from a culvert piercing the dam at this point, and which has a diameter of 16 feet. The foundations of this work have been put in, and the lower half of the culvert already constructed. Of course there must be no stopping back of the river until the entire dam is finished, but while the work is going on provision must be made for letting past the huge volumes of flood water which pour down after a few hours' storm. This is the purpose of the culvert. A portion of the dam, including one culvert, has first to be built, then a portion of the river will flow through it, while another enclosure is started out near the opposite bank with a second culvert. Then when there are two of these large culverts the centre portion of the dam can be built. Next, pipes will be laid through the culverts capable of paying into the river compensation water to the amount of 27,000,000 gallons a day. Last of all, the culverts, except the compensation water pipes and their valves, will be closed by a breastwork of steel plates and concrete.

The result of these operations will be that an accumulation of water, having a depth in places of as much as a hundred feet, will back up the valleys of the Elan and the Claerwen, forming a lake something like a letter Y in shape, and having a length up the longest arm of nearly four miles. The capacity of this Caban Coch reservoir will be eight thousand million

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gallons. We put that fact on record as a matter of figures, but an idea of the magnitude and character of the reservoir can only be obtained by an actual view of the ground to be submerged, and even then it is difficult to realise that the waters will rise to the height indicated by various landmarks put up for the occasion of the visit, and in time of flood will flow over the top of the dam in a cataract 3 feet in thickness.

During the journey by rail, high along the hill sides, but only 13 feet above what will be the top water level, attention was directed to various quarries on the opposite side of the valley from which huge blocks of hard, blue-tinted limestone are obtained, and to appliances for crushing material to blend with Portland cement into the concrete, of which vast quantities are employed. At the head of the site of the Caban reservoir the valley shallows towards the level of the railway, and as the ground becomes higher there is less cultivation until the landscape closes with smooth, rounded hills, with scanty turf, sufficing only for the sustenance of the hardy mountain sheep. Work is well forward in connection with the dams forming two higher, but smaller, reservoirs—that of Pen-y-Gareg and Craig Goch. Though smaller than the Caban reservoir, they will be lakes of considerable extent, the former having a capacity of 1,330 million gallons and the latter of 2,002 million gallons. Three other reservoirs in the Claerwen Valley are included in the scheme, but will only be constructed if the growth of the demand for water renders them necessary.

While the party were at the head of the valley, the Town Clerk, pointing to the gathering grounds beyond, said he would mention a few particulars as to the extent of the Welsh estate which the Birmingham Corporation had acquired. It reached for another six miles further ahead, ten miles to the left of where they were assembled, and perhaps two to the right, the whole area being 45,000 acres, or seventy-one square miles. Thirty-five thousand acres of this had been actually bought, and as regarded the other 10,000, it might not be necessary to purchase, as they had already acquired the manorial rights in order to prevent pollution by lead-mining. The Corporation were also the owners of 13,000 sheep, and were, he believed, the largest sheep farmers since Abraham. On the return journey explanation was given of the submerged dam, which stops back a sufficient portion of the water in the upper half of the Caban reservoir to allow of its being tapped at an adequately high point to flow to Birmingham on what is called the hydraulic gradient. The rate the water will travel is rather less than two miles an hour, so that a particular portion of the stream through

the aqueduct would complete its journey in a day and a half. Among other circumstances learnt at the excursion is that the actual expenditure of the committee up to the present time is a million sterling, while contracts have been given out for work estimated at another half million. Taking one portion with another, the estimates so far have proved trustworthy. The procedure of the committee has been to put in hand first the operations involving the most time and the greatest difficulty, so that the whole may finish together in 1902. Mr. Yourdi, the engineer in charge of the Caban Coch dam, expects that under favourable circumstances his work will be completed in 1901.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

12753. Frederick William Pinson, for "Improvements in the construction of padlocks."

12804. Winfield Scott Pettit, David Reed Pettit and Edward Devaul Sutton, for "Improvements in window-sash fasteners."

12824. Gustav Bortmann and Reinhold Munkwitz, for "Improvements in doorsteps."

12830. Stephen McClellan, for "Improvements in frames and other attachments for bit braces."

12835. Christian Heidecke, for "Improvements in or relating to tools for operating upon stone, metal, wood and other materials."

12864. Stephen Arnold Pearson, for "Automatic flushing arrangement."

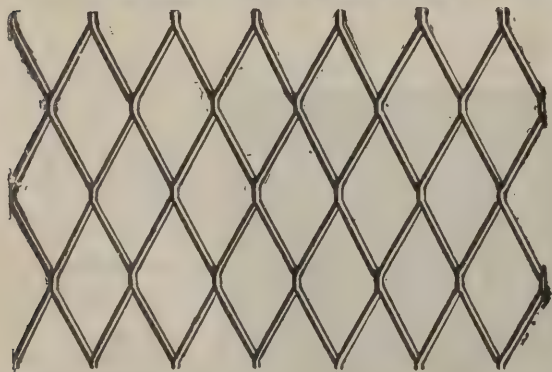
12871. John Edmundson, for "Improvements in hanging window sash and in the pockets of sash window frames."

12879. George Basker, for "Locking or fastening device for fanlights."

12903. Harriet Tidswell, for "Improvements in window sash-fasteners."

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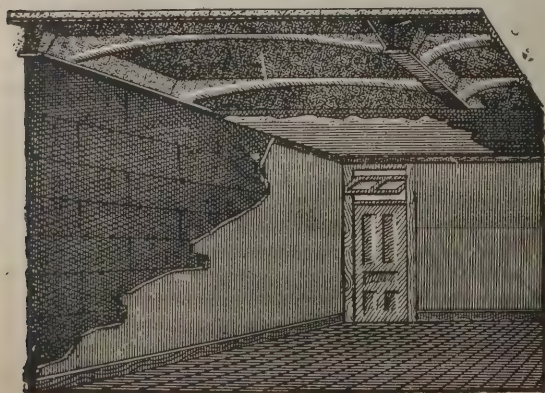
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## EDITORIAL NOTICES.

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*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

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*For Advertisement Scale, see page xv.*

## COMPETITION OPEN.

**BOOTLE.**—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000l. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

## CONTRACTS OPEN.

**ABERDEEN.**—June 22.—For erection of farm offices, Mains of Auchnacant, Foveran. Mr. Leslie Tait, Mill of Foveran.

**ABERGAVERN.**—June 25.—For alterations and additions to Castle Street School. Mr. E. A. Johnson, architect, Abergavenny.

**ALNWICK.**—June 23.—For enlargement of St. John's School, Howick Street. Mr. M. Temple Wilson, architect and surveyor, 69 Narrowgate, Alnwick.

**ALNWICK.**—July 3.—For erection of three blocks of cottages in Wagon Way Road, each block to be tendered for separately. Mr. C. E. Moore, Gazette Office, Alnwick.

**BALA.**—June 26.—For erection of classrooms, laboratories and other works for the Bala County School for Boys. Mr. R. Lloyd Jones, architect, Mount Place, Bala.

**BARNSELY.**—June 30.—For erection of two houses and out-buildings, Gawber Road. Mr. Herbert Crawshaw, architect, Barnsley.

**BIDEFORD.**—June 29.—For repairs to 16 Bridgeland Street. Mr. R. T. Hookway, Bideford.

**BRADFORD.**—For erection of loom works at Shipley Fields Mills, Frizinghall, near Bradford. Messrs. Mawson & Hudson, 2 Exchange Buildings, Bradford.

**BRADFORD.**—For erection of a school, offices for the Board, caretaker's house, manual training-room, &c., at Highfield; also for additions at Westgate Hill Board School. Messrs. W. & T. B. Bailey, architects, 9 Market Street, Bradford.

**BRADFORD.**—June 24.—For alterations to store in Green Lane, Manningham, and alterations to store at Brownroyd. Messrs. Rycroft & Firth, architects, Bank Buildings, Manchester Road, Bradford.

**BRIDLINGTON.**—June 26.—For pulling-down four houses and other buildings and the erection of six dwelling-houses and a shop, Quay Road. Mr. Samuel Dyer, architect, Bridlington Quay.

**BRIDLINGTON.**—June 26.—For construction of a brick gas-holder tank, 102 feet in diameter and 25 feet deep. Messrs. Thomas Newbigging & Son, engineers, 5 Norfolk Street, Manchester.

**BRYSNADDLER.**—June 21.—For erection of five houses at Brynsaddler, near Pontyclun. Mr. Evan Lewis, Torgelly Farm, Llanharry.

**BUDLEIGH SALTERTON.**—June 24.—For alterations and additions at The Firs. Mr. E. H. Harbottle, architect, County Chambers, Exeter.

**BURNLEY.**—For erection of a chapel in Old Hall Street. Mr. G. E. Bolshaw, architect, 189 Lord Street, Southport.

**BURNOPFIELD.**—For alterations to premises. Mr. J. Wm. Rounthwaite, 13 Mosley Street, Newcastle-on-Tyne.

**CANTERBURY.**—June 24.—For repair or renewal of the wood-paled fence enclosing the old moat in Rhodaus Town. City Surveyor, 28 St. Margaret Street, Canterbury.

**CARDIFF.**—For erection of Congregational church, Richmond Road. Messrs. Habershon & Fawckner, architects, Pearl Street, Roath, Cardiff.

**CARLISLE.**—June 21.—For erection of laboratories and lecture-rooms at the Grammar School. Mr. Geo. Dale Oliver, architect, 5 Lowther Street, Carlisle.

**CARLTON.**—June 21.—For building co-operative stores. Mr. R. Whitbread, architect, Carlton, Notts.

**CLACTON-ON-SEA.**—For erection of a villa in Thorogood Road. Mr. James W. Martin, architect, Station Chambers, Clacton-on-Sea, and 2 Devonshire Square, E.C.

**COLNE.**—June 23.—For construction of a chimney 70 yards high and flue, in connection with the refuse destructor at the proposed health depôt. Mr. T. H. Hartley, borough surveyor, Town Hall, Colne.

**CONWAY.**—July 7.—For erection of market hall, armoury, and public hall. Mr. T. B. Farrington, borough engineer, Municipal Offices, Conway.

**CORNWALL.**—For erection of a five-roomed dwelling-house at College Row, Camborne. Mr. E. Rogers, Treloar Warren Street, Camborne.

**CORSHAM.**—June 28.—For additions and alterations at Mansion House. Mr. Thomas Holloway, Chippenham, Wilts.

**CROYDON.**—June 21.—For excavating about 355 cubic yards of earth and erecting about 1½ rods of brickwork in Croyham Road. Mr. E. Mawdesley, town clerk, Town Hall, Croydon.

**CROYDON.**—June 24.—For erection of four cottages, stable and cart-shed upon irrigation farm at South Norwood. Mr. Thomas Walker, C.E., borough engineer, Town Hall, Croydon.

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DARLINGTON.—June 24.—For additions to Rudd Hall, for His Grace the Duke of Leeds. Messrs. Clark & Moscrop, architects, Felthams, Darlington.

DERBY.—June 21.—For additions and alterations to the Orchard Street Board School. Mr. A. Macpherson, architect, Tenant Street, Derby.

DONCASTER.—For erection of boot shop at the corner of St. Sepulchre Gate and Printing Office Street. Messrs. Gelder & Kitchen, architects, 76 Lowgate, Hull.

DOUGLAS.—July 7.—For erection of municipal buildings, free library and fire station in Ridgeway Street. Mr. Thomas H. Nesbitt, town clerk, Town Hall, Douglas, Isle of Man.

DOVER.—June 29.—For erection of a carshed at Buckland. Mr. Henry E. Stilgoe, Town Hall, Dover.

ELGIN.—June 25.—For erection of offices at Mortlach Distillery, Dufftown. Mr. Charles C. Doig, architect, Elgin.

FORDHAM.—For erection of a public hall and institute at Fordham, Cambs. Messrs. Gordon, Lowther & Gunton, architects, Finsbury House, London, E.C.

GLASGOW.—June 26.—For construction of a masonry dam at the outlet of Lock Katrine, by which the level of the loch is to be raised 5 feet. Mr. James M. Gale, engineer of the Water Department, City Chambers, 45 John Street.

GLASGOW.—June 23.—For additions to hospital at Merryflats. Messrs. H. & D. Barclay, architects, 245 St. Vincent Street.

GLASGOW.—June 25.—For erection of station buildings for the central low-level station on the Glasgow Central Railway, for the Caledonian Railway Company. Mr. Charles Foreman, C.E., 160 Hope Street, Glasgow.

HALIFAX.—June 25.—For alterations and additions to the Mechanics' Institute, Northowram. Mr. Joseph F. Walsh, architect and surveyor, Lancashire and Yorkshire Bank Chambers, Halifax.

HALIFAX.—July 2.—For erection of iron foundry mill, chimney and out-offices, &c., at Canal Machine Works, Water Lane. Mr. Medley Hall, architect and surveyor, 29 North Gate, Halifax.

HAMPTON.—June 25.—For construction of engine-house and other buildings on the site of sewage outfall works at Hampton-on-Thames. Mr. Isaac Shone, 47 Victoria Street, Westminster, S.W.

HOMERTON.—June 23.—For alterations and extensions to the master's office at the Workhouse. Mr. Frank R. Coles, clerk, Homerton, N.E.

IRELAND.—For building a residence at Innisbeg, Skibbereen. Mr. Arthur Hill, architect, 22 George's Street, Cork.

IRELAND.—July 5.—For erection of a town hall. Messrs. Anthony Scott & Son, architects, Drogheda and Navan.

KENDAL.—June 24.—For restoring and putting into thorough repair, internally and externally, the whole of the museum buildings. Mr. Stephen Shaw, architect, Kendal.

KIMBERWORTH.—June 29.—For erection of four dwelling-houses, &c., at Kimberworth; also three dwelling-houses, &c., in Clement Street, Richmond Park. Mr. J. Axleby, architect, Wilton Lane, Masborough.

KINGSWEAR.—June 24.—For additions to The Redoubt, Kingswear, consisting of a new room and conservatories. Mr. W. F. Tollit, architect, Gate House, Totnes.

LEAMINGTON.—June 21.—For erection of church and lecture-hall. Mr. C. O. Francis, architect, Leamington Chambers, 5 Richmond Street, Liverpool.

LEEDS.—June 30.—For construction of gate piers and stone boundary walling round Horsforth Church. Mr. James B. Fraser, architect, 8 Park Square, Leeds.

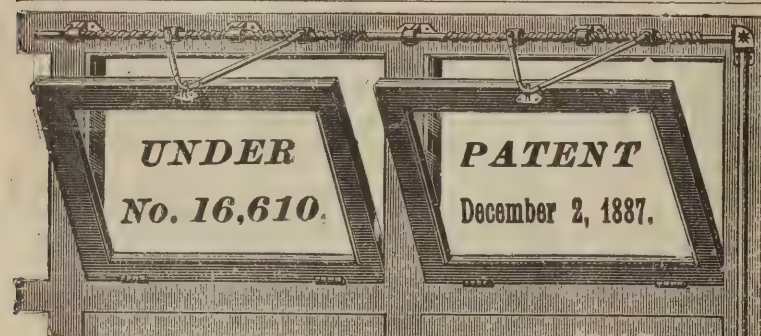
LEIGH.—June 23.—For constructing the seating and flues for two boilers and for erection of a brick chimney 120 feet high at the Sewage Works, Mather Lane. Mr. E. Pritchard, 37 Waterloo Street, Birmingham.

LEYLAND.—For fitting-up showground, erecting grand stand, &c., for the Leyland Hundred Agricultural Society's Show at Preston. Mr. T. F. Hutchinson, secretary, Peel House, Leyland.

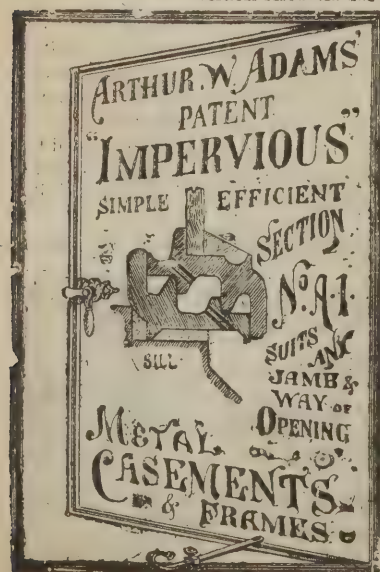
LIVERPOOL.—June 24.—For erection of proposed new offices, North John Street, Liverpool, for the Royal Insurance Company. Mr. J. Francis Doyle, architect, 4 Harrington Street, Liverpool.

LONDON.—June 21.—For supply of internal fittings, fixtures and furniture required at the new Dulwich Library in Lordship Lane. Mr. C. William Tagg, vestry clerk, Vestry Hall, Camberwell, S.E.

LUTON.—July 5.—For erection of school buildings in the Dunstable Road. Messrs. J. R. Brown & Son, Market Hill, Luton.



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**LYDGATE.**—For alterations at the Friendly Inn, Lydgate, near Todmorden, and lodging-house adjoining same; also for alterations at the Peeping Tom Inn, Cornholme. Mr. Charles Parsohs, architect, Burnley.

**MALDON.**—June 21.—For altering and renovating the Wesleyan chapel. Messrs. Eade & Johns, architects, Cornhill Chambers, Ipswich.

**MANSFIELD.**—For erection of two houses in St. John Street. Mr. Wm. Dodsley, architect, Mansfield.

**MICKLEOVER.**—June 25.—For erection of two cottages on land adjoining the county asylum. Mr. J. Somes Story, county surveyor, St. Mary's Gate.

**MICKLEOVER.**—June 25.—For supplying and laying about 98 squares of teak flooring and 36 squares of deal flooring in the wards of the county asylum. Mr. J. Somes Story, county surveyor, St. Mary's Gate.

**MIDDLEWICH.**—July 1.—For erection of technical schools and free library in Lewin Street. Mr. Reginald T. Worth, Town Hall Chambers, Middlewich.

**MORECAMBE.**—For erection of ten houses in Kensington Road. Mr. Albert Gorton, architect, 10 Morecambe Street, Morecambe.

**NOTTINGHAM.**—For alterations to the out-offices of Huntingdon Street Board school, for the Nottingham School Board. Mr. A. N. Bromley, architect, Prudential Buildings, Queen Street.

**NOTTINGHAM.**—For alterations and additions to the Clarendon Street Board school caretaker's house, for the Nottingham School Board. Mr. A. N. Bromley, architect, Prudential Buildings, Queen Street.

**OXFORD.**—June 30.—For alterations to fish market and north end of No. 2, Avenue, Meat Market. Mr. Richard Bacon, town clerk, Town Hall.

**POCKLINGTON.**—June 22.—For erection of kitchen wing, classrooms, drainage, &c., at Grammar School. Messrs. Demaine & Brierley, architects, York.

**SALFORD.**—June 24.—For erection of a block of sixty-six artisans' dwellings between King Street and Queen Street. Mr. Saml. Brown, town clerk, Town Hall, Salford.

**SANDGATE.**—June 21.—For erection of a public convenience (brick built), and all drains and fittings in connection with the same. Mr. A. R. Bowles, surveyor's office, Sandgate.

**SCOTLAND.**—June 21.—For renovating six cot-houses and repairs on the farm steading of Denbrae, in the parish of Logie. Mr. David Storrar, architect, Cupar-Fife.

**SCOTLAND.**—June 22.—For repairs and alterations to the farm steading at Cairnton, Fordoun. Mr. A. W. Kinnear, solicitor, Stonehaven.

**SCOTLAND.**—June 23.—For additions to dwelling-house and steading, Mains of Blervie, also for additions to steading, Rafford Farm. Messrs. James Duncan & Son, architects, Turriff.

**SCOTLAND.**—June 23.—For erection of the proposed hotel. Messrs. Swanston & Legge, architects, 196 High Street, Kirkcaldy.

**SCOTLAND.**—June 24.—For erection of shops and other buildings at Stenhousemuir. Mr. James Strang, architect, 102 High Street, Falkirk.

**SOWERBY BRIDGE.**—June 24.—For taking out the present choir gallery, &c., and forming a new choir gallery, with rostrum, communion, &c., at the Bolton Brow Wesleyan Chapel. Mr. Arthur George Dalzell, architect and surveyor, 15 Commercial Street, Halifax.

**STAINCLIFFE.**—June 21.—For erection of ten houses and shop in Healey Lane and Commercial Road. Mr. Alfred E. Rhodes, architect, Cheapside, Heckmondwike.

**STALYBRIDGE.**—For erection of eight shops and dwelling-houses, &c. Messrs. John Eaton, Sons & Cantrell, architects, Ashton-under-Lyne.

**ST. OSYTH.**—June 21.—For additions to National School, St. Osyth, near Colchester. Mr. T. A. Cressy, architect, Clacton-on-Sea.

**SWANSEA.**—For construction of a brick chimney, 100 feet high, for new engine-house at South Dock Lock. Mr. A. O. Schenk, Harbour Offices, Swansea.

**TOOTING.**—June 24.—For repairs to the chapels, lodges, boundary walls, &c., at the cemetery. Surveyor, Vestry Hall, Kennington Green, S.E.

**TYRONE.**—June 25.—For executing repairs and improvements at a house in Augher. Mr. Thos. Elliott, architect.

**WALES.**—June 21.—For erecting schoolroom, &c., at Pentre Broughton. Messrs. Davies & Moss, 11 Regent Street, Wrexham.

**WALES.**—June 23.—For erection of Council offices at Hengoed. Mr. James Jones, surveyor, Wood View, Hengoed.

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WALES.—June 24.—For alterations and additions to Fern-dale Infants' and Higher-grade Schools, for the Ystradfydwg School Board. Mr. Jacob Rees, architect, Hillside Cottage, Pentre.

WALES.—June 25.—For erection of stores and houses at Sackville Road (Glan'rafon New Road), Bangor. Mr. Richard Davies, architect, Bangor.

WALES.—July 5.—For erection of additional classrooms, caretaker's house, &c., for the governors of the Porth County School. Mr. J. Rees, architect, Pentre, Rhondda Valley.

WIGAN.—For erection of Primitive Methodist central hall and Sunday school. Mr. J. B. Thornley, architect, Powell's Chambers, Standishgate, Wigan.

## TENDERS.

### ARMATHWAITE AND BASSENTHWAITE.

For erection of two cottages. Messrs. GEORGE WATSON & SON, architects, 3 St. Andrew's Place, Penrith.

#### Accepted tenders.

Wren & Lindsay, Cockermouth, builder, masonry, slating and plastering . . .	£458 15 2
W. Grisdale, Braithwaite, Keswick, joiner . . .	181 19 3
G. Smiley, Penrith, plumbing, painting, and glazing . . .	48 4 0

### ASHBY-DE-LA-ZOUCH.

For laying water-mains from Woodville to Ashby, in connection with the Milton water scheme, for the Ashby-de-la-Zouch Urban District Council.

J. Ford . . . . .	£3,430 0 0
R. Holmes & Co. . . . .	2,400 0 0
J. A. Vicars & Co. . . . .	2,360 0 0
W. Dolman . . . . .	2,358 17 9
J. TOMLINSON, Derby (accepted) . . . . .	2,278 4 2

### AYLESBURY.

For repairs at the workhouse.

H. T. Grimsdale . . . . .	£114 0 0
E. PARADINE (accepted) . . . . .	88 19 0

### BOURNE FEN.

For construction and erection of a new pair of pointing doors, &c. Mr. HERBERT CLARKE, surveyor, Boston.

F. CLAYPHAN, Owston Ferry, Doncaster (accepted) . . . . .	£650 0 0
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### BRIDGNORTH.

For erecting new schools, Highley. Messrs. R. SCRIVENER & SONS, architects, Hanley.

W. Swain . . . . .	£2,500 0 0
H. Farmer . . . . .	2,450 0 0
R. Thomson . . . . .	2,447 0 0
H. Smith . . . . .	2,402 10 0
G. Bullock . . . . .	2,370 0 0
T. Morris . . . . .	2,250 0 0
J. Sheppard & Son, Stourport* . . . . .	2,237 0 0
Bradney & Lloyd . . . . .	2,198 0 0

\* Accepted subject to approval of Education Department.

### BRIGHTON.

For laying cast-iron water-mains between the Patcham pumping station and the bottom of New England Road, and between the Patcham pumping station and the junction of Tongdean Lane with Dyke Road.

B. Cooke & Co., Westminster . . . . .	£3,468 0 0
J. Ford, Leicester . . . . .	3,283 0 0
W. Jones, Neath . . . . .	2,695 4 0
HOLMAN & Co., Brighton (accepted) . . . . .	2,415 9 0

### CHESTER-LE-STREET.

For construction of 634 yards of new sewers at Fatfield. Mr. G. SYMON, surveyor, Birtley.

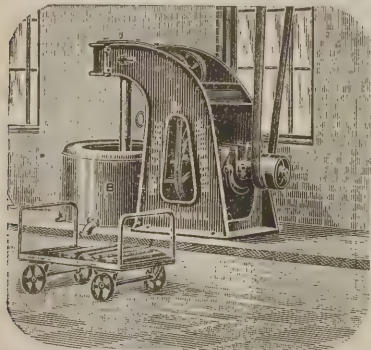
D. Champney . . . . .	£345 9 4
J. Robson . . . . .	309 12 9
J. Stokoe . . . . .	297 19 11
J. Carrick . . . . .	284 15 3
J. G. RUTTER & SONS, Washington, co. Durham (accepted) . . . . .	281 18 2
Surveyor's estimate . . . . .	281 8 0

### CUMBERLAND.

For erection of a concrete wall and apron, about 200 yards in length, near East Cote, Silloth. Mr. ROBERT STUBBS, surveyor, Abbey Town, Carlisle.

Perrin & Co. . . . .	£300 0 0
Beaty Bros. . . . .	260 0 0
T. Longcake . . . . .	233 5 0
M. Ormerod . . . . .	185 0 0
JOHNSTON & THOMPSON, Silloth (accepted) . . . . .	169 0 0

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For footpaths, for the Urban District Council. Mr. T. O. VEALE, borough surveyor.

W. C. Shaddock	£2,222	11	8
Pollar & Dart	1,897	0	0
R. C. Pillar	1,694	1	2
S. T. CLOTHIER (accepted)	1,666	17	6

**EALING.**

For erection of St. Saviour's Mission Church, Ealing. Mr. G. H. FELLOWES PRYNNE, architect, 6 Queen Anne's Gate, Westminster. Quantities by Mr. R. HENRY HALE, surveyor, 33 Old Queen Street, Westminster.

R. Porter.	£10,972	12	11
Holloway Bros.	10,555	0	0
Lawrance & Sons	10,300	0	0
Holliday & Greenwood	10,220	0	0
Rider & Sons	10,108	0	0
H. L. & R. Roberts	10,030	0	0
Dove Bros.	9,705	0	0
GODDARD & SONS, Farnham (accepted)	9,490	0	0
Adamson & Sons	8,651	0	0
Dovey & Co.	8,367	0	0
T. Nye & Son	8,235	0	0

Messrs. Adamson & Sons, Dovey & Co. and T. Nye & Sons withdrew.

**ELGIN.**

For erection of dwelling-house at Glenmoray Distillery. Mr. CHARLES C. DOIG, architect, Elgin.

*Accepted tenders.*

A. Allan, builder	£230	0	0
J. Ross, carpenter	153	5	0
Scott & Sellar, Aberdeen, plasterer	52	4	0
G. Ogilvie, slater	32	18	0
J. Gordon & Son, plumber	24	16	8
A. Forsyth, Aberdeen, painter	9	5	0

**HEBDEN BRIDGE.**

For erection of warehouse, workshops, stables, &c., Croft Yard. Mr. W. WRIGLEY, architect, Crossley Terrace, Hebdon Bridge.

*Accepted tenders.*

E. Riley, mason.
J. Haigh, joiner.
J. Lord, slater and plasterer.
S. Taylor, plumber and glazier.
W. H. Heywood & Co., patent glazing.
S. McFarlane, concreter.

**GUILDFORD.**

For road works. Mr. C. G. MASON, borough surveyor.

*Contract No. 1.—Lawn Road.*

Streeter Bros.	£251	3	0
G. A. FRANKS, Guildford (accepted)	234	12	0

*Contract No. 2.—Addison Road (portion of).*

G. A. Franks	386	4	0
STREETER BROS. (accepted)	376	5	0

*Contract No. 3.—Laundry Road.*

G. A. Franks	155	7	0
STREETER BROS. (accepted)	152	9	4

*Contract No. 4.—Onslow Road (portion of).*

G. A. Franks	107	0	0
STREETER BROS. (accepted)	98	12	6

*Contract No. 5.—Laying surface-water drain and sewer.*

Streeter Bros.	100	0	0
G. A. FRANKS (accepted)	98	10	0

**LANCHESTER.**

For construction of 48 chains of new road on Cornsay Common.

Mr. J. E. PARKER, surveyor, Lanchester.

J. WARDLAW, Heaton (accepted)	£578	18	2
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**LONDON.**

For building new warehouses, Farringdon Road. Messrs.

BACON & COBB, architects, 4 Copthall Chambers, E.C.

Perry & Co.	£6,317	0	0
Godson & Son	6,313	0	0
W. Downs	5,950	0	0
Harris & Wardrop	5,947	0	0
Killby & Gayford	5,902	0	0
F. C. HOSKINS, Tufton Street, Westminster (amended and accepted)	5,844	0	0

**LONDONDERRY.**

For erection of premises at Ferryquay Gate, Derry. Mr. T.

JOHNSTON, architect, 11 East Wall, Londonderry.

McClelland & Co.	£2,029	0	0
J. Colhoun	1,850	0	0
S. McLaughlin & Co.	1,736	6	8
W. J. Maultsaid	1,700	0	0
M. Sweeney	1,695	0	0
Shannon & Rutledge	1,665	0	0
J. A. FULTON (accepted)	1,566	10	10

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**LONDONDERY—continued.**

For erection of premises at James Street. Mr. T. JOHNSTON, architect, 11 East Wall, Londonderry.	
J. McClay . . . . .	£3,431 18 6
McClelland & Co., Limited . . . . .	3,255 0 0
J. Colhoun . . . . .	2,695 0 0
W. J. Maultsaid . . . . .	2,625 0 0
M. SWEENEY (accepted) . . . . .	2,450 0 0

**MIDDLESBROUGH.**

For alterations and additions to premises in Wesley Street to form stabling, &c. Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.

*Accepted tenders.*

D. Doughty, brick and cement concrete.	
W. Dale, carpenter and joiner.	
W. Tyerman, slater.	
Walton & Garthwaite, plumbing and glazing.	
Total, £287 15s.	

For reconstruction and repair of the following streets:—King George Street, Laws Street, Bennett Street, Tomlinson Street, Booth Street, for the streets committee. Mr. FRANK BAKER, borough engineer.

*Bennett Street.*

J. Spark . . . . .	£160 1 7
T. Hunt . . . . .	147 0 2
J. T. DIXON, Preston (accepted) . . . . .	103 17 3

*Laws Street.*

T. Hunt . . . . .	299 6 10
J. T. DIXON (accepted) . . . . .	218 17 3

*Booth Street.*

T. Hunt . . . . .	147 6 1
J. T. DIXON (accepted) . . . . .	103 2 5

*King George Street.*

T. Hunt . . . . .	232 17 2
J. T. DIXON (accepted) . . . . .	170 18 9

*Tomlinson Street.*

T. Hunt . . . . .	153 16 11
J. T. DIXON (accepted) . . . . .	105 18 9

For painting the scarlet fever ward at sanatorium. Mr. FRANK BAKER, borough engineer.

W. Ridgway . . . . .	£74 1 0
W. MARTIN & SON (accepted) . . . . .	55 10 0

**MIDDLESBROUGH—continued.**

For new mahogany shop front to premises, 89 Linthorpe Road. Mr. WALTER G. ROBERTS, architect, 61 Albert Road, Middlesbrough.

W. THOMPSON (accepted) . . . . .	£117 16 0
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**MARNHULL.**

For erection of a new bridge at Little King's Mill. Mr. WALTER J. FLETCHER, county surveyor, Wimborne.

*Accepted tenders.*

H. Bartlett, Shipton Gage, Bridport, masonry and general work . . . . .	£560 10 0
Dorman, Long & Co., Middlesbrough, ironwork . . . . .	342 0 0
H. N. Harris, Middlesbrough, fixing . . . . .	36 0 0

**MONMOUTH.**

For enlarging the cloakroom at Glendower Street School, Monmouth. Mr. JOHN W. RODGER, surveyor, 14 High Street, Cardiff.

J. Parfitt . . . . .	£145 0 0
C. Morgan . . . . .	125 0 0
O. Parry . . . . .	118 5 5
J. MACKIE, Monmouth (accepted) . . . . .	91 18 0

**PENRITH.**

For alterations and improvements to the Station Hotel. Messrs. G. WATSON & SON, architects, Penrith.

*Accepted tenders.*

W. Forrester, masonry . . . . .	£350 0 0
Moor & Son, joinery . . . . .	313 9 10
J. Dixon, plumbing, &c. . . . .	154 7 9
J. Bailey, slating . . . . .	36 10 0

**PONTEFRACT.**

For erection of two houses, Banks Avenue. Messrs. GARSIDE & KEYWORTH, architects, Ropergate, Pontefract.

Walker & Ward, brickwork . . . . .	£177 10 0
W. & C. Wilcocks, joiner . . . . .	80 10 0
Stewart & Sons, slater . . . . .	29 8 0
Keighley & Westwood, plumber . . . . .	23 0 0
T. W. Senior, plasterer . . . . .	21 0 0
W. Thrall, painter . . . . .	5 0 0

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Mr. G. H. FELLOWES PRYNNE, architect, 6 Queen Anne's  
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Queen Street, Westminster.  
Tickner & Partington . . . . . £201 11 6  
The Brush Electrical Engineering Co. . . . . 186 16 6  
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LAING, WHARTON & DOWN, Limited, London  
(accepted) . . . . . 151 0 0

RUGBY.

For alterations and additions to the Rugby School sanatorium.  
Mr. J. T. FRANKLIN, architect, 40 Bridget Street, Rugby.  
Smith . . . . . £4,197 0 0  
Young . . . . . 3,399 0 0  
Smaull & Son . . . . . 3,311 10 0  
Foster & Dicksee . . . . . 3,298 0 0

SHERINGHAM.

For work at the Grand Hotel, Sheringham, Norfolk. Mr.  
HERBERT J. GREEN, architect and diocesan surveyor,  
31 Castle Meadow, Norwich.  
Cornish & Gaymer . . . . . £32,241 14 0  
W. H. Brown . . . . . 29,835 0 0  
J. S. Smith . . . . . 29,393 9 0  
George Riches . . . . . 28,729 18 4  
Francis Thoday & Co. . . . . 28,300 0 0  
Bardell Bros. . . . . 26,999 0 0  
J. Youngs & Son, Norwich\* . . . . . 26,793 0 0  
James White, Cromer (*too late*) . . . . . 26,198 0 0  
\* Accepted, subject to modification.

SKEGNESS.

For erection of residence, South Parade. Messrs. SHEPPARD  
& HARRISON, architects, 17 Kirkgate, Newark.  
T. Crawshaw . . . . . £1,264 0 0  
J. T. Turner . . . . . 1,146 13 0  
G. DUNKLEY & SON, Skegness (accepted) . . . . . 1,040 0 0  
H. W. Parker . . . . . 1,025 0 0

SOUTHWELL.

For alterations to premises, Market Place. Messrs. SHEPPARD  
& HARRISON, architects, 17 Kirkgate, Newark.  
W. COTTAM, Carthorpe, Southwell (accepted) . . . . . £160 0 0

SWINDON.

For cleaning and decorating the large reading-room at the  
G. W. R. Mechanics' Institution, New Swindon.  
E. Bell . . . . . £212 0 0  
A. R. DEAN, LIMITED, Corporation Street, Bir-  
mingham (accepted) . . . . . 186 0 0

UXBRIDGE.

For repairs and painting market-house. Mr. WM. L. EVES,  
surveyor, 54 High Street, Uxbridge.  
Osborn . . . . . £164 0 0  
Ward & Son . . . . . 155 0 0  
H. Grainger . . . . . 144 15 0  
Briant & Son . . . . . 140 5 0  
Kearley . . . . . 132 16 0  
CASTELL (accepted) . . . . . 114 0 0

WALSALL.

For excavation and erection at the Pleck Gasworks of a gas-  
holder tank, 152 feet in diameter and 30 feet 6 inches deep,  
for the Corporation.  
C. B. WILLIAMSON & CO., Hendon, Sunderland  
(accepted) . . . . . £5,000 0 0  
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WANDSWORTH.

For painting and cleansing kitchen, dining-hall and lying-in  
ward at the Workhouse, Garratt Lane.  
J. TURNER, Wandsworth (accepted) . . . . . £129 10 0

WATERLOO.

For street works, for the Urban District Council. Mr. F. S.  
YATES, surveyor.  
*Accepted tenders.*  
P. Balmer, Longmoor Lane, Aintree, near  
Liverpool, Park Road, Haigh Road, Schubert  
Street, Norma Road Passage, Hicks Road  
Passage, Seaforth Passage . . . . . £1,543 15 11  
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T. Gregory & Co.	£31,600	0	0
Ashby & Horner	30,890	0	0
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For levelling, paving, kerbing, metalling, flagging, channelling, lighting, and making-good Marlborough, Clifton, Lammas, York and Cannon Roads, for the Watford Urban District Council.

*Marlborough Road.*

Jackson	£532	0	0
Adams	486	0	0
Reed	389	0	0
Clarke & Bracey	380	0	0
Dupont	375	0	0
MANN (accepted)	369	0	0

*Clifton Road.*

Jackson	354	0	0
Adams	290	0	0
Reed	227	0	0
Dupont	219	0	0
Mann	215	0	0
CLARKE & BRACEY (accepted)	212	0	0

*Cannon Road.*

Jackson	246	0	0
Adams	232	0	0
Reed	174	0	0
Mann	166	0	0
CLARKE & BRACEY (accepted)	165	0	0
Dupont	164	0	0

**WATFORD—continued.***York Road.*

Jackson	£330	0	0
Adams	315	0	0
Reed	237	0	0
Mann	229	0	0
Dupont	222	0	0
CLARKE & BRACEY (accepted)	220	0	0

*Lammas Road.*

Jackson	258	0	0
Adams	248	0	0
Reed	196	0	0
Mann	183	0	0
Dupont	176	0	0
CLARKE & BRACEY (accepted)	175	0	0

**WESTON-SUPER-MARE.**

For erection of new bar, &c., at the Waggon and Horses Inn. Mr. S. J. WILDE, architect, Boulevard Chambers, Weston-super-Mare.

L. Gibbs & Sons	£448	0	0
Keen & Keen	267	0	0
H. J. Fear	258	0	0
T. Allen	241	18	6
C. Taylor	230	0	0
W. M. Dubin	230	0	0
C. & E. STRADLING, Anstice Terrace (accepted)	220	0	0

**WHITEHAVEN.**

For alterations, &c., to 48 Church Street, Whitehaven. Messrs. MOFFATT & BENTLEY, architects, Whitehaven.

*Accepted tenders.*

J. Glaister, mason and brickwork.  
J. Shields, joiner.  
D. Burns, plumber, glazier and gasfitter.  
H. Tyson, slater and plasterer.  
Ramsay Bros., electric bells and palisading.  
Whittle & Son, grates and ranges.

**WOOLWICH.**

For alterations to furniture depository. Mr. J. O. COOK, architect.

Covil	£225	0	0
Hodgin	210	0	0
Mills	201	0	0
Thomas & Edge	196	0	0
C. Kitley	193	0	0

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Fifield	£9,119	0	0
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Martin, Wells & Co.	7,649	0	0
Ingram & Sons.	7,509	0	0
Mitchell Bros.	7,015	0	0
Tompsett & Lee	7,048	0	0
J. Harris & Son	6,650	0	0
T. H. Kingerlee	6,605	6	0
J. MARTIN, Addlestone (accepted)	6,362	0	0

WORKINGTON.

For alterations and additions to the Victoria Schools. Messrs. W. G. SCOTT & Co., architects, Victoria Buildings, Workington.

Accepted tenders.

G. Mann, John Street, mason	£420	0	0
J. Steel, Bolton Street, joiner	280	0	0
J. Lythgoe, Gray Street, joiner	104	5	0
D. M. Walker, Washington Street, plumber	79	0	0
J. Lawson, Gordon Street, plasterer	54	0	0
G. Davies, John Street, painter	20	0	0

TRADE NOTES.

THE Linslade Rural District Hospital, Leighton Buzzard, is being warmed and ventilated throughout by means of Shorland's patent Manchester grates, patent exhaust roof ventilators and special inlet panels.

THE Papermakers, Printers, Stationers Bookbinders, Fine Art Publishers and Photographers' Exhibition, which is to open at the Agricultural Hall on June 23 to June 30, promises to be of more than usual interest, as several specimens of the most modern printing machinery, both American and English, will be on view, in addition to the numerous machinery exhibits in operation.

MESSRS. NIGHTINGALE & Co., of Great Grimsby, have recently had to add very considerably to their wood-working machinery, to enable them to cope with their increasing wood-block flooring business. Their factory is now replete in all respects with apparently every modern appliance, consisting,

as it does, of extensive storage and large drying store or kiln, and machinery of the newest and best make, thus rendering the works one of the best and most compact factories of its kind. The building is situated direct on the M. S. and L. Railway Company's wharf, and will enable the company to give all their orders the utmost despatch. The company holds carefully selected stocks of the best descriptions of Baltic and White Sea fir, also pitch-pine, oak, jarrah, teak, mahogany, and other various woods suitable for their requirements. We understand from Mr. Whiteing, the manager, that they have a large number of orders in hand, and amongst them may be mentioned the Manston Asylum for 3,472 yards oak flooring, National Provincial Bank of England at Leeds, the generating station for the Leeds City Corporation, in connection with their new scheme of electric tramways; the Elmsfield College at York, besides many other contracts of various kinds in all parts of the kingdom, amongst which may be mentioned the city of York contract for the year's supply of paving blocks required for street work.

BUILDING AND BUILDERS.

THE foundation-stone of a new Protestant church for Arklow, the gift of Lord Carysfort, and which is to cost 25,000*l.*, was laid by the Countess of Carysfort. The new church occupies a prominent site near the railway station, and is to accommodate 500 people.

THE Primitive Methodist Sunday school in John Street, Sheffield, is to be enlarged. The work is estimated to cost about 2,000*l.*

THE foundation-stone of the new Corporation baths, now in course of erection in East Hull, was laid on the 10th inst. The new building will be in the Renaissance style of architecture. The men's swimming bath is 96 feet by 30 feet, and the depth of the water 6 feet 6 inches. In the boys' bath the size will be 60 feet by 30 feet, and the depth from 3 feet to 4 feet 6 inches. There will be thirty-one private baths, a laundry and wash-house. All the most modern improvements have been adopted, and when completed the new baths will undoubtedly be the best equipped in the county.

THE foundation-stones of a new Wesleyan Methodist chapel at Ecclesfield were laid on the 9th inst.

THE foundation-stone of Dudfield Memorial Hall, to be erected contiguous to and in connection with the Lansdowne

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Place Ragged School and Mission, Tabard Street, Borough, was laid by Earl Compton, M.P., on the same day.

THE Marquis of Dufferin laid on Wednesday the commemoration-stone of the new harbour at Hastings. The Hastings Harbour Act received the Royal Assent in August 1890, but owing to the difficulty of raising the money the work was not commenced till May of last year. Up to the present time 60,000*l.* or 70,000*l.* have been expended on the works. The original idea was to have a harbour 18½ acres in extent, but that in process of construction will be 27½ acres. The western arm is half built, and when finished will be 1,760 feet in length; the eastern arm will be 1,000 feet long and the mouth will be 300 feet wide. The harbour is situated at the east end of Hastings, and the depth of water at the mouth will be 14 feet at low spring tide, and to a considerable distance landwards 12 feet, whilst the shallow will be 5 feet deep. The rise and fall of the sea level will be 20 feet, and it is stated that any steamer used for crossing the Channel will be able to enter the basin at any time. It is hoped that the western arm will be so far completed by the early spring of next year that the Commissioners will be able to begin trading. The Harbour District Railway Bill, now passing through Parliament, will connect the harbour with both the South-Eastern and London, Brighton and South Coast Railways. It is hoped that the works of the new harbour, which will be of inestimable value to Hastings, will be sufficiently advanced to enable it to be used next year.

### ELECTRIC NOTES.

THE lighting committee of the Wolverhampton Corporation have issued their annual report with regard to electric lighting, which shows that a net profit has been made of 225*l.* 14*s.* 5*d.*, which has been applied to the deficiency on the working of the previous years. The total quantity of electricity generated was 287,507 Board of Trade units, of which 224,709 were sold, and 60,820 were unaccounted for. The quantity sold for the lighting of the streets was 73,466 units, for which 1,242*l.* 5*s.* was received, while the sale to private consumers realised 3,778*l.* 18*s.* 6*d.*

THE Liverpool lighting committee have decided to recommend the Council to make the following extensions in the electric mains of the city:—Granby Street, at an estimated cost of 683*l.*; Park Road and Cornhill, at an estimated cost of 337*l.*;

Oxford Street, at a cost of about 118*l.*; and Smithdown Road, at an expenditure of something like 60*l.* The committee received an intimation that the Municipal Electrical Association intended visiting Liverpool on July 1 for the purpose of inspecting the electric lighting stations and the arrangements existing in the city for the supply of the electric light. The necessary permission for the inspection was granted.

THE gas committee of Dundee Town Council met last week for consideration of the tenders for a new engine and dynamos, a new boiler, arc lamps and accessories, and a new battery. It was agreed to recommend the following offers for acceptance:—For engine and dynamos, Siemens Brothers, London, 1,505*l.*; boiler, Cooper & Greig, Dundee, 493*l.*; and arc lamps and accessories, Crompton & Co., London, 332*l.* 4*s.* It was resolved to recommend the purchase of two new batteries, the contractor taking the old plant. On that footing the offer of the Electrical Power Storage Company, Limited, London, amounting to 1,112*l.*, was accepted. A large number of beautiful designs were submitted for street arc lamps. After lengthy consideration, two styles, in respect of price and design, found most favour with the committee, and it was agreed to recommend the Town Council to erect one of each pattern, in order that the members of Council and public might have an opportunity of making a satisfactory selection.

AT a private meeting of the Crief Town Council, held in the County Court-room on Monday evening, Provost Finlayson submitted a report dealing with the progress of the electric-lighting scheme at Fort William. The Provost intimated that recently he had been through the works at Fort William, that he had seen the system in operation and that he had interviewed several of the leading residents in regard to the scheme. After some discussion, during which the Provost was questioned regarding the cost of installation, &c., the Board decided to consider the matter further. Sir Patrick Keith Murray, Bart., of Ochertyre, has offered a free supply of water provided the scheme is proceeded with.

THE firms of specialists who have made arrangements for undertaking electrical works have been increased, for Messrs. S. Newton & Co., of High Street, Clapham Road, announce that they can undertake complete light and power plants, shop and private lighting, &c. They have already succeeded with several important installations, and on that account they can with confidence look forward to obtaining public support from all who desire excellent work.

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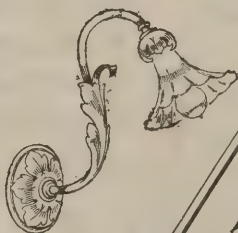
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## ILLUSTRATIONS.

CATHEDRAL SERIES.—ST. PAUL'S: WEST FRONT.—CHOIR, LOOKING EAST.—NAVE, LOOKING WEST.—SOUTH AISLE OF NAVE, LOOKING WEST.

## VARIETIES.

THE parish church of Heeley, near Sheffield, was reopened after renovation and enlargement on the 13th inst.

A NEW village hall substantially built, plainly decorated, suitably lighted and ventilated, and seated for 250, was opened on the 11th inst. at Bowden, near St. Boswells.

THE Paddington Vestry propose paving certain main streets in their district with hard Australian wood, at a cost of 13,751*l*.

A FIRE broke out at the Huyton post office, near Liverpool, on Saturday morning last. The post office was destroyed. An adjoining confectioner's shop was completely gutted, and a bootmaker's premises were partially destroyed.

THE work of increasing the accommodation at the church dedicated to St. Philip the Evangelist, at Dorridge, Knowle, has been completed, and on the 16th inst. the ceremony of dedicating the new portion took place. The total cost of the completed edifice will be between 5,000*l*. and 6,000*l*.

THE Archbishop of York has arranged to open for the Missions to Seamen a new fishermen's institute at Scarborough as a local Diamond Jubilee commemoration early in August. It is to cost 1,500*l*., besides gifts in kind for furnishing.

THE Masonic Hall which has been erected at Carrick-on-Shannon to the memory of the late Surgeon-Major Parke was on the 9th inst. formally opened and solemnly dedicated to the uses of Masonry.

THE restoration of the west front of Peterborough Cathedral is rapidly approaching completion, but it will not be finished in time for the Jubilee commemoration service.

THE John Robinson Memorial Church which has been erected at Gainsborough at a cost of 7,000*l*. was opened on the 9th inst.

THE new Tivoli Theatre at Dover, which was opened on the 14th inst., was designed by the late Mr. C. J. Phipps. The house is fireproof, has accommodation for 1,000 persons, and all seats command a good view of the stage.

PLANS have been approved for the Convalescent Home for Frenchmen in Arundel Road, Brighton, and for a new road between Arundel Road and Arundel Street, to be called Courcel Road, after the name of the French Ambassador, Baron Alphonse de Courcel.

THE Brighton Town Council have decided to lay one-half of New Road with Jarrah wood blocks and one-half with Swedish deal creosoted wood blocks, while in North Street a similar experiment is to be made with Karri blocks and Swedish blocks.

A HANDSOME new reredos was dedicated at the parish church, Wirksworth, on Sunday morning. It is of oak and cedar wood, the figures being beautifully carved and coloured. The gift is a splendid addition to the interior of this ancient church.

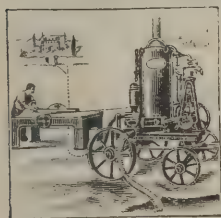
THE erection of the marble sarcophagus to enclose the remains of the late Prince Henry of Battenberg in Whippingham Church, Isle of Wight, has this week been commenced from designs by Mr. Nutt, chapter surveyor at Windsor Castle.

THE Paisley Town Council have unanimously negatived a proposal to demolish the old prison in County Square. For fifteen years the premises have been unoccupied, and thirteen years ago they were purchased by the Town Council, who regard them as a fine specimen of the old baronial style of architecture.

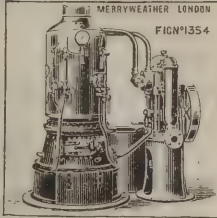
THE Duke of Fife proposes that the burgh of Macduff should take over the harbour at the price of 13,000*l*.—8,000*l*. of which is to be paid when the transfer is made, and other 2,000*l*. to be allowed to lie as a loan on the harbour at the rate of 3*½* per cent. He offers the remaining 3,000*l*. as a donation in aid of the improvement scheme. The Town Council have agreed to call a meeting of traders to discuss the proposal.

A SERIOUS accident has happened at the new Ardgowan Distillery, at present being constructed in Ingleston Street, Greenock. Four men were at work on the roof of the mash-house, when through the slipping of a plank three of them were precipitated to the ground, a distance of 40 feet. Samuel Ross, foreman, was killed on the spot, and Francis Gallocher and Henry Jackson, labourers, were injured, the latter sustaining severe internal hurt. Gallocher and Jackson were removed to the infirmary. All three were from Glasgow, the foreman being a young man of twenty-four years of age.

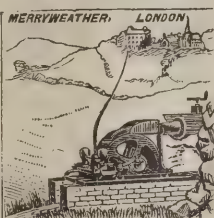
## MERRYWEATHER on WATER SUPPLY TO COUNTRY MANSIONS, &amp;c.



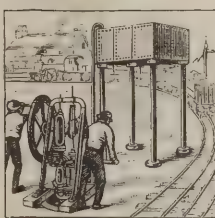
"Estate" Steam Pumping and Driving Engine.



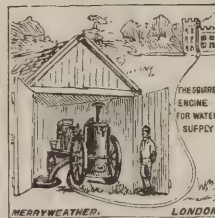
Light Pumping Engine and Boiler.



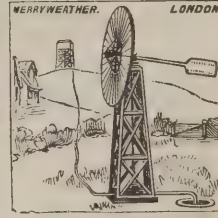
Water Wheel Pumps.



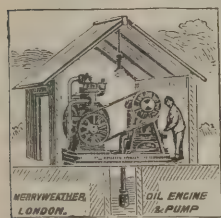
"India" Pattern Pumping Engine.



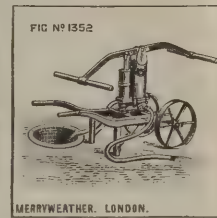
"Squire" Portable Fire Engine.



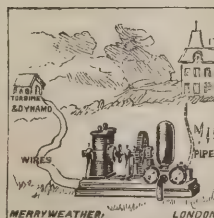
Windmill Pump.



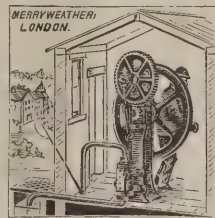
Oil Engine and Pump.



Estate Manual Force Pump.



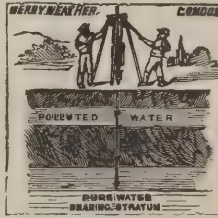
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THE covered wooden bridge across the Rhine from Rheinfelden, in Switzerland, to the Baden side of the river, took fire on Saturday last and was a volume of flames in a short time. The central arch which was very broad fell into the river without breaking and floated down stream a mass of fire; and on Monday the 300-foot-long wooden bridge across the Eisack, joining Bozen in the Tyrol with Loretto, caught fire at a spot where a passenger had thrown away a burning match and in an hour the entire structure fell burning into the torrent. A fireman fell with a burning rafter and swam on it some distance before he was saved. There is no means now of crossing the Eisack.

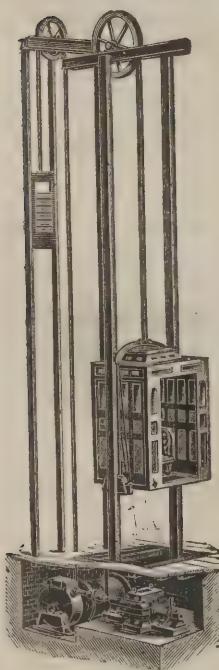
NEW day schools which have been erected in connection with St. Luke's Church, North Street, Leeds, were opened on the 12th inst. The schools have been built on the central-hall system, with the classrooms arranged on either side, those for the girls being on the side adjoining the old school buildings, and those to be used by the boys being on the east or lower side of the site. There are four classrooms, each 25 feet by 20 feet, and two 28 feet by 20 feet. The central hall is 60 feet by 28 feet, and at the south end, opposite the entrances, is a raised platform, divided from it by patent swivel partitions, so as to form a teachers' room, or a platform and stage when the central hall is being used for parochial or public purposes. Entrance to the schools is gained by two porches and lavatories, 18 feet by 16 feet, which are built close up to the Skinner Lane frontage. The building is heated by means of hot-water pipes and coils, and it is exceedingly well lighted by lofty mullioned and transomed windows. The lights to the Skinner Lane elevation are contained beneath pressed brick arches, the spandrels being filled in with diaper bricks to special design. The central hall is not only lighted by large windows in the gables, but by clerestory windows at the sides. The whole of the buildings are faced with pressed brickwork, and the playgrounds are concreted. The cost of the building per child is less than half the cost which obtains in the case of the Board schools in the city. The buildings have been erected from the designs and under the superintendence of Messrs. Smith & Tweedale, architects, South Parade. The cost is about 2,500/.

A NEW Wesleyan church, which has been erected in Waterloo Road, Smethwick, was opened on the 3rd inst. The church is built upon a site fronting Waterloo and Sycamore Roads, and is in the Early English Gothic style of architecture. It is constructed of brickwork, with stone dressings. The main entrance-porch faces Waterloo Road, and consists of a moulded

stone archway with stone columns having moulded caps and bases, and a stone carved pediment. A similar and separate entrance situated in the tower, and immediately adjoining, gives access to the gallery by a conveniently-arranged staircase. The plan of the church consists of nave, with lean-to aisles and chancel, in which seats are arranged for the choir. The organ-chamber is placed on one side of the chancel, and the minister's vestry upon the opposite side; also the choir vestry, with suitable lavatory accommodation. The seats upon the ground floor are arranged in three blocks, the largest being in the nave, and the remaining two situated on each side, separated by arcades to five bays, formed by moulded stone arches resting upon richly-carved caps, and circular columns having moulded stone bases. The church is about 90 feet in length, 45 feet in width (inclusive of aisles) and 31 feet high. The floor is laid to a gradient towards the pulpit. The seating accommodation is for about 650 persons. The building is well lighted by side aisle windows, and on each side of the nave above the arcading are arranged the clerestory windows, while over the gallery are arranged two three-light windows, with moulded stone mullions and tracery, with wheel-tracery window above the same. The chancel is lighted by a single four-light window, with stone mullions and open tracery in spandrels, and glazed with tinted cathedral glass in lead-work. The aisles have been laid with solid wood blocks, and the floors of the entrance-porch, lobbies, passage at rear of chancel, lavatories, &c., are laid with tessellated tiles. The oak pulpit is octagonal on plan, and has rich tracery panels. A leading feature of the exterior is a graceful stone spire springing from a tower situated next the main entrance, and rising to about 80 feet in height. The interior woodwork is of pitch-pine and red deal, stained and varnished, the roofs of nave, aisles and chancel, all of which are open framed, being oil-stained. The ventilation is efficient, and the heating, upon the low-pressure system, is by Messrs. Hoden & Son. The wrought-iron fencing and gas-fittings have been carried out by Mr. Edwin Glover, of Dudley Road. The stained-glass throughout has been supplied by Mr. T. H. Yates, of High Street, Smethwick. The builders were Messrs. J. Harley & Son, of Rolfe Street, Smethwick, and the architects are Messrs. Ewen & J. Alfred Harper, of Colmore Row, Birmingham. The cost of the structure is about 3,500/.

THE new booking-hall at Waverley Station, Edinburgh, which is rapidly approaching completion, is built from the plans of Messrs. Blyth & Westland, C.E., and situated immediately to the rear of the present ticket offices, is in the French Renaissance

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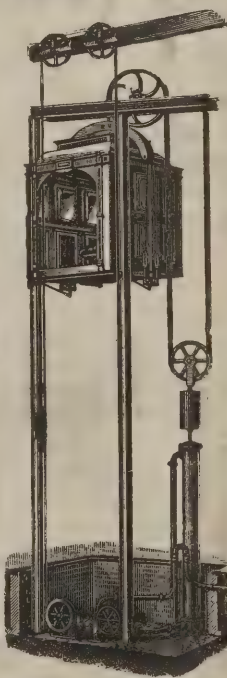
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style, and measures 75 feet square, with a height of 30 feet, having a magnificent dome in the centre of the roof, surrounded by eight flat cupolas. Prudham stone has been used exclusively in the erection of the hall, the masonry being altogether substantial and displaying a large amount of carving and moulding. The woodwork of the roof is composed of wainscotted oak, the intervening panels being filled in with Tynecastle tapestry of pretty design and colour. The large centre cupola is of artistic design, the frieze being handsomely brought out with semi-relief figures in gold on a coloured ground. With regard to the flat cupolas, great care has been taken to avoid any chance of accident through falling glass, the architects having provided for the introduction of ornamental wrought-iron gratings, which have a very pleasing effect. The booking-office itself, which is placed in the centre of the hall, is also a handsome structure. It is in wainscotted oak, and richly carved in keeping with the general surroundings. Octagonal in shape, the office, in so far as convenience and suitability for its purpose are concerned, is probably the most complete of its kind in the country, as assuredly the booking-hall is as a whole. There are thirteen windows in the office, in the centre of which is the superintendent's room. The design of the mosaic tile flooring is costly and elaborate. The North British Railway Company's coat-of-arms is introduced at the four corners, with a border representing the Scottish thistle. Below the hall extensive cellars have been constructed. The lighting, heating and ventilating arrangements of the hall have been carefully attended to. The electric light will be used throughout, being worked from the roof of the building. Ferguson's patent Carlisle fireproof flooring has been freely used, and the outside protecting cupolas that lie over the flat ones are glazed with Pilkington's patent wired glass. The contractors for the booking-hall are Messrs. G. & R. Coussin, Alloa; the joiners, Messrs. Drysdale & Gilmour, Edinburgh; the tapestry decorations were by Mr. Scott Morton, Tynecastle Works Company, Edinburgh; while the mosaic tile floor was laid by Messrs. Doulton, London.

### BUILDING IN GLASGOW.

At the last fortnightly meeting of the Glasgow Dean of Guild Court there were thirty-five petitioners, and "linings" for property to the value of 100,000*l.* were granted. The chief "linings" were those granted to the Baltic Chambers, Limited,

who received permission to erect a block of offices in Wellington, Cadogan and Holm Streets, Glasgow, at a cost of 38,500*l.*; to the Rev. James Stalker, D.D., and the deacons, as trustees of Free St. Matthew's Church, Glasgow, who received permission to erect a church and hall in Garscube Road, Glasgow, at a cost of 5,000*l.*; to David S. Cargill, merchant, Glasgow, and the trustees of the Glasgow Church of Scotland Church Extension Association, who were granted a "lining" to erect a church and hall at the corner of Doncaster and Hinshaw Streets, Glasgow, to be called St. Cuthbert's Church; to the trustees of the Association for Infirm Children, who received permission to make alterations on East Park Home, Maryhill; and to the Glasgow Eastern Co-operative Society, who were granted a "lining" for tenements of dwelling-houses on the south-west side of Baltic Street, Bridgeton, Glasgow. The numerous remaining "linings" were mostly for tenements of shops and dwelling-houses in various quarters of the city.

### MR. BARNATO'S HOUSE.

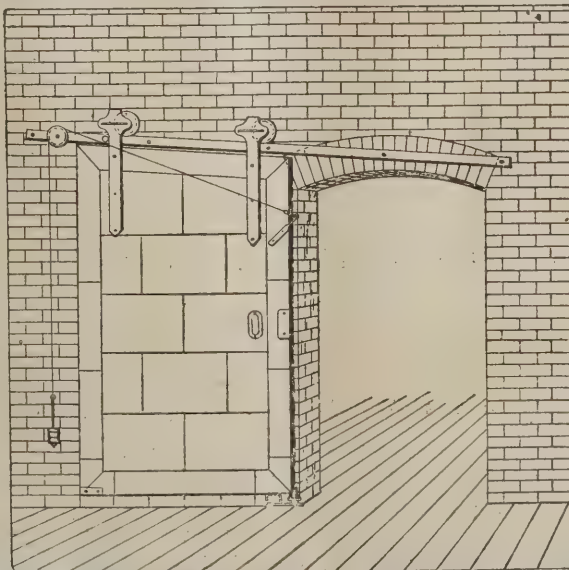
IN one of the best positions in Park Lane the late Mr. Barnato, says the *Daily Telegraph*, elected to build his house. Some idea of the place can be given by saying that the freehold cost 70,000*l.*, the building 41,000*l.* more, and the interior decorations nearly 30,000*l.* It is a five-storey structure, built of Portland stone, and commanding one of the finest prospects in London, the Crystal Palace in one direction and Highgate in another. The work of preparing the site for the superb building which now attracts the notice of every passer was begun in October 1895, the actual building operations not being commenced until a few weeks later. Ten months after that the architect, Mr. T. H. Smith, and the builders, Messrs. Colls & Son, hoisted Mr. and Mrs. Barnato, with a party of friends, to the top with a crane, when the apex of the gable was successfully placed. The house includes a ball-room—a magnificent one, with 2,000 square feet of dancing floor—two drawing-rooms, a conservatory, winter-garden, dining, reception, morning and billiard-rooms, and a splendid hall. The first thing to strike the visitor is the grand marble staircase, with its statuary and ornaments, the wonderful balustrades and the dadoes in wainscot oak. This staircase is four flights in length, and is lighted by a glass dome in the top of the house. The style of the interior is Renaissance, tinged with the slightly more florid taste of Louis XIV., the characteristics of which are greater freedom of

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ornamentation, ivory white and gold finishing being everywhere used, with a fine effect of lightness and elegance. Both the inside and the outside of the mansion might be described as a free treatment of the early Italian Renaissance, adapted to modern requirements, the statuary and carving being carried out in harmony with the style of the seventeenth century. All the floors are heated by hot-water radiators—this to conform to the late Mr. Barnato's ideas of comfortable temperature, acquired in a life principally spent in the tropics. An instance of the solicitude which the late millionaire always displayed for his children is shown by the plan of the special kitchen he had constructed for the little ones, with their bathroom, nursery and schoolroom on his own floor. Meantime the work of completing the mansion is going steadily forward.

### INDIAN INK.

In his last report on the trade of Wuhu, Consul Fraser says that the province produces the celebrated Indian ink, more correctly called China ink (*Encre de Chine*), used by artists who paint in water-colours. From Wuhu it goes to every part of China and all over the world. In 1895 about two tons of it were exported to foreign countries from Shanghai, valued at 564*l*. It may be made in other parts of China, but the best comes from the province of Wuhu.

The materials with which this beautiful black ink is made are the following:—(1) Sesamum oil, colza oil or the oil expressed from the large poisonous seeds of what Dr. Brett-schneider calls *Dryandra Cordata*, or *Elaeococca Verrucosa*, called by the Chinese *Wu Tung*, a tree extensively cultivated in the Yangtze valley and also well known in Japan; (2) varnish; (3) pork fat. The lampblack made by the combustion of these substances is classed according to the materials and the grade of fineness, and also according to the time taken over the process of combustion. The paste made of this lampblack has some glue added and is beaten on wooden anvils with steel hammers. Two good hammerers can prepare in a day eighty pieces, each weighing half a pound. A certain quantity of musk (of the musk deer), or of Baroos camphor, for scenting it, and gold leaves, are added; the latter, the quantity of which varies from 20 to 160 to the lb., being to give a metallic lustre. The materials thus prepared are moulded in moulds of carved wood, dried (which takes about twenty days in fine

weather), and adorned with Chinese characters in gilding. About thirty or thirty-two average-sized sticks of ink go to the lb. The price varies from 2*s*., or less, per lb., to so much as 7*l*. per lb., there being over a dozen different grades.

Nearly all writing is done by the natives throughout this immense empire, in Japan, Corea, Tonquin and Annam, with this China ink, rubbed down on a stone ink-slab, and applied with a paint brush of sable, fox, rabbit, &c., hair, set in a bamboo holder, and when not in use carefully covered with a protecting brass cap.

The superior kinds of this ink appear to be used in China and not exported.

### TAXATION OF MACHINERY.

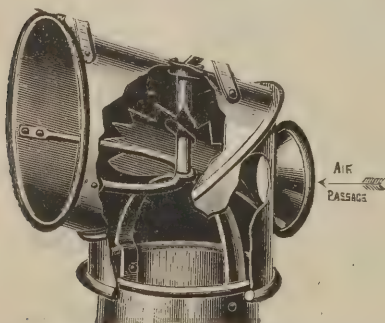
IN reply to a memorial from the Association of Chambers of Commerce in reference to the present state of the law as to allowances made in income-tax assessments for depreciation of machinery and for obsolete machinery, the Chancellor of the Exchequer has directed the following letter to be written:—

"The chief points raised in the memorial are as follows:—(1) That the allowances in respect of repairs and depreciation of machinery are insufficient, and the methods of calculating such depreciations are unsatisfactory; (2) that no allowance is made for the cost of replacing machinery which has become obsolete. As to the first point, I am to say that, as the law now stands, deductions are allowed both in respect of expenditure incurred in repairs or alterations of machinery according to an average of the three years preceding the year of assessment, and also in respect of the diminished value of machinery by reason of wear and tear during the year. The allowance of these deductions is in the hands of the district or special commissioners, as the case may be, and they have to decide in each case, as it arises, the adequacy of the deductions allowed. As to the second point, I am to say that the Board of Inland Revenue have given instructions to their surveyor at Leicester, which is particularly referred to in the memorial, that where a claim is made in respect of the introduction of more modern machinery in a factory, no objection is to be taken to the allowance, as a deduction from the assessable profits of the year, of so much of the cost of replacement as is represented by the existing value of the machinery replaced. Any excess in the cost of the new machinery over the actual present value of the old is an addition to the capital of the business, and cannot

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properly be regarded as a charge upon revenue for the purposes of income-tax assessment. I am to add that similar instructions will be given to surveyors in other districts when this question arises there."

### DUBLIN MAIN DRAINAGE WORKS.

THE contractors for this weighty undertaking (Messrs. H. & J. Martin, of Grand Canal Street), who are also engaged in transforming the Leinster Hall into the new Theatre Royal, are now pushing the drainage works forward, says the *Irish Times*, with creditable despatch. Westward from O'Connell Bridge, along the northern line of quays, great progress has been made in the matter of effecting a junction with the sewer coming up from Kingsbridge. In Lower Abbey Street the excavations are being carried out vigorously, these having now reached to a point opposite the Metropolitan Savings Bank. This section is in continuation of the sewer through Lower Marlborough Street. It will be continued through Beresford Place and Amiens Street to Clontarf *via* the North Strand. This section will have its outfall in the main drainage at the junction of the northern line of quays and Lower Marlborough Street. It is understood that the work on the Clontarf section will be pushed steadily forward while the surface of the northern line of quays is repaved and rendered again fit for traffic; and it is stated that the Dublin Tramways Company mean to repave on an entirely new system the portion of the quays that are under their lines, and that the laying of these lines will be regulated in view of the possibility of their being used in the future for electric traffic. The Corporation will, it is said, co-operate with the Tramways Company in the work of improving the system of paving the quays. It may be mentioned that the contractors will not be in a position to commence cuttings on the southern side of the river until the northern side is again open for traffic.

A large number of men engaged on the drainage works, pending the opening of the cutting on the southern side of the river, are finding full employment on the Clontarf section, now in operation, and on the siding in Winetavern Street, through St. Michael's Hill, to take in the wash of the Poddle River, which empties into the Liffey a great deal of drainage that is discharged into it at a point near where it joins the Liffey. Gangs of men are at present completing the Kingsbridge section from the Kingsbridge terminus, Bow Bridge, and the field in the neighbourhood of Steevens's Hospital, and as far as Old

Kilmainham. Up to the present the time has not been fixed for the completion of the paving of the northern line of quays, and consequently the time for the opening along the southern quays cannot be definitely stated. So far as the drainage operations have gone, all the work that has been done up to the present is what is known as the brick and barrel drainage. The cuttings, generally 21 feet, have been lined with brick throughout. For carrying across the opening the discharge from the sewers running into the Liffey from the northern side special provision had to be made, and arrangements have also been made for intercepting the existing sewers and linking them into the new main drainage along the quays when that is completed and the outlet is provided at the Pigeon House Fort. The existing sewerage of the city, which will be linked into the main drains along the quays, will, it is stated, be subjected to scarcely any modification except to extend and perfect it in certain districts, and it is believed that when the main drainage offers a proper outlet, the existing system, when altered, will be a very perfect one. Over the system Messrs. H. & J. Martin have 450 men employed, and the engineer for the contractors is Mr. H. E. Williams, C.E., who personally superintends the progress of the works.

### SOCIETY OF ENGINEERS.

AT a meeting of the Society of Engineers, held at the Royal United Service Institution, Whitehall, on Monday evening, June 14, 1897, Mr. G. Maxwell Lawford, president, in the chair, a paper was read by Professor Herbert W. Umney, Assoc.M.Inst.C.E., entitled "The Compression of Air by the Direct Action of Water."

The author, by way of introduction, referred to the importance of obtaining compressed air by the simplest possible means. In particular he called attention to the best of all methods, being the only one whereby the compression takes place isothermally. The idea, however, he observed, was not a new one. He referred to the ancient methods in use in Spain, and stated the general principle underlying the system. He then directed special attention to the plant erected by Mr. Frizell of New York, which gave an efficiency of 52 per cent. when tested. He stated that an abstract of these experiments was recorded in the proceedings of the Institution of Civil Engineers in 1880.

The author then described a plant which has recently been erected by Mr. Taylor of Montreal, giving an increased efficiency

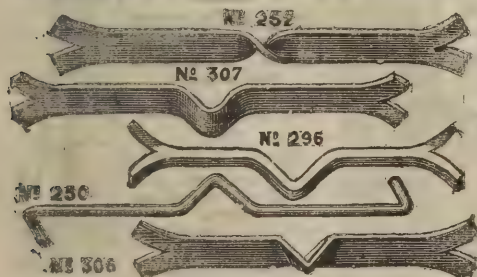
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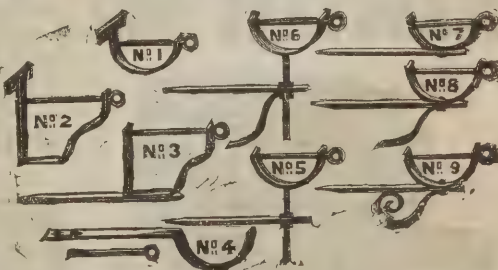
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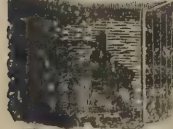
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of 10 per cent. He gave in detail the method of impregnating the water with minute bubbles of air, the improvement being entirely due to this feature, and pointed out the alterations necessary, being confident of obtaining 75 per cent. of the power at command. He also gave records of the trials conducted, and has computed the various hydraulic losses in the apparatus. He summarised the advantages of adopting this principle as follows:—

1. The compression takes place isothermally.
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3. It is suitable for adoption in the case of low waterfalls.

He claimed that these far outweighed the objections of sinking a shaft.

### METROPOLITAN STREET IMPROVEMENTS.

A LIST of the street improvements in the Metropolis, contemplated by the improvement committee during the present year, has just been presented to the London County Council. The localities of the suggested improvements are Rosemary Branch Bridge, Hackney and Shoreditch, Roehampton Street, Westminster, Albert Embankment, Lambeth, and York Road, Battersea, and Wandsworth. In the first case it is proposed to rebuild the Rosemary Branch Bridge over the Regent's Canal. The total cost of the work is estimated at 6,800/., towards which the vestries of Shoreditch and Hackney are each to be asked to contribute. The estimated net cost to the Council after deducting contributions, will, if the scheme is carried out as suggested, be 4,100/.

The proposed improvement in Roehampton Street, Westminster, is in the nature of a continuation of the thoroughfare in order to afford additional communication to the new streets proposed to be laid out by the Council on the Millbank prison site. The estimated net cost of the work, including the acquisition of property, is 5,700/.. The Vestry of St. Margaret and St. John, Westminster, have offered to contribute 500/., but the committee think this an insufficient amount, and recommend the Council only to carry out the work on the local authority agreeing to contribute one-fourth the net cost.

An improvement of considerable magnitude is suggested at the Albert Embankment, Vauxhall. The proposal is that the Council should undertake, as a county improvement, the widening of part of the Albert Embankment formerly called

High Street, Vauxhall, between Vauxhall Walk and Kennington Lane. The matter has several times been before the Council and repeated attempts have been made to secure a contribution from the local authority. This has been persistently refused, but it has been pointed out that the construction of the Albert Embankment was carried out as a county improvement, and that the present proposal is a continuation of that improvement, and that the cost should therefore be paid out of the county fund. The committee feel that there is much force in that argument and have decided to recommend the Council to carry out the work without a contribution from the local authority. The present width of the road which runs north and south, varies from about 40 to 60 feet, and it is proposed to increase this to 60 feet throughout by setting back the eastern side. The estimated net cost of the paving and other works is 3,700/., and of the property, after deducting recoupment, 30,300/., making together 34,000/.

The fourth suggested improvement is the widening of York Road, Battersea, between Falcon Road and Wandsworth Station. In July 1891 the committee brought up a report recommending the Council to undertake the widening of this road, subject to contributions being made towards the cost.

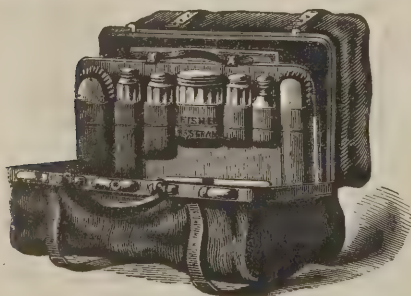
The report included nine large improvements, estimated to cost in all 2,097,625/.. net, and after discussion the Council referred it to the committee to bring up those of the nine improvements which they considered to be of the greatest urgency, with the result that the York Road widening had to stand aside for other improvements which at the time were even more urgent. Recently, however, it has become more and more apparent that the widening of York Road is a work which cannot be longer postponed without grave inconvenience, and the committee have therefore had plans prepared with a view to recommending the Council to carry out some portion of the improvement. The proposed scheme embraces the widening of the portion of York Road within the parish of Battersea commencing near Falcon Road and terminating at John Street, and the widening of the portion of York Road within the parish of Wandsworth commencing at John Street and terminating at Wandsworth Station. The total net cost of the complete scheme is estimated at 80,150/., and of that amount the local authorities are to contribute one-fourth. Nearly the whole of the property to be acquired for the improvement consists of forecourts, and the estimates of the cost have been prepared on the assumption that Parliament will grant the Council power to acquire where necessary the

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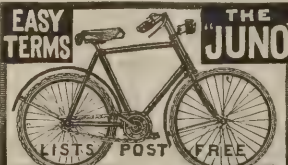
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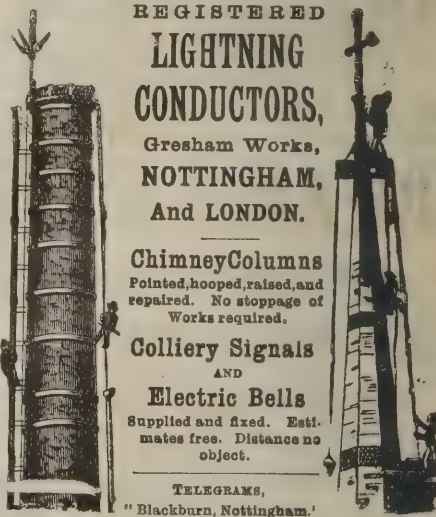
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forecourts only, instead of being compelled to purchase the houses as well. In fact, the committee consider the granting of this power should be a condition of the carrying out of the improvement, as otherwise the cost of the property would be prohibitive. It will accordingly be necessary for the Council to ask Parliament to exempt them from Section 92 of the Lands Clauses Consolidation Act, 1845, which provides that where the promoters of a public undertaking, acting under statute, require to take part of a house, the owner shall have the right of calling upon them to take the whole.

The estimated net cost of the four suggested improvements without deducting contributions is 126,650*l.*, and after deducting contributions 102,487*l.*; the annual charge on the rates for interest on and the repayment of debt, calculated on the net cost, is 4,270*l.*—equal to 028*d.* in the pound—and the annual charge decreases each year by 4*d.*

### LISKEARD CHURCH TOWER.

THE tower of the parish church, Liskeard, having become unsafe it was decided to erect a new structure. Plans were sought in competition and the first prize was awarded to Mr. Sansom, the second being awarded to Mr. Burke Downing. In April last the vicar, the Rev. J. Norris, and churchwardens accordingly addressed a petition to the bishop praying for a faculty for the erection of a new tower with choir vestry, in view of the "precarious and dilapidated condition" of the present tower. In reply, the chancellor (Mr. R. M. Paul) wrote the Registrar in May, and the following extract from his letter was sent to the Vicar and churchwardens:—

#### *Liskeard Church.*

"I have carefully considered the petition for a faculty, which appears to me to involve the pulling down of the existing tower and the erection of a new tower of very much greater height on apparently different lines. It is possible, of course, that demolition may be an actual necessity, but inasmuch as the existing tower is said to possess considerable historical and architectural interest, I think it might be the duty of the Court to discourage rather than sanction the destruction of the tower. I have no desire to prejudge the question, but I should wish it to be clearly understood that, even if the petition should be unopposed, the Court will require the production of the evidence of disinterested experts."

In reply, the Vicar wrote a letter dealing with the report of Mr. G. H. Fellowes Prynne, who, on being called in to inspect the tower, recommended its repair. Mr. Norris wrote:—

"1. The present tower (subject to several repairs and alterations) was built for and to a much smaller nave and of Norman architecture.

"2. The present nave is of considerable size, much larger than the original one, and is of Perpendicular style.

"3. The present tower has undergone several changes, alterations and repairs, and now contains very little of its original (Norman) architecture. The battlements and west doorway are of later date.

"4. The condition of the tower, as stated by Mr. Prynne, is exceedingly dangerous. The east side is shattered from summit to base, one vertical opening being wide enough to take one's hands. There are several smaller perpendicular rents, while the south side is vertically rent, and the louvre is such that the arch stones are falling out. The north side is literally dissolving partnership by splitting into two halves; the outer wall is bulging to a heavy extent.

"5. There are no foundations.

"Mr. Prynne's description of the roof is enough. The tower is in that condition that we have long ceased to ring the bells. There is very little more to be said beyond the fact that the tower must be rebuilt. Nothing short can or will be done by this generation."

The Vicar, having described the "repairs" suggested by Mr. Prynne, which were rejected by the committee as unsuitable and impracticable, pointed out that if such work had been carried out at a cost of 1,000*l.* or 1,200*l.*, the tower would have remained "wholly inadequate to the size of the nave and the surroundings of the church, and out of harmony with its architecture—a tower that is new without the stability of a new tower, having no substantial foundations; a tower propped up by buttresses, bolted together by iron rods, and cased in granite blocks—all this to last, as Mr. Prynne said, 'many generations,' 'for many years to come.' On the other hand, the committee are prepared to erect a substantial tower, and with it a choir vestry, to cost much over 3,000*l.*; to reuse every solid stone, window, grotesque head, doorway, so-called Norman arch and battlements. We have reduced the architect's design from 100 feet to 80 feet to meet the wishes of a few and reduce the cost. We are prepared to carry out the unanimous decision of every vestry meeting. We are prepared to complete the undertaking of previous churchmen, who erected the nave, by build-

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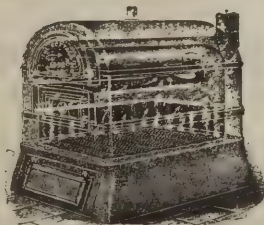
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ing the tower thereof, and by completing the beautiful symmetry of the interior of the church.—J. NORRIS, M.A., vicar."

On May 17 the Chancellor gave his decision on the petition. His letter was printed in the *Cornish Times* of May 22. He said:—"The proposed new tower appears to be totally distinct in style, design and dimensions from the existing tower, and beyond the preservation of some small details, will not hand down to posterity any general idea of what to many has been the most interesting part of Liskeard Church. Both architects (Messrs. Sedding and Prynne) admit that the tower is in a very dilapidated state and that it must be taken down, and if the committee could see their way to re-erecting the present tower and submitting fresh plans, I should raise no further difficulty."

Mr. Paul's letter was considered by the tower committee on May 21, and a resolution was adopted:—"That inasmuch as no notice of opposition has been given to the petition, it is the opinion of this meeting that the Chancellor should be asked to forward the faculty at once, if a faculty is necessary."

The next letter was another from the Chancellor to Mr. Burch, dated the Monday following:—

"Truro: May 24, 1897.

"My dear Sir,—I yesterday received two copies of the *Cornish Times* (a newspaper published at Liskeard), containing an account of a meeting of the committee appointed to arrange for the erection of a new tower and some editorial remarks, of which, whilst the matter is *sub judice*, I can of course take no notice.

"From the resolution passed at the meeting the members of the committee seem not to be aware that unopposed petitions for faculties are frequently heard in open court (as will be seen from the reported cases in various Consistory Courts), and also frequently dismissed.

"If the petitioners decline to adopt the suggestion contained in my letter to you of the 17th inst. (which suggestion accords to a very large extent with the views of Mr. Sedding and Mr. Prynne), or to incur the expense of a report by an independent architect of my nomination, I have no more to say. I can, however, only repeat that I should be willing to grant a faculty to take down the present tower, and (to quote the words of Mr. Sedding from his report to the restoration committee) to rebuild, 'carefully preserving and marking the old materials, as Mr. Pearson is now doing at Peterborough, so

that the present tower may be re-erected as far as it can be done, any new walling stone being in harmony with the old.'

"I think that I may even go further and say that without insisting upon an exact reproduction of the existing tower, the Court would be justified in granting a faculty even if the height of the rebuilt tower were somewhat increased, provided there is no unnecessary departure from the general style and design of such existing tower.

"If, however, the committee will not adopt any of my suggestions, I must refuse a faculty for the erection of a tower totally dissimilar to the present one in its style and proportion.

"I am, yours very truly, ROBERT M. PAUL.

"Arthur Burch, Esq., Diocesan Registry, Exeter."

The above letter "crossed" with the following communication from the Vicar of Liskeard:—

"The Vicarage, Liskeard: May 22, 1897.

"Dear Sir,—In reply to the Chancellor's letter of the 17th inst., I beg to submit to him, through you, a copy of a resolution unanimously passed at a meeting of the tower committee on May 21. I may point out that the chosen design for the new tower was highly recommended by Mr. Sedding, and was the chosen set out of twenty-five competitive exhibits. Mr. Sedding was a perfect stranger to each and all of us. The chosen plans cost us 50*l.* (first prize), and in addition we have paid 25*l.* to Mr. Burke, of London, the winner of the second prize.

"Mr. Sansom (the winner of the first prize), our chosen architect, who was with Mr. Coad, of London (who wisely carried out the restoration of the nave), is a man of great experience and an expert. Mr. Sansom alone carried out the restoration of the chancel of this ancient church. These chosen plans cost Mr. Sansom many years of patient study and progress. The successful plans have been approved of by the parishioners and by several architects, as they were, with the other twenty-four sets, exhibited to the public for many days. They are in perfect harmony, save the interworking in of every portion of this Norman or semi-Norman tower. As Mr. Sansom is strongly conservative in his profession, he was careful to incorporate every portion of interest of the old tower into the designs for the new tower; in fact, such were our instructions to all the architects.

"No other tower but the proposed one could be in keeping with the architecture and dimensions of the nave. The present tower belonged to a much smaller and lower church; the traces of the roof of the former nave are to be seen.

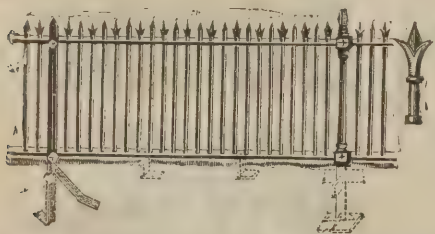
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"From the evidence, and on the recommendation of Messrs. Sedding and Prynne, we have for many months past ceased to have the bells rung, much to the regret of many. The tower is truly in a very dangerous condition, and we, the Vicar and churchwardens, recognise our responsibility, and, therefore, wish to carry out—and at once—the erection of the tower from the plans of Mr. Sansom. This tower is to be in commemoration of the sixty years' glorious reign of our good Queen, as decided on in public meeting.

"I may say, in order that the Chancellor may fully understand our settled intentions—which I convey on my own responsibility, knowing the positive decision of each and all of the committees—that on no ground will we re-erect the existing tower, nor will we pay the cost of any further engagement of expert or experts. We will give a hearty welcome to the Chancellor of Truro should he honour us by personally examining the interior of this tower. We shall carry out the wishes and terms of Miss Pedler and her will.

"Ninety-nine per cent. of the population of this town is with us in the carrying out of our proposed plans. We trust the Chancellor will kindly withdraw his terms and grant to us speedily the prayed-for faculty. Every vestige of the present—every sound stone of this tower—will be incorporated into the new tower.—Faithfully yours,

"Arthur Burch, Esq., Exeter."

On receipt of the copy of the Chancellor's letter of the 24th, the Vicar further wrote the Registrar:—

"The Vicarage, Liskeard: May 26, 1897.

"Dear Sir,—I wired Chancellor Paul this morning, 'Conversation here or at Truro might facilitate business.' This I was led to after reading the copy of his letter to you. I am sending to him a photo of the church I have had in my possession some time, by which he will be better able to judge of the church and its architecture.

"It is our wish to complete the church by the erection of a tower worthy of it in appearance, internally and externally. Internally, the appearance will be in keeping, symmetrical from every point of view. Now the west end of the church (internally) has a broken, dark and unfinished look.

"The Chancellor will remember that Miss Pedler left 1,000*l.*, conditionally, towards the erection of a new tower—(1) that we must raise 2,000*l.* by 1900; and (2) that the tower cost not less than 3,000*l.* We can raise the 2,000*l.*, but could not raise 250*l.* towards rebuilding this tower. We are not

called upon to build or rebuild any tower by 1900, or by 2900, to claim the 1,000*l.*, but we are called upon to raise 2,000*l.* or commence the erection of the tower by 1900—the first we can do. We could not spend 3,000*l.* on the re-erection of this tower. I would almost venture to undertake to do this work for 1,000*l.*

"If we have to give our time and our money we naturally think that our wishes should be respected. We are on the spot and know our wishes and the wishes of the people. Our architect has plainly told us that he will not pull down and rebuild this tower. In fact, no architect would be required to do such absurd work.

"I again can only ask the Chancellor to pay us a visit and see the tower and nave; failing that, I am willing and ready to proceed to Truro to talk over matters with him.

"None of us will hand down to posterity the fact of having in 1897-98 rebuilt a Norman or semi-Norman tower of this size to a Perpendicular nave. We will incorporate the 1627 doorway, Norman windows, &c., and reuse every available stone, but there are hundreds of loads of small rubble stones which can never go into a new tower—they are worthless. You would require the angels to number them.—Faithfully yours,

"Arthur Burch, Esq., Exeter."

"J. NORRIS."

"Helena Villa, Princetown, Devon: June 1, 1897.

"My dear Sir,—I have carefully considered the Vicar's letters to you of the 24th and 26th inst., and am much obliged to him for sending me a photograph of the tower. Having seen the tower itself within the last six months, I feel that nothing would be gained by a personal interview, unless I were accompanied by an independent architect of my own selection, whose expenses would have to be borne by the petitioners.

"I was not aware, until I saw the Vicar's last letter, that Miss Pedler's legacy was conditional on the new tower costing 3,000*l.*, nor should I allow the source from which such sum is to be derived to influence my decision.

"The evidence already submitted to me consists of the reports obtained by the petitioners from two well-known architects, and these point to the necessity of taking down the existing tower and the desirability of rebuilding it, as far as possible, on the original lines. Without such further evidence as I have suggested I see no reason for varying my previously expressed opinion, and must therefore decline to grant a faculty.—I am, yours very truly,

"Arthur Burch, Esq."

"ROBERT M. PAUL."

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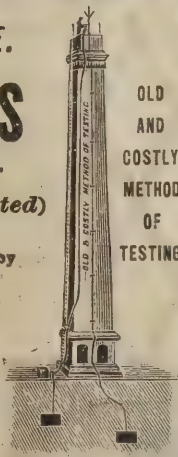
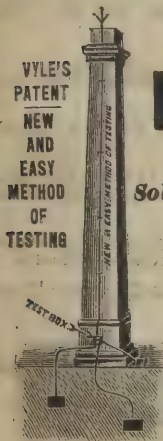
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"Liskeard: June 4, 1897.

"Sir,—We have a tower committee meeting on Tuesday. If not asking too much, might I ask what do you object to in our new tower plans? If the pinnacles and west window were removed and the height of the tower reduced, there would not be much difference between the old and new towers. In the new tower the same doorway, the Norman windows, grotesque heads, arch, &c., are shown. We have chosen the lower tower of the two designs sent us by our architect. I write this on my own account that I may be better able to put before the meeting your objections. To remove the west window would be to rob the new tower and the nave of the church (internally) of their chief attractions.—Faithfully yours,

"Chancellor Paul.

"J. NORRIS."

"Helena Villa, Princetown: June 7, 1897.

"My dear Sir,—In the face of the comments in the *Cornish Times* whilst the matter was *sub judice* and your statement that 'on no account will the committee re-erect the tower, nor pay the cost of any further engagement of expert or experts,' I scarcely think that I can, consistently with the dignity of the Court over which I preside, add anything to what I have already written.—Yours faithfully,

"The Rev. J. Norris.

"ROBERT M. PAUL."

At the meeting of the committee Mr. White inquired what position the Vicar and churchwardens would be placed in provided they pulled down the present tower without a faculty.

The Vicar said that was a very hard question to answer, and although he had consulted lawyers and legal works, he could obtain no definite information on the point. Some people rather favoured the idea that they need not trouble their heads about a faculty. His own opinion was pretty well known. He should pull down the present tower without the slightest hesitation and run all risks. They could only send him down to Bodmin for a few days. But really he was not afraid of anything very serious happening if they did take the matter into their own hands.

Mr. Olver, as one thoroughly acquainted with the affairs of Liskeard Church, said he had never heard before of a faculty being deemed necessary.

Mr. Childs said he was sorry a faculty was ever asked for at all. However, he held a very strong view as to what was their legal position. If the Chancellor was going to do what he thought he could do, they might as well stop collecting money

for the purpose of rebuilding the tower, because, under those circumstances, the 1,000*l.* legacy would go to the cathedral at Truro—they could not spend 3,000*l.* on re-erecting the present tower.

After a protracted discussion, it was decided to adjourn the consideration of the subject until June 24, when a report will be submitted by the Vicar and churchwardens.

## PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

### APPLICATIONS FOR PATENTS.

13354. Henry McLauchlan, for "Stop cock and cleansing pipe combined."

13361. Walter John Brayshaw, for "Window or sash fastener."

13367. John Ritchie Hunter, for "Improvements in the construction of shop fronts."

13375. Thomas Bird Smith, for "An improvement in brick-making machines."

13396. Howard Herbert Deacon, for "A new or improved sash fastener."

13411. Mary Proctor, for "Improvements in or appertaining to venetian blinds."

13432. Sydney Warning Lockhart, for "Improvements in locks or fastening devices."

13452. Robert Thomas Harrison, for "A novel or improved device for securing window sashes."

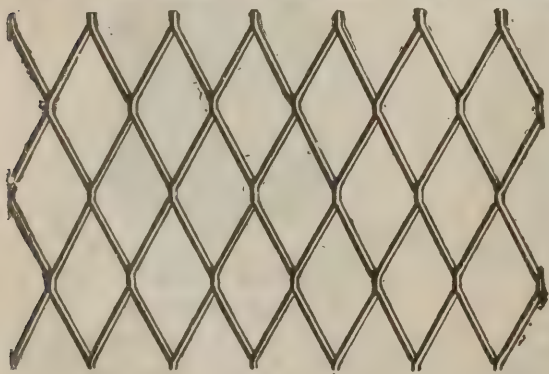
13487. Robert Hodges Bishop, for "Improvements in the manufacture of cornice-pole brackets."

13493. Frank Bradley Thorpe, for "Waste-water preventers for flushing closets."

13560. John Thomas Abell, for "Improvements in roof glazing."

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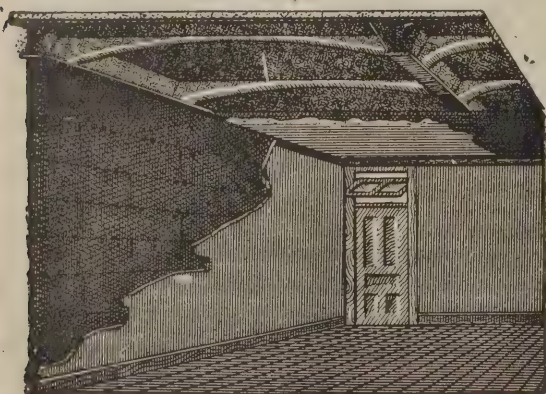
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# THE Architect and Contract Reporter.

## EDITORIAL NOTICES.

*The authors of signed articles and papers read in public must necessarily be held responsible for their contents.*

*No communication can be inserted unless authenticated by the name and address of the writer—not in every case for publication, but as a guarantee of good faith.*

*Correspondents are requested as much as possible to make their communications brief. The space we can devote to Correspondence will not usually permit our inserting lengthy communications.*

## TENDERS, ETC.

*\*\* As great disappointment is frequently expressed at the non-appearance of Contracts Open, Tenders, &c., it is particularly requested that information of this description be forwarded to the Office, 175 Strand, London, W.C., not later than 2 P.M. on Thursdays.*

## NEW READING CASE.

To Librarians of the Public Libraries and Reading-rooms.—A new handsome Reading Case can be supplied at a nominal charge of 2s., by post 2s. 6d., on early application to the Publisher, 175 Strand, W.C.

*For Advertisement Scale, see page xiii.*

## COMPETITION OPEN.

BOOTLE.—July 31.—Competitive plans are invited of a technical school to be erected at the corner of Balliol Road and Pembroke Road, at a cost not exceeding 15,000*l*. Premiums of 50, 30 and 20 guineas will be awarded for the designs adjudged of sufficient merit, and placed first, second and third in order respectively. Mr. J. H. Farmer, town clerk, Town Hall, Bootle.

## CONTRACTS OPEN.

ABERDEEN.—June 28.—For erection of house at Annesley, Torphins. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ABERDEEN.—June 28.—For addition to dwelling-house at Mains of Auchmunziel, New Deer. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ABERDEEN.—July 1.—For erection of house. Messrs. Jenkins & Marr, architects, 16 Bridge Street, Aberdeen.

ALNWICK.—June 28.—For alterations and repairs to premises in Dispensary Street and Hotspur Place. Mr. M. Temple Wilson, architect, 69 Narrowgate, Alnwick.

ALNWICK.—July 3.—For erection of three blocks of cottages in Wagon Way Road, each block to be tendered for separately. Mr. C. E. Moore, *Gazette* Office, Alnwick.

ASHTON-UNDER-LYNE.—June 30.—For construction of a 4-foot brick culvert at Timperley Clough, near Gamber Hill Bank. Mr. J. T. Earnshaw, surveyor, Town Hall.

BAILDON.—For erection of a detached house. Messrs. Walker & Collinson, architects, Swan Arcade, Bradford.

BALA.—June 26.—For erection of classrooms, laboratories and other works for the Bala County School for Boys. Mr. R. Lloyd Jones, architect, Mount Place, Bala.

BARNSELY.—June 30.—For erection of two houses and out-buildings, Gawber Road. Mr. Herbert Crawshaw, architect, Barnsley.

BELFAST.—July 1.—For building electric station, Lagan Bank Road. Messrs. Graeme-Watt & Tulloch, architects, 77A Victoria Street.

BIDEFORD.—June 29.—For repairs to 16 Bridgeland Street. Mr. R. T. Hookway, Bideford.

BRACKNELL.—June 28.—For altering an old house and building a new cottage and two cells, for the Berkshire County Council. Mr. Joseph Morris, county surveyor, 156 Friar Street, Reading.

BRADFORD.—June 29.—For erection of a school, offices for the Board, caretaker's house, manual training-room, &c., at Highfield; also for alterations and additions at Westgate Hill Board School. Messrs. W. & J. B. Bailey, architects, 9 Market Street, Bradford.

BRADFORD.—June 30.—For additions and alterations to Milton Rooms, Westgate. Mr. Rhodes Calvert, architect, 4 Forster Square.

BRADFORD.—For erection of a detached house. Messrs. Walker & Collinson, architects, Swan Arcade, Bradford.

BRADFORD.—For erection of a pair of semi-detached villas at Frizinghall. Messrs. Walker & Collinson, architects, Swan Arcade, Bradford.

BRIDLINGTON.—June 29.—For pulling-down four houses and other buildings and the erection of six dwelling-houses and a shop, Quay Road. Mr. Samuel Dyer, architect, Bridlington Quay.

BRIDLINGTON.—June 26.—For construction of a brick gas-holder tank, 102 feet in diameter and 25 feet deep. Messrs. Thomas Newbigging & Son, engineers, 5 Norfolk Street, Manchester.

BRIGHTON.—June 29.—The Brighton and Preston School Board, U.D., have given notice that the time for sending in tenders for the erection of a cookery school and a school for afflicted children in connection with the York Place School has been extended to 29th inst., 12 noon.

BRISTOL.—June 30.—For erection of a temporary grand stand to seat 800 persons and provided with a canvas awning in the grounds of the West Gloucester Farmers' Club Exhibition at Fishponds. The Secretary, 3 Broad Street, Bristol.

CARDIFF.—June 28.—For construction of an underground public convenience in the Hayes. Mr. William Harpur, borough engineer, Town Hall.

CHESTERFIELD.—For alterations and additions to the Stephenson Memorial Hall, comprising new stage, dressing-rooms, entrances and exits, and caretaker's house. Mr. W. H. Wagstaff, architect, Saltergate, Chesterfield.

CONWAY.—July 7.—For erection of market hall, armoury, and public hall. Mr. T. B. Farrington, borough engineer, Municipal Offices, Conway.

COOKSTOWN.—June 30.—For erection of boys and girls' schools at Cookstown, co. Tyrone. Mr. J. H. Fullerton, architect, Armagh.

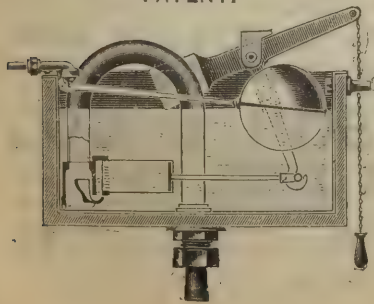
CORK.—June 25.—For erection of a pair of semi-detached villas on the Smith Barry Estate. Messrs. W. H. Hill & Sons, architects, 28 South Mall, Cork.

CORSHAM.—June 28.—For additions and alterations at Mansion House. Mr. Thomas Holloway, Chippenham, Wilts.

CROWBOROUGH.—June 30.—For erection of a manager's residence, adaptation of existing buildings for new carbonising block, workshop and stores, purifying block, meter and governing houses, tank and tar wells, together with incidental earthwork required in diverting stream, embanking round tank

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CROYDON.—June 28.—For erection of a dwarf wall and oak fencing with gates, on the front boundary of the premises of cottage homes, Mayday Road. Mr. Frederick West, 23 Coombe Road, Croydon.

DOVER.—June 29.—For erection of a carshed at Buckland. Mr. Henry E. Stilgoe, Town Hall, Dover.

DUBLIN.—June 28.—For construction of a galvanised roof over the manure-shed at Stanley Street depôt. Mr. Spencer Harty, borough surveyor, City Hall.

DURHAM.—For erection of two tenement-houses at Tantobie. Mr. J. Arkless, Tantobie.

DURHAM.—June 29.—For erection of public urinals, Annfield Plain. Mr. T. J. Trowsdale, surveyor, Annfield Plain.

EAST HARLSEY.—July 3.—For erection of a pair of semi-detached houses. Mr. Thos. W. T. Richardson, architect, 57 High Street, Stockton-on-Tees.

ESSEX.—July 13.—For foundations, in part, of large lunatic asylum, Chadwell Heath, Ilford. Mr. Lewis Angell, borough engineer, Town Hall, Stratford, E.

GLASGOW.—June 26.—For construction of a masonry dam at the outlet of Lock Katrine, by which the level of the loch is to be raised 5 feet. Mr. James M. Gale, engineer of the Water Department, City Chambers, 45 John Street.

GREAT YARMOUTH.—June 30.—For erection of a printing factory, Theatre Plain. Mr. Chas. G. Baker, architect, Town Hall Chambers, Great Yarmouth.

HALIFAX.—July 2.—For erection of iron foundry mill, chimney and out-offices, &c., at Canal Machine Works, Water Lane. Mr. Medley Hall, architect and surveyor, 29 North Gate, Halifax.

HAMPTON-ON-THAMES.—July 6.—For erection of a fire station in Thames Street. Mr. John Kemp, surveyor, Park House, Hampton-on-Thames.

HAREFIELD.—For erection of dwelling-house (nine rooms) in High Street, Harefield. Mr. F. W. Marchant, Supply Stores, Harefield, Uxbridge.

HORSFORTH.—June 30.—For construction of gate piers and stone boundary walling round church. Mr. James B. Fraser, architect, 8 Park Square, Leeds.

HURST BROOK.—For erection of butcher's shop and store-room, &c. Mr. Samuel Shirt, 81 Hillgate Street, Hurst Brook.

IPSWICH.—July 7.—For erection of an addition to the borough asylum. Mr. E. Buckham, borough surveyor, Town Hall, Ipswich.

IRELAND.—July 5.—For erection of a town hall. Messrs. Anthony Scott & Son, architects, Drogheda and Navan.

ISLE OF MAN.—July 7.—For erection of municipal buildings, free library and fire station, in Ridgeway Street, Douglas. Mr. Thomas H. Nesbitt, town clerk, Town Hall, Douglas, Isle of Man.

KEIGHLEY.—For additions to Park Works, Keighley. Mr. John Haggas, architect, North Street, Keighley.

KIMBERWORTH.—June 29.—For erection of four dwelling-houses, &c., at Kimberworth; also three dwelling-houses, &c., in Clement Street, Richmond Park. Mr. J. Axleby, architect, Wilton Lane, Masborough.

KNUTSFORD.—June 30.—For erection of new offices, Board-room and committee-rooms on land adjoining the workhouse. Mr. Robert J. M'Beath, Birnam House, Sale, near Manchester.

LANCHESTER.—June 30.—For taking-down and rebuilding two of the wing walls of the Ford Bridge. Mr. Wm. Cumming, surveyor, Lanchester.

LANCHESTER.—June 30.—For construction of culvert, retaining-walls and roadway improvement at Holmside. Mr. J. E. Parker, Post Office Chambers, Newcastle.

LEEDS.—For erection of inn at Scholes. Mr. A. D. Kaye, architect and surveyor, 71 Albion Street, Leeds.

LEEDS.—For erection of a house at Halton. Mr. Percy Robinson, architect, 72 Albion Street, Leeds.

LEEDS.—June 30.—For construction of gate piers and stone boundary walling round Horsforth Church. Mr. James B. Fraser, architect, 8 Park Square, Leeds.

LEEDS.—July 2.—For erection of villa residences near Roundhay Park. Messrs. W. H. & A. Sugden, architects, Cavendish Street, Keighley.

LEICESTER.—July 1.—For erection of manager's house and horsekeeper's cottage, stabling, shedding, &c. Mr. T. W. Pettifor, architect, Berridge Street Chambers, Leicester.

LLANWENARTH ULTRA.—July 2.—For erection of new cart-shed and certain other repairs at Pendycae Farm, Llanwenarth Ultra. Mr. Lemuel Hiley, Ty Clyd, Govilon, Abergavenny.

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**LUTON.**—July 5.—For erection of school buildings in the Dunstable Road. Messrs. J. R. Brown & Son, Market Hill, Luton.

**MERSTHAM.**—July 1.—For erection of schools for 600 children upon a site in Nutfield Road. Mr. Paxton H. Watson, 4 Adam Street, Adelphi.

**MIDDLEWICH.**—July 1.—For erection of technical schools and free library in Lewin Street. Mr. Reginald T. Worth, Town Hall Chambers, Middlewich.

**MOSSLEY.**—For extensions, &c., to National Schools. Mr. J. H. Burton, architect, 2 Guide Lane, Hooley Hill.

**NEWSHAM.**—For re-erection of farm buildings at Early Lodge, near Newsham, Yorkshire. Mr. J. A. York, solicitor, Barnard Castle.

**NOTTINGHAM.**—For the excavating for and building of the foundations of the new workhouse and infirmary, Bagthorp. Messrs. Marshall & Turner, architects, King Street, Nottingham.

**OLDBURY.**—For erection of offices and fitting shops at Langley Green. Mr. H. Bertram Nichols, Grosvenor Chambers, 59 Corporation Street, Birmingham.

**OXFORD.**—June 30.—For alterations to fish market and north end of No. 2 Avenue, Meat Market. Mr. Richard Bacon, town clerk, Town Hall.

**PENKRIDGE.**—July 2.—For erection of scaffolding for the parish church tower restoration. Mr. W. O. Rooper, Congreve, Penkridge.

**PETERBOROUGH.**—June 30.—For erection of two cottages at North Bank. Mr. J. G. Stallebrass, architect, North Street, Peterborough.

**PETERBOROUGH.**—For erection of three cottages at Bedford Street. Mr. J. G. Stallebrass, architect, North Street, Peterborough.

**PONTEFRAC.**—July 1.—For rebuilding Birkin Bridge. Messrs. J. H. Greaves & Co., architects, Pontefract.

**RIPON.**—July 3.—For erection of infirmary at workhouse. Mr. F. H. Hargrave, architect, Market Place, Ripon.

**ROTHERHAM.**—For erection of five houses in Newton Street, Middle Lane. Plans at Newton House, Newton Street.

**SCOTLAND.**—July 1.—For repairing and thorough overhauling of Beltenmont Mill, Kirkpatrick-Fleming. Mr. James MacDonald, Commercial Bank Buildings, Annan.

**SHOREDITCH.**—July 3.—For repair of the tower and portico of Shoreditch Church. The Committee, Shoreditch Vicarage, Hoxton Square.

**TRING.**—July 8.—For erection of a lych gate and toolhouse, fencing, making and gravelling footpaths, &c., at the Wilstone Cemetery. Mr. W. Huckvale, architect, Tring.

**WALES.**—July 1.—For erection of school in the town of Llandilo. Mr. Henry Herbert, architect, Brynmarlais, Ammanford, R.S.O.

**WALES.**—July 5.—For erection of additional classrooms, caretaker's house, &c., for the governors of the Porth County School. Mr. J. Rees, architect, Pentre, Rhondda Valley.

**WALES.**—July 15.—For erection of infants' department at Palmerstown Road Board Schools, Cadroxton, Barry, to accommodate 290 children, with outbuildings and boundary walls. Mr. W. H. Dashwood Caple, architect, 1 St. John's Square, Cardiff.

**WALTHAMSTOW.**—July 7.—For erection of house at Higham Hill. Mr. Geo. B. Jerram, architect, Bridge Chambers, Hoe Street, Walthamstow.

**WATERFORD.**—July 1.—For erection of thirty-five cottages for the labouring classes at Lisguggan Little; for erection of thirty-six cottages for labouring classes at Doyle's Lane and Newport's Lane. Mr. James J. Feely, town clerk, Town Hall, Waterford.

**WHITTINGTON.**—July 1.—For the erection of four houses. Mr. J. Fawcett, solicitor, Carnforth.

## TENDERS.

### ASHFORD.

For external painting and decorating, &c., the West London District Schools, Ashford, Middlesex, near Staines.

J. J. RICHARDS (accepted) . . . . . £320 0 0

### AUGHEBRACK.

For finishing new church. Mr. E. J. TOVE, architect, Strand, Londonderry.

### Accepted tenders.

J. Harkin, builder . . . . . £556 10 0  
E. M'Court, wood altar . . . . . 150 0 0

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For levelling, paving, flagging, channelling and completing the following streets, for the Town Council, viz. Taylor Street, Jenkinson Street, David Lane (Batley Carr). Mr. O. J. KIRBY, borough surveyor, Market Place, Batley.

*Accepted tenders.*

J. Ackroyd & Son, Birstal—Taylor Street.  
H. & W. Barraclough, Brighouse—Jenkinson Street and David Lane.

**BELFAST.**

For erection of houses at Wellington Park. Messrs. FORMAN & ASTON, architects, Belfast.

J. Lees	£1,040	0	0
J. Hillis	890	0	0
J. E. Smyth	890	0	0
W. Robinson	812	0	0
YOUNG & DICKSON, Pakenham Street (accepted)	798	10	0

For erection of houses at Wellington Park. Messrs. FORMAN & ASTON, architects, Belfast.

Price	£3,800	0	0
McHenry	3,270	0	0
Lowry & Sons	3,150	0	0
Lees	2,950	0	0
Young & Dickson	2,348	15	6
J. E. SMYTH, Duncarn Garden (accepted)	2,347	0	0

**BISHOP AUCKLAND.**

For erection of fifty dwelling-houses, and also for the formation of streets, footpaths and drainage thereto. Mr. W. PERKINS, architect, Victoria Street, Bishop Auckland.

*Accepted tenders.*

T. Hilton, mason, bricklayer and joiner.  
J. R. Mascall, slating.  
S. Kirby, plasterer.  
O. Pallister, painting and glazing.  
Sykes & Co., plumbing.  
G. H. Bell, street-making and drainage.

**BLACKFINE AND SHOTLEY BRIDGE.**

For the making of about 87 yards of kerb and channel at Shotley Bridge, and also for the cementing of about 820 yards of footpath at Blackfine and Shotley Bridge, for the Benfieldside Urban Council. Mr. JOHN DIXON, surveyor, St. Cuthbert's Terrace, Blackhill.

*Blackfine.*

C. ORMEROD, Blackhill (accepted)	£99	16	8
<i>Shotley Bridge.</i>			
G. CHRISTOPHER, Blackhill (accepted)	47	14	9
A. Stephenson	47	13	9

**BRIDPORT.**

For erection of an infectious disease hospital, caretaker's cottage, laundry, mortuary and other works at North Allington. Mr. F. COOPER, borough surveyor and architect.

Mingo & Boon	£1,833	0	0
W. J. Cooper	1,588	10	0
A. POOLE, Ilminster (accepted)	1,439	0	0
Architect's estimate	1,505	0	0

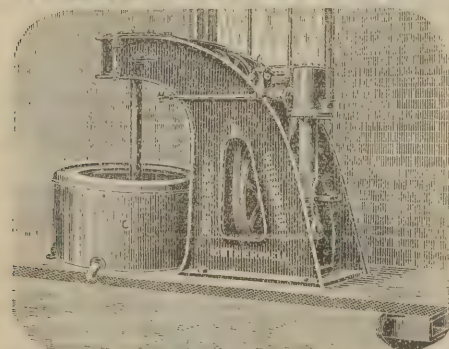
**BRIGHTON.**

For completion of the electric-light wiring, &c., of the Municipal School of Science and Technology, Richmond Terrace. Mr. F. J. C. MAY, borough engineer, Town Hall, Brighton. If in wood casing, with the exception of the basement and other situations mentioned in the schedule.

Belshaw & Co.	£835	0	0
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W. Gell	159	10	0
Adams & Cooper	157	0	0
T. BUTLER, Bunney, Notts (accepted)	156	0	0

**CHESHIRE.**

For extensions of, and alterations at, the Hospital for Consumption, Bowdon. Mr. W. CECIL HARDISTY, architect, Manchester. Quantities by Mr. C. JACKSON, Brazenose Street, Manchester.

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T. Broadbent	2,648	4	0
M. Stone	2,610	0	0
Southern & Sons	2,600	0	0
R. Neill & Sons	2,578	0	0
J. HAMILTON & SON, Altrincham (accepted)	2,537	0	0

**CLACTON-ON-SEA.**

For paving and making-up parts of Wellesley Road, Thoroughgood Road and Vista Road. Mr. A. R. ROBINSON, surveyor.

<i>Wellesley Road.</i>			
J. C. Allen	£1,350	0	0
D. MACKENZIE & SON (accepted)	1,270	0	0
Surveyor's estimate	1,288	0	0

<i>Thoroughgood Road.</i>			
D. Mackenzie & Son	360	0	0
J. C. ALLEN (accepted)	324	0	0
Surveyor's estimate	336	0	0

<i>Vista Road.</i>			
D. Mackenzie & Son	304	5	0
J. C. ALLEN (accepted)	274	15	0
Surveyor's estimate	290	0	0

**CLITHEROE.**

For construction of a filter-bed at Bowker Park Coppy, near Grindleton. Mr. J. E. SHARPE, borough engineer.

J. FORD, Clitheroe (accepted)	£147	14	0
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**CUMBERLAND.**

For erection of public offices and free library at Wilson Terrace, Frizington. Messrs. MOFFAT &amp; BENTLEY, architects, Whitehaven.

*Accepted tenders.*

Wren & Lindsay, mason and plasterer	£687	10	0
J. Martindale, joiner	231	0	0
Fisher & Co., plumber and glazier	79	0	0
T. Mandle, slater	59	0	0
Armstrong & Reed, painter	10	0	0

The above tenders are exclusive of fire-engine station and boundary walls.

**FARNBOROUGH.**

For making-up a portion of Reading Road. Mr. R. WALTER KNAPP, surveyor.

J. H. Hard, Farnborough, 10d. per super yard (accepted).

T. Turner, 10½d.

D. Stuart, 10½d.

J. Williams, 2s.

**GRIMSBY.**

For erection of Diamond Jubilee provident homes, Grimsby. Mr. HERBERT C. SCAPING, architect, Grimsby.

J. M. Thompson & Sons	£6,251	4	0
H. Marrows	6,123	19	1
L. W. Davison	5,950	0	0
Hewins & Goodhand	5,943	8	11
A. Atkinson	5,592	0	0

**HARROGATE.**

For draining, levelling, paving, metalling, kerbing, channelling and lighting Studley Road and Back Studley Road. Mr. S. STEAD, borough surveyor.

*Accepted tenders.**Studley Road.*

H. Leedham, Little Wonder, Harrogate	£782	13	2
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*Back Studley Road.*

H. Leedham	351	7	9
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For draining, levelling, paving, metalling, kerbing and lighting Cheltenham Road. Mr. S. STEAD, borough surveyor.

J. L. HAMPTON-MATTHEWS, York Road (accepted)	£321	0	0
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CROSSLEY BROS., LIMITED, Manchester (*accepted*) £85 9 0

**HEYWOOD.**

For restoration and repair of buildings at the cemetery.

S. & A. TAYLOR, William Street (*accepted*).

**HOXTON.**

For removal of existing railings and gates round enclosure in Charles Square and for erection of about 160 lineal yards of new wrought-iron railings, 6 feet high complete, fixed upon a 12-inch by 12-inch granite kerb, including two gateways about 7 feet wide. Mr. J. RUSH DIXON, surveyor.

C. S. MALLETT & Co. (*accepted*) £493 0 0

**HUDDERSFIELD.**

For erection of out-buildings in Scotgate Road, Honley. Mr. J. BERRY, building surveyor, Huddersfield.

*Accepted tenders.*

J. Jenkinson, Honley, mason.

B. Oldfield, Honley, joiner and painter.

**KNUTSFORD.**

For alterations and additions to the hospital at the workhouse. Mr. ROBERT J. M'BEATH, architect, Birnam House, Sale, near Manchester.

T. Rowlands, Northwich £700 0 0

J. E. DEAN, Ashton-on-Mersey (*accepted*) 638 0 0

**LARNE.**

For new recreation-grounds and trotting track for the Committee. Messrs. FOREMAN & ASTON, architects, Queen Buildings, Royal Avenue, Belfast.

Heggarty & Gault £1,541 0 0

T. McMurray 960 0 0

W. McLARNON, St. James Street, Belfast (*accepted*) 743 2 0

**LIVERPOOL.**

For painting at Sefton Park.

W. MERRICK, Benson Street (*accepted*) £643 0 0

For erection of stores and offices at Newsham Park.

F. H. BURGOINE, Harford Street (*accepted*) £1,409 0 0

**LLANGOLLEN.**

For additions and alterations to the Llangollen Board Schools, and fencing, &c., the proposed new playground opposite the school, for the Llangollen (U.D.) School Board. Messrs. DAVIES & MOSS, architects, 11 Regent Street, Wrexham.

*Contract No. 1.*

Hulse £936 0 0

Thomas 891 9 4

EVANS & MORRIS, Llangollen (*accepted*) 814 10 0

*Contract No. 2 in abeyance.*

**LONDON.**

For erection of a house, Bostal Heath, for Mr. Brodie. Mr. W. H. CHANCY, architect.

Houghton £685 10 0

Thomas & Edge 631 0 0

A. J. Ware 610 0 0

For repairs at the Licensed Victuallers' Asylum, Asylum Road, Old Kent Road, S.E. Mr. W. F. POTTER, architect.

R. Hirst £340 0 0

R. J. Young 318 0 0

H. Eames 300 0 0

F. Dawes 275 0 0

W. CROFT, Sydenham (*accepted*) 180 0 0

For alteration at the Lord Stanley public-house, Camden Town.

Mr. HERBERT RICHES, architect, 3 Crooked Lane, King

William Street, E.C.

A. Porter £728 0 0

T. Osborn & Sons 722 0 0

P. Hart \* 675 16 0

\* Accepted subject to slight modification.

For alteration in making billiard-room at the Hope and Anchor, Camden Town. Mr. HERBERT RICHES, architect, 3

Crooked Lane, King William Street, E.C.

W. H. Durrant £485 0 0

G. Stuart 479 0 0

Antill & Co. 450 0 0

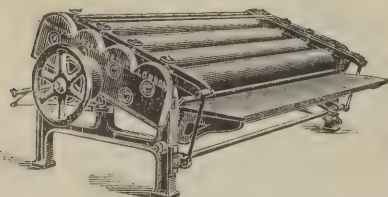
P. HART (*accepted*) 382 0 0

For painting, &c., at the King's Head, Pimlico, S.W. Mr. HERBERT RICHES, architect, 3 Crooked Lane, King

William Street, London, E.C.

T. OSBORN & SONS (*accepted*) £90 0 0

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For alteration and fittings to shop, High Street, Deptford, S.E.  
 Mr. HERBERT RICHES, architect, 3 Crooked Lane, King  
 William Street, London, E.C.  
 Parnall & Co. . . . . £316 0 0  
 S. J. Scott . . . . . 263 0 0  
 SPRECKLEY & CO. (*accepted*) . . . . . 257 0 0

**LONDONDERRY.**

For erection of new library, recreation hall and baths at St.  
 Columb's College. Mr. EDWARD J. TOYE, architect,  
 Strand, Londonderry.

*Accepted tenders.*

D. McCaffery, builder . . . . . £2,690 19 11  
 Mahon & Bradley, plumber . . . . . 264 0 0

**MACHYNLLETH.**

For alterations and improvements at the workhouse.  
 O. J. WILLIAMS, Machynlleth (*accepted*) . . . £325 0 0  
 For erecting new school buildings.  
 Humphreys & Davies . . . . . £1,463 16 3  
 J. Hughes . . . . . 1,455 0 0  
 H. JONES, Penygroes (*accepted*) . . . . . 1,315 0 0  
 J. M. Jones . . . . . 1,272 0 0

**MORECAMBE.**

For erection of a brick chimney 129 feet in height, engine and  
 boiler houses and other offices for generating station of the  
 electric-light works. Mr. JOHN BOND, surveyor.  
 J. EDMONDSON, Queen Street, Sawmills (*ac-  
 cepted*) . . . . . £2,676 0 0  
 For construction of two cartways extending from the seawall,  
 now in course of construction, to the beach, for the Urban  
 District Council. Mr. JOHN BOND, surveyor.  
 A. KRAUSS, Russell Town, Bristol (*accepted*) . £870 0 0

**PORTISHEAD.**

For completing the sewerage scheme. Mr. T. J. MOSS  
 FLOWER, engineer, Carlton Chambers, Bristol.  
 J. & T. BINNS, Horwich (*net tender accepted*) £10,687 9 10

**NEW TREDEGAR.**

For erection of forty houses on Fothergill's Road, New  
 Tredegar. Mr. GEO. KENSHOLE, architect, 26 Duffryn  
 Terrace, New Tredegar.

E. Williams . . . . . £172 10 0  
 Thomas Bros. . . . . 150 10 0  
 S. Hawkins . . . . . 150 0 0  
 W. Jenkins . . . . . 149 0 0  
 E. Mainwaring . . . . . 145 12 6  
 Harding & Davies . . . . . 140 0 0  
 W. WILLIAMS & SONS, New Tredegar (*accepted*) 147 10 0

**NORMANTON.**

For erection of chapel at Hopton. Mr. ARTHUR HARTLEY,  
 architect, Carlton Chambers, Castleford.

*Accepted tenders.*

J. Lockwood, plasterer.  
 J. Snowden & Sons, plumber.  
 W. Holland, jun., joiner.  
 H. Ramskill, bricklayer.  
 J. Craven, mason.  
 S. Evison, slater.  
 T. Watson, painter.

**ROSSENDALE.**

For adding a chancel to St. Nicholas's Church at Newchurch.  
 MOORE & Co., Rawtenstall (*accepted*).

**SALISBURY.**

For supply and erection of a corrugated iron roof, about 70 feet  
 span and 50 feet long, for the Gas Company. Mr. N. H.  
 HUMPHRYS, engineer.  
 W. JONES & SONS, London (*accepted*).

**SCOTLAND.**

For formation of concrete precipitation-tanks and filters, with  
 all ironwork, piping, &c., connected therewith, at Rothies.  
 Mr. LOUIS HARPER, engineer, 115 Union Street, Aberdeen.  
 C. Stuart . . . . . £1,262 7 2  
 Scott & Sellar . . . . . 1,012 0 0  
 R. Marshall . . . . . 946 11 10  
 J. WARRACK, Aberdeen (*accepted*) . . . . . 779 0 1

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J. E. Broderick . . . . .	£687	0	0
G. Milson . . . . .	546	16	2
Wainwright & Co. . . . .	468	9	7
E. Bradshaw, Southsea * . . . .	427	5	7
Architect's estimate . . . . .	435	0	0

\* Accepted subject to approval of Education Department.

## WREXHAM.

For erection of Welsh Baptist Chapel at Pentre Broughton. Messrs. DAVIES & MOSS, architects, 11 Regent Street, Wrexham.

J. Rogers . . . . .	£1,060	0	0
S. Moss . . . . .	987	0	0
R. Williams . . . . .	954	0	0
W. H. Wycherly & Co. . . . .	935	0	0
R. S. ROBERTS, Broughton, Wrexham (accepted) . . . . .	882	15	0

## COMPETITION DECIDED.

GORLESTON-ON-SEA.—In a recent limited competition the design of Messrs. George I. Skipper, F.R.I.B.A., and F. W. Skipper, architects, of Norwich, was selected for a new hotel to be erected on a magnificent site on the top of the cliffs, commanding unique views of the harbour mouth, the jetty to the east and the coast line towards the south. Beneath the cliffs are excellent sites for shops, baths, lavatories, &c. Some of the shops are now being erected by Mr. I. F. W. Bray, contractor, of Great Yarmouth, who has undertaken to complete his contract by the middle of July, ready for occupation this season. The hotel is to be completed in readiness for next season.

A NEW Congregational church in Woodsley Road, Leeds, was opened on the 17th inst.

## BUILDING AND BUILDERS.

THE memorial-stones of a Baptist chapel in Tump Road, Blackheath, Birmingham, were laid on the 22nd inst. The chapel when built will accommodate 500 persons, and the cost will be about 1,200*l*.

ON the 20th inst. the sudden death took place at Isycoed, near Wrexham, of Mr. John Shone, a well-known builder in the neighbourhood. He was paying a visit to his brother, who lives close by, and whilst talking to him fell down dead. He leaves a widow and six children.

THE death has occurred, at the comparatively early age of forty-two, of Mr. Arthur James Chivers, of Cheap Street, Reading. The deceased had been in business as a builder for about twenty years.

THE foundation-stone was laid recently of a new chancel and vestry to the parish church, Stockingford, near Nuneaton.

## VARIETIES.

ALMSHOUSES for aged couples, in connection with the Grimsby Alms-houses Trust, were formally opened on the 17th inst., and the inmates given possession. The houses have been built on land given by Mr. Grant Thorold at a cost of about 70*l*. each. A number of others have previously been erected, while six more are being built for widows with families. A large number of friends were present at the ceremony, and several others sent bags of coal, tea, sugar, bread, &c. A tea and public meeting were afterwards held at the Harbour of Refuge.

LADY BROOKE, of Norton Priory, has promised to give a new reredos to Halton Church, near Runcorn.

As a memorial of her late husband, the Hon. James Byng, the Hon. Mrs. Byng has contributed £1,000 towards the cost of building a tower to St. John's Church, Tunbridge Wells.

A DISASTROUS conflagration has occurred at the Star paper mills, Finis-cowles, near Blackburn. The damage can hardly be estimated, but it is thought to be over 50,000*l*.

A PAINTER, named William Chambers, while engaged in Jubilee decoration work at Leeds, was killed by the snapping of a ladder, which caused him to drop 40 feet.

A MEMORIAL-TABLET was on the 21st inst. unveiled at Blantyre village, where David Livingstone, the African

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missionary and explorer, was born, to whose memory it was erected in the gable of the tenement which was Livingstone's home.

A BRASS eagle lectern has been presented to St. James's Church, Doncaster, in memory of the late Rev. J. Campion, who was vicar of St. James's from 1853 to 1890. It is a Jubilee gift from parishioners and members of the congregation.

At the parish church, Stranton, West Hartlepool, on Sunday, a memorial window, erected by the officers of the 4th D.A.V. in memory of their late commander, Colonel Cameron, was unveiled by the vicar (the Rev. J. Bennett) and the Rev. D. A. Stewart.

THE new non-infectious hospital at Rothesay, which has been built at a cost of 3,000*l.* from voluntary contributions, and named the Victoria Cottage Hospital, in commemoration of the Diamond Jubilee, was formally opened on the 21st inst. by the Marquis of Bute.

LORD EBURY'S mansion at Moor Park, near Rickmansworth, was partially destroyed by fire on the 18th inst. The house hose was brought into requisition, and, shortly after the arrival of the Rickmansworth and Watford Brigades, the fire was got under control. An upper storey room was considerably burnt, but the damage is not so extensive as was at first reported. The origin of the outbreak is unknown.

MESSRS. GEORGE I. & F. W. SKIPPER, architects, of Norwich, have received instructions to prepare designs for the new town hall and public library, &c., proposed to be erected in East Dereham, Norfolk.

At the Sheringham Hotel, Norfolk, a new central block and corridor connections, comprising large dining-hall, kitchen, sitting-rooms and thirty-five new bedrooms, with all modern appointments, are now being completed by Mr. George Riches, contractor, of Cromer. The whole of the building, including the decorations internally, has been carried out from the designs of the architects, Messrs. George I. & F. W. Skipper, of Norwich. The hotel by these additions becomes the largest in East Anglia.

THE first sod of the new waterworks at Midhope for the Barnsley Corporation was cut on the 17th inst. There are now some 70,000 people dependent upon the Barnsley water supply, and under the new Act 30,000 more, who cannot obtain water elsewhere, are brought within the area of supply. The Ingbirchworth reservoir may give a maximum supply of 1,250,000 gallons per day, the new reservoir will give 1,600,000

gallons per day. It is estimated to cost 170,000*l.* to complete the works.

THE Skinners' Company has decided to contribute a hundred guineas, and the Fishmongers' Company twenty guineas, towards the purchase of Churchyard Bottom Wood, Highgate, as an open space. Promises of donations have been received to the amount of 4,916*l.*, besides 10,000*l.* promised by the Hornsey Urban District Council, and 2,000*l.* and 1,000*l.* by the parishes of Islington and St. Pancras respectively. The Middlesex County Council has agreed to contribute a sum not to exceed 5,000*l.*, and there is a prospect of obtaining support from another quarter, but a considerable amount is still required to complete the purchase and drain the wood.

THE plans for the new Congregational chapel, &c., which have just been erected in Woodsley Road, Leeds, comprise a chapel, 57 feet by 38 feet, with gallery, to seat 500 persons; a schoolroom, 55 feet by 30 feet, for 400 scholars; a large classroom, 21 feet by 19 feet; six classrooms opening out from the schoolroom; minister's vestry and requisite conveniences. Only the chapel, minister's vestry and large classroom have so far been built. The structure is in the Classic style of architecture, the walls being of pressed bricks with stone dressings. The internal woodwork is of pitch pine. The whole has been erected from the design and under the superintendence of Mr. G. F. Danby, architect, Leeds. The total cost will be about 3,300*l.*, and 2,300*l.* has been expended on the work already completed.

### STONE AND ALABASTER VASES.

THE Egyptians used different kinds of stone for making bowls, jugs and other vases destined to hold the liquids and other substances offered to the gods, or otherwise employed for religious or private purposes. The principal materials used for this purpose were granite, basalts, serpentine and alabaster, or arragonite, a kind of stalagmite of great beauty of a creamy-white colour, and more extensively employed than any other material, especially for vases of the toilet. The kind in use at the earliest period of the fifth and sixth dynasties was plain and of one uniform layer, but about the twenty-fifth dynasty a zoned arragonite of yellow colour and many layers came into use. The principal shapes are a hemispherical vase with wide

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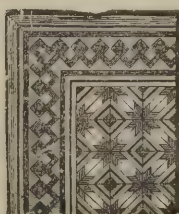


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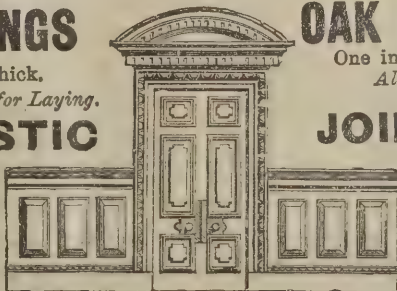
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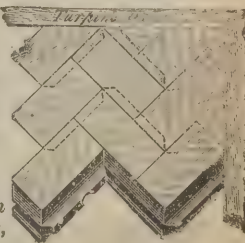
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open mouth for holding wine, basins, cylindrical vases with wide rims for holding unguents or oils, an elongated vase with pointed foot, also for holding unguents or perfumes; a vase with cylindrical body, large flat lips and mouth, often employed for holding cosmetics; and vases in shape of the wine-jugs, the Greek olpe or the oinochoe, the two-handled amphora and drop-shaped alabastros, and other shapes. On many of these alabaster vases the name of the monarch in whose reign they were made, of the person in whose tomb they were deposited, and even the amount of the capacity, or their dedication for sepulchral use is incised in hieroglyphs. The alabaster vases appear to have been highly prized. They had covers of the same material, and were used only for domestic purposes by the upper classes. So much were they esteemed that they were exported from Egypt, and the names of Persian monarchs have been found in hieroglyphs and cuneiform characters upon them, while vases apparently in Egyptian material, if not of Egyptian fabric, have been discovered in the early tombs of Asia Minor, Greece and the isles of the Archipelago.

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### ILLUSTRATIONS.

CATHEDRAL SERIES.—ST. PAUL'S: DETAILS OF CHOIR STALLS.—ENTRANCE TO CHOIR STALLS.—GATES IN SOUTH CHOIR AISLE.

### ROYAL AGRICULTURAL SOCIETY.

THE Manchester meeting of the Royal Agricultural Society, which opened on Wednesday last, is one of the largest and generally most satisfactory which has been held since the memorable Windsor show in 1889. The third section, in which only we can take any professional interest, as that is the machinery and engineering section, is more than up to the mark of previous years. Among the largest exhibitors in this section are Messrs. Newton, Chambers & Co., Limited, who, at Stand No. 148, Machinery in Motion, are exhibiting, as usual, a good number of their patent and improved cooking ranges, which have a very high merit, and are worthy of inspection. This firm manufacture almost every conceivable article in cast-iron, such as the following, from which their various exhibits are taken:—Altar rails, ash bins, ashes' grates, air bricks, baker's ovens, balconies, bannisters, bar weights, boilers, wrought and cast-iron; boundary posts, brackets, carving tables, castings generally, cattle troughs, cisterns, coil boxes, coil cases, coil pipes, columns, communion rails, condensers, cooking apparatus, corn bins, crestings, dampers, dust hoppers, expansion joints, fountains, garden bordering, garden chairs, garden seats, garden rollers, gasholders, gas mains, gas valves, gates, gill pipes and fittings, girders, gratings, gullies, gutters, heating apparatus, hot hearths, hot-water pipes and fittings, kitchen ranges, lamps, laundry stoves, lifting gears, mangers, manhole frames and covers, mantel registers, manure pumps, palisading, park seats, pig troughs, pumps, purifiers, radiators, railings, rain-water pipes and fittings, retorts, scrubbers, seat standards, sham registers, soil-pipes and fittings, stable fittings, staircases, steam closets, stench traps, stop-tap boxes, stove pipes, stoves, cast-iron tanks, tomb fencing, valves, vases, verandahs, ventilators, ventilating grating, water grates, water pipes, windows.

Their latest production is the Colvent and Fervent Radiators, the cheapness, utility and durability of which cannot be excelled. This firm manufacture many other kinds of radiators, specimens of which may be inspected at their stand. The Kingston, Octopus, Newton, Olympian and the Finsbury are among their wrought welded boilers, and are specially commended; as is also their cast-iron Mornington

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boiler, the latter especially being suitable for amateur gardeners; the different designs of garden vases are such as to rank them amongst the first of this class of goods. It need hardly be said that garden rollers, hot-water pipes and fittings, sanitary castings, lamp posts, staircases, tank plates, retort mouthpieces and many other miscellaneous goods too numerous to mention, are amongst this firm's manufactures. Last but not least is their exhibit of the current steam portable disinfecter, of which large quantities have been sold to the principal public institutions throughout the country. The entire arrangements of this firm's exhibits at the show are in the hands of Mr. C. W. Dawson, eldest son of Mr. Geo. Dawson, J.P., C.C., managing director of Messrs. Newton Chambers & Co., Limited, Thorncliffe Iron Works, near Sheffield.

The "Trusty" Engine Works, Cheltenham, have, too, an attractive show of their well-known "Trusty" oil and gas engines, showing amongst others  $3\frac{1}{2}$ ,  $9\frac{1}{2}$  and 25 horse-power fixed, and  $9\frac{1}{2}$  and  $12\frac{1}{2}$  horse-power improved portable oil engines, and 1 and 10 nominal horse-power gas engine, and an excellently-arranged electric installation (by Drake & Gorham, London), driven by one of the larger engines.

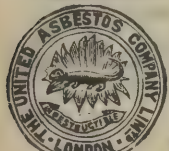
This company inform us that during the last twelve months they have supplied a large number of their engines for such installations both at home and abroad, and at the present time several important contracts are in hand for lighting country houses. The use of these engines (which are now largely manufactured in all sizes, single cylinder, from  $\frac{1}{2}$  to 40 horse-power) for general farm and estate purposes are now so well known that farmers and others are having the fullest confidence in replacing their steam-engines, horse-gears and turbines by them. Since the last royal show some important contracts have been completed for the South American, Japanese and Norwegian Governments, and the leading home and foreign railways, and at this moment a large pumping contract is being put down for one of the leading railway companies.

### THE PALACE OF BLENHEIM.

SIR UVEDALE PRICE, whose work on the picturesque will never be forgotten, stood before Blenheim with Reynolds's eulogy of the architect in his recollection, and looking at the vast extent of front, the massy columns, the grand porticoes, the lofty towers, the innumerable pinnacles and

clustered chimneys, which gave light and shade and such varied magnificence to the elevations and the horizontal profiles, concurred with the painter, and then endeavoured to discover on what principles the whole had been planned. "Reynolds is the first," he says, "who has done justice to the architecture of Vanbrugh by showing that it was not a mere fantastic style without any other object than that of singularity, but that he worked upon the principles of painting, and that he has produced the most painter-like effects. It appears to me that at Blenheim Vanbrugh conceived and executed a very bold and difficult design, that of uniting in one building the beauty and magnificence of the Grecian architecture, the picturesqueness of the Gothic and the massive grandeur of a castle, and that in spite of many faults, for which he was very justly reproached, he has formed, in a style truly his own and a well-combined whole, a mansion worthy of a great prince and a warrior. His first point appears to have been massiveness as the foundation of grandeur; then, to prevent the mass from being a lump, he has made various bold projections of various heights as foregrounds to the main building; and, lastly, having been forcibly struck with the variety of outline against the sky in many Gothic and other ancient buildings, he has raised on the top of that part where the slanting roof begins in any house of the Italian style a number of decorations of various characters. These, if not new in themselves, have at least been applied by him in a new and peculiar manner, and the union of them gives a surprising splendour and magnificence as well as variety to the summit of that princely edifice." The genius of Vanbrugh as an architect since the diffusion of these and other equally generous criticisms has been sufficiently acknowledged. The originality which ruined his fortune has raised his fame, and he now stands, as he deserves, high on the vantage ground of original invention—a position in which there are few British rivals to jostle him. He has many faults, among which all must recognise a cumbrous splendour, a multiplicity of little parts in buildings of diminutive size, and a want of attention to interior detail; but the merit of an originality at once grand and poetic atones for all such deficiencies, and places him foremost amidst the architects of our latter times. He will ever be honoured as the only great original architect of the reign of Queen Anne and George I., and his last comedy, "The Journey to London," will satisfy all the world that, however the bad taste of his age may have poisoned his theatrical vein, he might, under other circumstances, have been a dramatic classic at once refined in art and blameless in morals.

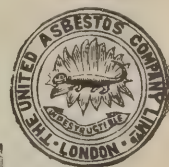
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## ART AT WARING'S.

THE beautiful and artistic catalogue which Messrs. Waring have issued as descriptive of their very interesting exhibition of antique furniture, tapestries, embroideries, brocades, &c., chiefly Spanish and Italian, although by no means entirely from those sources of ancient *objets d'art*, should be regarded as a valued acquisition by every connoisseur in such matters. Admirably printed on old English paper, with vellum cover ornamented with the royal arms embossed in red, the volume is extremely attractive in its get up; but its interest lies in its admirable illustrations of the principal objects exhibited, which embrace historical velvets, hangings, tapestries and embroideries, comprising ecclesiastical and other vestments, including an historic elaborately-worked Byzantine chasuble said to have been worn by Charlemagne. There are numerous sketches of antique silver in exquisite designs, curious quaint old furniture, including a Shakespeare chair from Ann Hathaway's cottage. A fine old carved oak Elizabethan bedstead, with inlaid frieze panels, arches, columns, &c. Choice family furniture of the periods of Louis XIV., XV., XVI. and XVII., and the Empire, and a fine old oak room from the house of Rubens at Antwerp, which is an interesting Flemish panelled oak room, with frieze inlaid with ebony panels and carved with heads, and a fine chimney-piece with panelled frieze and terminal figures and double-fluted pilasters. The pair of folding doors, the lower panels of which are carved with figures of St. Peter and St. Paul, have open fluted columns, capitals, &c. The smaller doorway has an over door, with finely carved terminal figures and busts. The stained-glass wrought-iron grilles in the windows, the brass chandelier, wall-lights and brass log vases, and the interesting examples of furniture of the period, render complete this example of a room of the seventeenth century.

## CITY OF LONDON LUNATIC ASYLUM.

THE Corporation of London has recently considered the advisability of carrying out many improvements at the City of London Lunatic Asylum at Stone, near Dartford, consequent on a report of the Commissioners in Lunacy in April 1896, in which they express a hope that an early commencement will be made in the extension of the infirmaries, the building of a detached chapel, laundry, &c.

It was not till 1864 that the City of London possessed a

lunatic asylum of its own; now the management of the Asylum has received such high praise that the authorities of various unions and parishes send patients, and so large has been the demand for accommodation for private patients that owing to want of space many such patients have been refused.

It was in April 1857 that the Court of Common Council considered the question of carrying into execution the Lunatic Asylums Act of 1853, and thus provide a lunatic asylum for the City of London.

The result of deliberations of the special committee appointed was the expression of opinion that a pauper lunatic asylum was a necessity, and that patients in such an institution would be under a more perfect system of classification and discipline than was compatible with the accommodation provided in the unions and various licensed houses then in use.

In 1864 the land was purchased and the building erected at an expenditure of 68,105*l.*; from time to time it was found necessary to add to the building. In 1874 the female wing was enlarged at an expense of 9,000*l.*; in 1878 the detached cottage hospital was built, this costing 2,850*l.*; seven years after the male wing was enlarged, 5,100*l.* being expended; two years later an expenditure of 8,000*l.* was incurred by the purchase of Stone Lodge Farm, having 107 acres of land.

The necessities of the institution having grown, it is now contemplated making various improvements at an estimated cost of about 46,770*l.* These improvements consist in providing a new laundry, to be built in three sections, which will provide for the washing of 11,000 articles weekly, and this it is estimated will cost 16,225*l.*; the female hospital will consist of three dormitories, eight single rooms, &c., and for this 11,400*l.* is to be set aside; the male hospital will provide a dormitory for fourteen patients, six single rooms, at an expense of 4,900*l.*; bath-rooms will necessitate an expenditure of 3,075*l.*; water-closet accommodation, 2,250*l.* The large outlay of 8,700*l.* for a recreation-room, in which quiet and well-behaved patients of either sex can meet at a theatrical performance, concert and weekly dance, is an instance of the kindly treatment of lunatic patients. This sum will include the building of a detached chapel.

A new clock turret, to be erected at a cost of 220*l.*, completes the outlay suggested of 46,770*l.*

It will be seen from these figures that the City of London is determined to do its duty in this respect, and few, if any, will complain of the county rate by which it is proposed to raise the necessary funds.

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**SHERNBOURNE CHURCH, SANDRINGHAM.**

At Norwich Consistory Court on the 16th inst. Mr. Chancellor Blofeld granted, on the application of Mr. J. B. T. Hales, proctor of the court, a faculty to the vicar and churchwardens of the parish of Shernbourne, near Sandringham, for the restoration of the church of that parish. This is a small flint-built structure erected in the Early English style, and is stated to have been the second church founded in East Anglia by St. Felix. Its ancient font is one of the finest examples in the county. The fabric was in a very dilapidated condition when, some few years since, the Prince of Wales purchased an estate in the neighbourhood of which the parish forms a part. One of his first acts of ownership, says the *Norfolk Daily Standard*, was to look to the condition of the little church in which the parishioners had for centuries been accustomed to worship, and it is due to this thoughtful consideration that the ancient and interesting building is about to undergo the improvement it so much needs. Plans have been prepared by Mr. H. J. Green, the diocesan architect, by which the chancel and south aisle are to be rebuilt, new roofs provided, the church reseated, and the general repairs of the fabric carried out satisfactorily. The estimated cost of this extensive restoration of a sanctuary which provides sitting accommodation for about seventy people is 1,500*l.*, and it is a fact worthy of record that the Prince of Wales, with his customary generosity, has contributed no less than 1,000*l.* to this amount—an example which many land-owners in the country might very well emulate.

**THE NEW GENERAL HOSPITAL, BIRMINGHAM.**

In view of the opening of the new General Hospital the Corporation, says the *Birmingham Post*, is pushing on the improvements at the junction of Steelhouse Lane and Corporation Street. The Council, it will be remembered, decided, in deference to a generally expressed wish, to set back the street line at this corner, chiefly to open up the view of the noble architecture of the new hospital. A piece of land, formerly covered by unsightly buildings, and having an area of 355 square yards, was given up by the committee of the improvement scheme, while the authorities of the General Hospital gave up a slightly larger portion opposite, at the corner of Steelhouse Lane and Loveday Street. The result is that Steelhouse Lane at this point, instead of being something like a gullet, is now a wide street debouching into a spacious junction at the corner of

Lancaster Street and Corporation Street. Instead of the tramway lines running close to the footpath, a wide stretch of roadway intervenes between them and the nearest line of buildings. The condemned buildings have been cleared away, and the angle made by Corporation Street and Steelhouse Lane has been rounded off and provided with a wide footway. The out-patient department of the hospital is seen in direct view from Corporation Street, and to an advantage that could never have been realised without this improvement. From the actual corner the ornate gateway, with the picturesque pile of buildings rising behind, may be seen, while from the new portion of the roadway may be obtained an oblique view of the whole frontage, with glimpses of the lower parts of the main buildings and of the statuary and other ornamental features of the courtyard. The portion of Steelhouse Lane in front of the hospital and the open square at the junction is being laid with wood blocks. The street traffic, including that to and from the hospital, will be greatly facilitated by the alteration, while the advantage of bringing so fine a piece of architecture as the new hospital into something more like the prominence it deserves cannot be overrated. The only matters for regret are that the buildings still left standing at the corner are the opposite of ornamental, and that the clearance could not have been extended so as to bring into direct view from Corporation Street the whole of the hospital frontage.

**SANITARY IMPROVEMENT IN SCOTLAND.**

THE annual congress of the Sanitary Inspectors' Association of Scotland was held on the 18th inst. in the Town Hall, Aberdeen. There were about sixty inspectors present.

Mr. Kenneth Cameron, chief sanitary inspector, Aberdeen, the president for the ensuing year, delivered his inaugural address. He said that undoubtedly much of the opposition which was given to sanitary work in its earlier stages arose from the feeling that the rights of the individual were being invaded without authority and just cause. Much of this antagonism had, however, been overcome, and the great mass of the people, speaking generally, acknowledged that the work undertaken by the sanitary officer was really for the benefit both of the individual and the general community. The work and multifarious duties of the sanitary inspector, tending as they did towards the general good of the community, must be held to be an important agency among others that had within the past thirty years steadily made towards the

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amelioration of the condition of the people. What had been done in this way might be more clearly brought into view by looking at the decrease that has been made in the death-rate throughout Scotland. Of course he did not claim that sanitary work had been alone concerned in this direction, but he made bold to say that the work of the sanitary officer had been a factor in no small measure in obtaining these gratifying results. The death-rate in Scotland during the three decades from 1866 to 1895 inclusive has been as follows:—1866 to 1875, 22·3 deaths per 1,000; 1876 to 1885, 20·0 deaths per 1,000; 1886 to 1895, 19·0 deaths per 1,000. Thus between 1866 and 1895 the death-rate in Scotland has fallen from 22·3 deaths per 1,000 to 19 deaths per 1,000, or a reduction in the number of deaths per 1,000 of population of 3·3. The estimated population of Scotland at the present time was about 4,200,000, and thus the annual saving of life is not less than 13,860 persons. The reduction in the death-rate of the eight principal towns in Scotland during the same period was still more remarkable, as the following figures show:—From 1866 to 1875 the death-rate was 26·5 per 1,000; 1876 to 1885, 22·5; 1886 to 1895, 20·8. The decrease between 1866 and 1895 in the case of the towns was thus 5·7 per 1,000 of population. The estimated population in these eight towns at present was about 1,350,000, so that the saving of life in these centres of population was above 8,800 persons per annum. To have any share in effecting such great results was to raise the work of the sanitary inspector into a sphere of importance which many of them were sometimes inclined to overlook. While trusting that legislation would help them, as it had done in the past, the best guarantee we have for the future of their profession and for the measure of its usefulness was that of an enlightened and educated community, who would acknowledge more and more that the duties which the sanitary inspector sought to perform were not for the benefit of the individual only, but had as their highest aim the permanent good of the whole people.

Mr. Wm. Mackenzie, county sanitary inspector, Ross and Cromarty, gave interesting particulars as to the sanitary conditions existing in the Outer Hebrides, especially the state of matters as they exist in the Island of Lewis. The people at bottom were, he said, extremely conservative, living in a traditional past, and refusing to recognise that the times in which they lived were moving on, and looking upon everything modern with suspicion, and as an innovation to be abhorred. The Local Authority and County Council were both thoroughly

alive to the wretched state of matters, and were doing what they could to improve them, but they felt almost powerless, and he dreaded to think what the end might be unless special means were devised by Government, as in the case of the schools, or by way of a grant or loan, to enable people to erect suitable premises and otherwise improve their holdings. There was a hope at present that the Congested Districts Board about to be appointed might be given sufficient power to grapple with the circumstances. Mr. Mackenzie suggested that the Association might consider the advisability of petitioning Parliament with the view of having the condition of matters he had described improved.

At a later stage of the proceedings the following resolution was unanimously passed:—"That this conference of the Sanitary Inspectors' Association of Scotland, believing that the housing of the people in the Outer Hebrides and western islands is of the very worst description and detrimental to their health, respectfully bring the subject before the Secretary for Scotland in the hope that further investigation will lead to adequate assistance being provided by Government on their behalf, without which we believe their condition cannot be materially improved nor the problem solved."

### INDUSTRIAL DESIGN IN GERMANY.

GERMANY appears to have made very rapid progress in recent years in pattern-drawing and designing. France has long held the first place in these particular branches, but Germany's rapid strides of late years bid fair to make her, in the near future, a most formidable rival of France in designing and pattern-drawing for textile fabrics. The United States Consul at Glauchau says, in his last report, that thirty years ago designers or pattern-sketchers were almost unknown in the German Empire. Since then, branching out from the German technical schools, pattern-drawing has been pursued with most satisfactory results to the present day. Of late years the rush of young men to this branch of art designing and pattern-drawing as a profession has extraordinarily increased. In the Royal Industrial Art School at Plauen in Vogtland, which city is the centre of the embroidery and curtain industry, about 200 young apprentices in designing annually finish their course. There are other large schools established in various parts of Germany, the principal ones being situated at Dresden, Berlin



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#### STREET IMPROVEMENTS IN LEEDS.

AN inquiry was held in Leeds by Colonel Hasted, R.E., inspector of the Local Government Board, relating to the application of the Leeds Corporation for permission to borrow 62,300*l.* for the purpose of carrying out street improvements in the city.

The town clerk, Mr. Harrison, said that according to the last published statement of the finances of the borough the

assets were 6,177,077*l.*, which amount included valuable properties, such as the tramways, the waterworks and the gas undertaking. The estimated debts were 4,568,093*l.* Since these figures were published the Corporation had floated a loan for 500,000*l.*, which bore interest at the rate of 2½ per cent. The money was forthcoming without any difficulty, and had not yet been used. It was not included in the figures previously mentioned. The general district rate of the city for the current year was 5*s.* 10*d.* in the pound, and of this amount 9*d.* was for highway purposes. The application of the Corporation now was that the repayment of the loan of 62,300*l.* should extend over a period of thirty years. The works at present contemplated included the repairing of a large number of streets with granite and concrete. This work had been rendered necessary in many cases by the installation of the electric tramway system, and also by the wretched state of the tramways when taken over by the Corporation. A large number of other streets were also included in the works projected; indeed, Leeds was to a large extent being repaved. Since the scheme was adopted an alteration had been made by the decision of the committee to lay down, at a somewhat increased expenditure, wood paving in Park Row, instead of granite. In 1884 permanent public works were undertaken on loan, the principle being followed that the cost of the works which benefited a future generation should be spread over as long a period as was possible. That was the proposal also at present. The Corporation had power to make the highways rate as high as 2*s.* 6*d.*, and as it stood only at 9*d.*, he thought they were well within the limit in the present application. The mileage of highways in 1884 was 266 miles, and at the present time it was 320, so that in the thirteen years the Corporation had had an increase of public highways repairable by the public of 54 miles. He thought the fairness would be admitted of the proposal to spread the cost of these works over a considerable period, seeing that the works would be of great public benefit for many years to come. It was many years since Leeds Corporation made any similar application with reference to paving works, and many of the streets required repair through age. In many cases, where the tramways had been relaid, the roadway on either side was at present on a lower level than the rails, and it was absolutely necessary that such a state of affairs should be remedied. This applied to seven miles of streets, or fourteen miles of tramway track. Of course, the repairing and maintenance of the tramway track, and also a width of 18 inches on either side outside

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the rails, would be provided for by the tramways committee of the Corporation out of tramway revenue. He put in the plans of the projected works.

The inspector afterwards, in company with the city officials, drove over a part of the streets proposed to be repaired.

### THE ELECTRIC LIGHTING OF PORTOBELLO, EDINBURGH.

THE following report by Professor Kennedy, consulting electrical engineer for Edinburgh, on the subject of a supply of electric current to Portobello, has been prepared for the Corporation:—I have now been able to examine very carefully into the question of the supply of electric light to Portobello, which has been referred to me. In working out this matter I have found it to be so much mixed up with the question of a second station in Edinburgh—which no doubt, at some not very far distant time, the Corporation will have to consider—that I have found it impossible to consider it entirely by itself. Although, therefore, I have not been formally asked to make any report on the latter point, I have found it necessary to discuss it somewhat in the following remarks as to the question of supplying Portobello. I visited Portobello in order to form some estimate of the amount of electric light which it might require, or, at any rate, which might probably be asked for within its limits, in order to see what the cost of supplying any such amount of light would be to the Corporation, and how far the expenditure would be remunerative. I have come to the conclusion that it would be safe for you to assume that in the course of, at any rate, a couple of years, there will be a demand for at least the equivalent of 4,000 eight candle-power lamps in Portobello. I understand that the owners, or lessees of the pier have stated that they would become consumers, but I have had no figures as to what demand they would make.

I do not know to what extent the question of street lighting in Portobello is to be considered, but if, besides this private lighting, the line from the station to the sea were lit with arc lamps, the Promenade itself and the High Street, the lamps being placed about 70 yards apart, there would be required about 36 arc lamps in all. From whatever point in Edinburgh the current is to be supplied there is no doubt that it would have to be supplied at high pressure, for otherwise the cost of mains would be disproportionately great. Portobello would

therefore be supplied from some station in exactly the same way as the northern and southern suburbs of Edinburgh, are now supplied from Dewar Place, and by exactly similar machinery. The fact that Portobello is three or four miles away instead of being only a mile and a half practically does not make any electrical difference in the case, although it somewhat increases the proportional cost of mains. Considering only current for private lighting in the first instance, I find that the total cost of supplying and laying the necessary high-tension cables as feeders, low-tension distributing mains, with all road work, transformers and transformer sub-stations, as well as meters and connections for, say, fifty consumers, will be about 7,500*l*. This does not include any machinery of any sort, as it is certain that the supply to Portobello would have to be simply a portion of the general work of the station it was supplied from—no special machines would have to be put down in the station for the purpose of supplying Portobello and doing nothing else. The 4,000 lamps wired may each be taken as using 15 units per annum, making a total of 60,000 units sold per annum. Of course this is estimating at a very much lower figure than in Edinburgh, where, largely on account of the public lamps, each lamp used in 1896-97 as much as 26.6 units per annum. But it would not be safe to take nearly so high a figure for Portobello.

The cost of supplying this amount of electrical energy may be estimated as follows:—

	Per unit sold.
Generating expenses per unit sold, say	1.0 pence
Capital charges:—5 per cent. for interest and sinking fund on an amount of 7,500 <i>l</i> . is equivalent to	1.5 „
Maintenance and attendance in connection with the mains may be estimated at 37.5 <i>l</i> . per annum, which is also equal to	1.5 „
The value of the plant used in the station for supplying Portobello would be about 2,000 <i>l</i> ., and an allowance of 5 per cent. for interest and sinking fund on this capital would amount to	0.4 „
The total cost per unit sold in Portobello, including all capital charges, would thus be about	4.4 „

I do not think you could sell this current, delivered at so great a distance and on so small a scale, for the same price which you are charging in Edinburgh itself unless you were to sell it at a loss. But if you were to charge the current at 5*d*. per unit there is no doubt that it would contribute some share to the profitable working of the station. At 4.5*d*. per unit it

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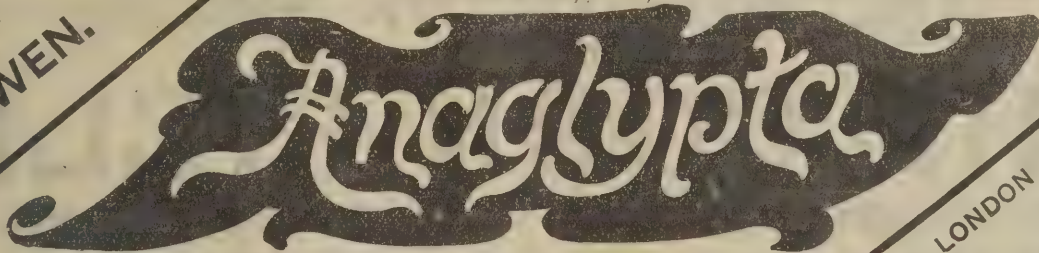
would practically be sold at cost price, which I imagine you would hardly be willing to do until experiments had shown you what the cost price actually was. The cost of the thirty-six arc lamps, with all the necessary leads, and with proportion of cost of rectifiers, assuming the leads to be arranged in two circuits, would be about 4,000/. But the same leads would be sufficient to supply from twenty to twenty-five additional lamps along the road if they should be required. The cost of supplying these lamps with current would be the same as in the case of other lamps so far as generating expenses were concerned, but somewhat greater in capital charges because of the very much greater length of leads in proportion to the number of lamps. It is difficult to say in such a case exactly what the cost would be, but it would certainly not exceed 20% per lamp per annum—possibly this might be reduced to 18%. A question which I have had, of course, to consider very carefully has been whether the current for these lamps, and for the lighting of Portobello generally, should be supplied from your present station in Dewar Place, or from some new station which in the course of time you will undoubtedly have to erect. After going very carefully into the matter, I have come definitely to the conclusion, keeping specially in view the fact that by this autumn your Dewar Place station will be changed over to double voltage, that it is very desirable to keep all the high tension work in one station, and to place in the future station solely continuous current plant. The use of the double voltage will enable you easily to supply continuous current in suitable places for distances of a mile and a half, or even two miles from the station. Although there will be in your extensions a considerable increase of the supply by alternating current, yet, at the same time, it will gradually be possible to change over the distributing mains now used for alternating current in the parts of the city nearer the station, to the continuous current system, leaving the alternating current always for the furthest out districts. I do not think, therefore, that the demand for alternating current will ever be greater in Edinburgh than you can quite easily supply from plant in a portion of your Dewar Place station, where it has been arranged to be placed, and where, in fact, similar plant now stands. It will, of course, be necessary, in reference to this question, to consider where a second station can best be placed when one has to be erected. No doubt some site can be found in the north or north-east of the city which would be considerably nearer to Portobello than Dewar Place is, and from which therefore the actual outlay in mains would be considerably less than if the supply

were from Dewar Place. But the additional cost of spare high-tension plant, which would otherwise have to be put down at any new station, of starting a new high-tension switchboard, new rectifier board and connections, &c., very considerably more than counterbalances this saving in cost, so that on the whole, assuming as necessary that Portobello has to be supplied by high-tension current, it will be cheaper to do it from Dewar Place than from any new station, unless it were necessary to have high-tension machinery at the latter in any event, which I have already stated is not, in my opinion, the case. The estimates which I have given above, therefore, are based on the assumption that the current for Portobello is supplied from your present station.

In connection with this question of a second station I think it may be interesting to you that I should lay before you some figures arrived at in connection with my working out of this matter. I find that the Dewar Place station will be sufficient to contain plant and the necessary reserves for about 180,000 lamps of eight candle-power wired, besides the arc lamps. At your present rate of progress you may reach this number in about eighteen months from now. Although, therefore, there is no need for immediate hurry in arriving at any decision as to your future course, yet it would be as well that the committee should bear in mind that before very long it will be necessary to decide on what steps are to be taken in order to meet the increase of demand. I have no doubt myself that it would be well to put down a second station. (In Glasgow, I understand, the Corporation have under consideration the question of erecting two more stations, one in the north and one in the south.) Any such second station should be situated symmetrically with the first so far as possible (*i.e.* in the north or north-east), and it must be placed upon a line of railway, so that the coal may be easily and cheaply obtained. The second station, wherever it was built, would work always in parallel with the first, the mains from the two being absolutely connected, but capable of being easily separated for purposes of testing, &c. In this way, in the case of a breakdown at either station, the other could always help it to a certain extent. For reasons, however, which I have already mentioned above I think it is unnecessary, and if unnecessary it is certainly undesirable, that the second station should have any high-tension plant in it. It would be solely a continuous current station worked at 460 volts, the whole of the high-tension plant being concentrated at Dewar Place, and distributed from there by the high-tension switchboard.

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**THE MARBLE TRADE.**

It was once said by a keen observer of men, says a writer in the *Stonemason*, that the marble trade must be a peculiarly depressing business, for he had never yet come across a man with a happy face engaged in it. We are inclined to doubt this sweeping assertion, but certainly the troubles and trials in connection with this particular business are greater than those which fall to the lot of most mortals.

To begin with, the nature of the material in which he trades is a source of perpetual anxiety to the dealer. He never knows what a block will turn out until it is opened, and with regard to the white marbles especially, their clear texture shows every mark which nature has set upon them, and this creates a position full of many difficulties. There are some people who never will understand that it is nature and not the quarryman who is responsible for the marking of marble, and nature is a somewhat capricious manufacturer. She abhors sameness, and infinite variety always accompanies her handiwork. The manufacturer of a piece of cloth can be sure that one yard of the material will be the same in texture, in weight and in colour to that of other yards on the same roll, but the quarry owner and the marble merchant are not in this happy position.

"Pure statuary," for instance, is frequently inquired for, and by it is sometimes meant statuary of a pure white without marking of any sort. Probably a block of marble which would answer such a description is not in existence and never has been. Absolutely pure carbonate of lime may be obtained by a chemist in the form of a beautiful white powder, but it cannot be obtained direct from nature's own laboratory. The lime is always found mixed more or less with other ingredients, and these form the marks and veins which, if man could be the manufacturer instead of nature, might possibly be eliminated. Then there is the purchaser who asks for bastard statuary without mark. These are none so few as some may think. They belong to two classes. One, those who are altogether ignorant of the trade and terms used in connection with it, and the other those who, knowing the trade and its terms, say one thing and mean another. What these last really mean is first quality statuary at second quality price, or, in other words, a shilling for a threepenny bit.

The careful selection of Sicilian used for monumental purposes cannot be too much insisted upon, but here texture and weather-resisting properties are of infinitely more importance than mere colour or marking. Especially in this climate marble will rapidly disintegrate unless it be of a fine close

texture, even grain, and its chemical composition is such as will insure its preservation against the assaults of our rigorous climate. Here again the difficulties of the quarryman and merchant are considerable. Pure carbonate of lime is rapidly disintegrated by the weather, especially near towns where there is frequently more or less of sulphuric acid in the atmosphere; a good weather stone cannot therefore be white, for the whiter a marble is the more pure is the carbonate of lime of which it is composed. But the colour of the chemical constituents which will preserve the carbonate of lime against the weather is the very thing which is frequently objected to by those who fail to recognise that a weather-resisting stone for memorial purposes is of the first importance, and that all marble bleaches by exposure.

With coloured marbles the difficulty is of another kind. In this case the freaks of nature in points of marking are little objected to, but another demand is made, which the quarry owner is unable to supply. In specifications we frequently read that coloured marble is asked for perfectly sound and free from defects of any sort. There is very little coloured marble in existence which will answer such a description. It is not too much to say that all coloured marble is more or less defective from the point of view of those who style anything but a perfectly homogeneous material a defective one. Indeed, this must be so when we consider the nature of the case. Coloured marbles are formed either by the cementing together of various fragments of different coloured limestones under great pressure, thus forming what is known as brecciated marbles, or by the injection of variously coloured foreign matters into cracks formed in limestone rock. In either case some portions of the material must be less sound than others. The very beauty of the markings and veinings is caused by this fact. A perfectly homogeneous stone may be sound, but it cannot be found with a texture diversified with variously coloured veins and markings.

**DUTY ON BUILDING MATERIALS IN CANADA.**

By the new Canadian tariff, which took effect on April 23, says the *Canadian Architect*, several changes are made in the import duties on building and construction materials; but taken as a whole they are of a moderate character, and are not likely to seriously affect many industries. A feature of the new tariff is the double schedule, framed with the object of giving Great Britain a preference in our markets and of compelling other

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countries to adopt reciprocal tariffs. This double schedule provides for reducing the import duty whenever any country gives certain concessions to the products of Canada.

Below are shown some of the changes affecting the building trade:—

Portland or Roman cement, from 40 cents per barrel to 12½ cents. per 100 lbs.

Fire brick, from free to 20 per cent. duty.

Copper wire, from 15 to 20 per cent.

Builders' hardware, from 32½ to 30 per cent.

Cotton, linen or rubber fire hose, from 32 to 35 per cent.

Sawn or dressed flagstones, from 30 to 25 per cent.

Floor earthenware tiles, from 35 to 30 per cent.

Glass, ornamented and coloured, painted and vitrified, and rough plate-glass, from 25 to 30 per cent.

Plate-glass, not coloured, in panes not over 12 feet, from 4 cents per square foot to 30 per cent.; over 12 feet and not over 30 feet from 6 cents per square foot to 30 per cent.; over 30 and under 70 square feet from 8 cents per square foot to 30 per cent.; over 70 square feet from 9 cents per square foot to 50 per cent. When bevelled the duty on all sizes is placed at 35 per cent.

Iron hydrants, valves and watergates from 27½ to 25 per cent.

Indiarubber hose from 32½ to 35 per cent.

Rolled iron or steel angles, channels and special sections, weighing less than 35 lbs. per lineal yard, from 35 per cent., but not less than 10 dols. per ton to 7 dols. per ton.

Rolled iron and steel angles, channels and special castings weighing less than 35 lbs. per lineal yard, rolled iron or steel beams, joists, girders, column sections and other building or bridge structural sections not less than 25 lbs. per lineal yard, and rolled iron or steel bridge-plate not less than ⅜ inch thick nor less than 15 inches wide from 12½ to 15 per cent.

Bar-iron, rolled or hammered, squares and bars and shapes of rolled iron or steel, not more than 4 inches in diameter, and flats not thinner than No. 16 gauge, n.e.s., from 10 dols. to 7 dols. per ton.

Iron and structural iron bridges from 30 per cent., but not less than 1 cent per lb. to 30 per cent.

Bridge plate, not less than ⅜ of an inch thick nor less than 15 inches wide, from 12½ to 15 per cent.

Wrought-iron pipe, from 30 per cent. and ½ cent per lb. to 35 per cent.

Cast or wrought-iron, hollow-ware, from 27½ to 30 per cent.

Iron or steel plates or sheets, sheared or unsheared, and

skelp iron or steel, sheared or rolled in grooves, and of all widths thicker than No. 17 gauge, n.e.s., from 10 dols. to 7 dols. per ton.

Iron or steel ingots, coggled ingots, billets and puddled bars, loops and other forms less finished than iron or steel bars, but more advanced than pig-iron, except castings, from 5 dols. to 4 dols. per ton.

Cut nails and spikes of iron and steel, from ¾ cent per lb. to 30 per cent.

Pig-iron, iron kentlege and scrap-iron, from 4 dols. to 2 dols. 50 cents per ton.

Cast-iron pipes, from 10 dols. per ton, but not less than 35 per cent. to 8 dols. per ton.

Manufactures of steel and iron, or parts of iron and steel, from 27½ to 30 per cent.

Lead pipe, from 4 dols. 10 cents lb. and 25 per cent. to 35 per cent.

Manufactures of marble, from 30 to 35 per cent.

Plaster of Paris, calcined or manufactured, from 40 cents per barrel of 300 lbs. to 12½ cents per 100 lbs.

Steam pumps, from 30 to 25 per cent.

Granite, flagstones and freestones, dressed, and all other building stone dressed, except marble, and n.e.s., from 30 to 25 per cent.

Lincrusta Walton wall decorations, from 1½ cents per roll of 8 yards and 25 per cent. to 35 per cent.

Wire cloth of brass or copper, from 20 to 30 per cent.

Iron or steel wire, n.e.s., from 25 to 20 per cent.

In view of the above changes, we give some figures, compiled from the trade and navigation returns of the Dominion, showing the import of several lines of building materials from the different countries, together with value thereof:—

Cement, hydraulic or water lime, from Great Britain, 2,810 barrels; Belgium, 310; United States, 2,680; value, 8,727 dols. Portland or Roman, Great Britain, 93,307 barrels; Belgium, 79,674; France, 11,112; Germany, 12,814; United States, 8,279. Value, 240,388 dols.

Plate glass, Great Britain, 262,562 square feet; Belgium, 155,675; France, 87,855; Germany, 32,265; United States, 1,226; Austria, 7,798. Total value, 149,409 dols.

Lime, Great Britain, 10 barrels; United States, 10,229. Value, 7,331 dols.

Roofing slate, United States, 2,421 squares. Value, 8,274 dols.

Granite, flagstone, rough freestone and other building stone, rough, Great Britain, 854 tons; United States, 13,904. Value,

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Cast-iron pipe, from Great Britain and the United States, 43,778 cwt. Value, 47,415 dols.

Bar iron, 67,546 cwt. Value, 121,096 dols.

Fittings of wrought-iron or steel pipe, Great Britain, 33,126 lbs.; Germany, 5,839; United States, 1,304,376 lbs. Value, 68,951 dols.

Iron bridges and structural ironwork, Great Britain, 77,785 lbs.; United States, 1,121,188 lbs. Value, 48,318 dols.

Pig-iron, Great Britain, 6,525 tons; United States, 31,680. Value, 406,916 dols.

Cut nails and spikes, Great Britain, 44,442 lbs.; United States, 710,726. Value, 15,932 dols. Other nails and spikes, wrought and pressed, Great Britain, 133,499 lbs.; United States, 441,322. Value, 20,262 dols. Wire nails, Great Britain, 27,024 lbs.; United States, 241,512. Value, 9,008 dols.

Steam pumps, Great Britain, 10; United States, 203. Value, 39,237 dols.

Rolled iron or steel angles, channels, beams, joists, girders and other bridge structural sections, Great Britain, 93,655 cwt.; Belgium, 5,195; Germany, 80,239; United States, 58,863; France, 212. Value, 270,261 dols.

The arrangement of the duties on cement is rather in favour of Canadian manufacturers, but not to the extent that is generally believed. Under the former tariff the duty was 40 cents per barrel of 375 lbs. The standard barrel of Belgium cement is 350 lbs., therefore the duty under the present tariff of 12½ cents per 100 lbs. would be 43½ cents per barrel, or an increase of 3½ cents. The standard English barrel is 375 lbs., which would make the present duty 47½ cents less a discount of one-eighth under the preferential clause, leaving the duty to be paid on English cement this year at about 41½ cents. But after January 1, 1898, a further reduction of one-eighth is to be given to Great Britain, in which case English cement may be imported under a duty of slightly over 36 cents per barrel, or 4 cents less than the former duty. It would appear from the above that the increased duty required to be paid on importations from other foreign countries may result in the use of greater quantities of cement of English and Canadian manufacture.

The present tariff does not entirely meet the views of Canadian bridge manufacturers. The duty on imported bridges is slightly reduced, while an increase of 2½ per cent. is made on bridge plate, which constitutes the chief imported raw material

of the manufacturers. This increase, however, is not sufficient to seriously affect the Canadian firms.

Manufacturers of heating apparatus view the new regulations favourably. The manufactured goods are now protected from foreign competition by a duty of 30 per cent., an increase of 2½ per cent., while pig-iron, scrap-iron, iron pipe and such materials, which constitute the bulk of the raw material used in the construction of furnaces and radiators, are admitted more liberally than heretofore. Pig-iron, formerly subject to a duty of 4 dols. per ton, is now imported for 2.50 dols., and wrought-iron pipe at 35 per cent., whereas the old tariff on iron pipe was 30 per cent. and ½ cent per lb., which was equal to an additional 30 per cent., making the rate fully 60 per cent. As an offset to the above reduction, the government have increased the bounty to be paid to Canadian manufacturers of iron and steel.

### PATENTS.

[This List of Patents is compiled specially for this Journal by Mr. G. H. Rayner, of the firm of Rayner & Co., Consulting Patent Agents, 37 Chancery Lane, London, W.C., from whom all particulars and information relating to Patents may be had gratuitously.]

#### APPLICATIONS FOR PATENTS.

13951. John Craw, jun., for "Improvements in door knobs."  
13969. James Somerville, for "Improvements in show-table with adjustable leaves."

13982. John Tingley, for "Improvements in bricks."

14001. William Kelby Lee, for "Improvements in the construction of fastenings for windows."

14048. Henry William Friend, for "Pulley stile sash-retainer."

14054. Peter Liebig, for "Improved flushing apparatus and for water-closets."

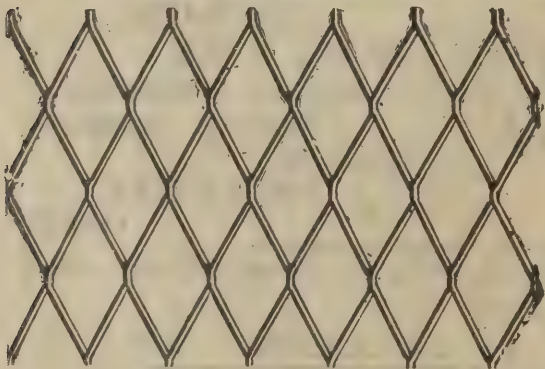
14064. Theophil Krah, for "Slaps for covering walls."

14068. Joseph Alfred Fisher, for "Improved fireproof ceilings and partitions."

14121. Alexandre Thomas Williams, for "A simple window fastener."

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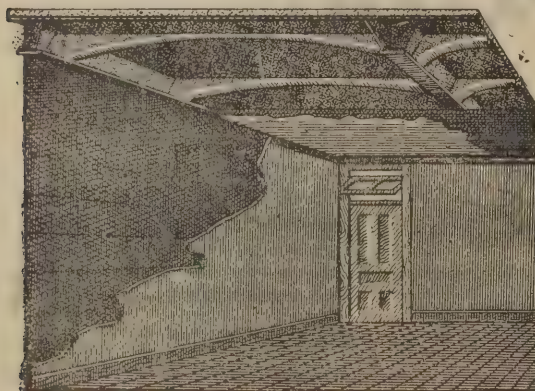
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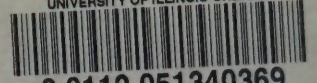








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